

# Stormwater Management Program (SWMP) Plan

Town of Andover, Massachusetts

June 30, 2019

Updated December 23, 2022

## Prepared For:

**Town of Andover**  
36 Bartlet Street  
Andover, MA 01810



## Prepared By:

**Comprehensive Environmental Inc.**  
41 Main Street  
Bolton, MA 01740



# Stormwater Management Program (SWMP) Plan

## Town of Andover, Massachusetts

### Prepared For:

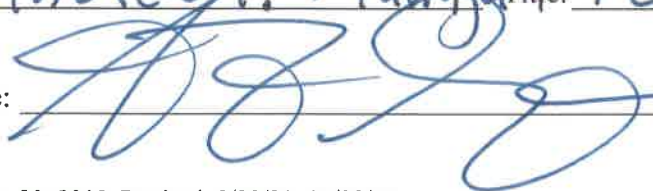
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### Stormwater Management Program (SWMP) Plan Certification

“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 gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

Name: Andrew P. Flanagan Title: Town Manager  
Signature:  Date: 1/3/23

### Stormwater Management Program (SWMP) Plan Revision Log

Revision Date	Section Revised	Revisions Made	Revisions Made by
September 29, 2021	<ol style="list-style-type: none"> <li>1. Section 1.4</li> <li>2. Section 2</li> <li>3. Section 7</li> <li>4. Section 8.3</li> <li>5. Section 9</li> <li>6. Table 11-1</li> <li>7. Appendices</li> </ol>	<ol style="list-style-type: none"> <li>1. Section 1.4: Added reference that SWPPP and Salt Reduction Plan are prepared as separate documents.</li> <li>2. Section 2: Updated impaired and TMDL waters and Table 2-1. Added Section 2.4 Measures to Protect Surface Drinking Water Supplies and Figure 2-4. Renumbered subsequent sections.</li> <li>3. Section 7: Updated Table 7-1 with progress updates.</li> <li>4. Section 8.3: Updated Table 8-1 with progress updates. Removed reference to Appendix F SWPPP Facilities. Added reference that SWPPPs are prepared and maintained as separate standalone documents. Renumbered remaining appendices.</li> <li>5. Section 9: Updated text and Table 9-1 and 9-2 with TMDL/impaired water changes. Added reference to Appendix I (TMDL Progress).</li> <li>6. Table 11-1: Updated schedule for implementing regulatory changes (BMP 5-1 &amp; 5-5). Updated BMP 7-5 to extend schedule for identifying retrofits.</li> <li>7. Appendix B: Updated impaired waters table and map (changes highlighted in table).  Appendix C: Updated stormwater map (changes include the correction of outfalls based on dry weather screening and the assignment of ownership to catch basins).  Appendix D: Added updated regulations.  Appendix E: Added inventory and map of Town-owned property.  Appendix H: Added BMP inspection results from Year 3.  Appendix I: Added Phosphorus Source Identification Report Progress Memo. Added Chloride Requirements Progress Memo.  Appendix J: Added 2019, 2020, and 2021 Annual Reports.</li> </ol>	Allison Huffman, CEI

<b>Revision Date</b>	<b>Section Revised</b>	<b>Revisions Made</b>	<b>Revisions Made by</b>
December 23, 2022	<ol style="list-style-type: none"> <li>1. Section 1.4 and 9.1.2</li> <li>2. Section 2</li> <li>3. Section 2.3 and 9</li> <li>4. Section 11</li> <li>5. Appendices</li> </ol>	<ol style="list-style-type: none"> <li>1. Section 1.4 and 9.1.2: Added reference that Phosphorus Source Identification Plan is prepared as a separate document.</li> <li>2. Section 2: Updated Town population information and Figures 2-2 and 2-3.</li> <li>3. Section 2.3 and 9: Updated impaired waterbodies in text, tables and figures. Removed reference to Appendix B Impaired Waterbodies and renumbered remaining appendices.</li> <li>4. Section 11: Added BMP status to Table 11-1.</li> <li>5. Appendix C: Added LID and Green Infrastructure regulatory review. Appendix D: Added municipal property BMP retrofit evaluation. Appendix H: Updated PCP progress memo.</li> <li>6. Appendix I: Added 2022 Annual Report.</li> </ol>	

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# 1 Introduction

Andover 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 (MS4s) in Massachusetts, which was signed on April 4, 2016, with an effective date of July 1, 2018. A modified permit was signed on December 7, 2020, with an effective date of January 6, 2021. Hereinafter, the permit is referred to as the 2016 MS4 Permit.

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

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## 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 USEPA'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 MS4s in urbanized areas, through the use of National Pollutant Discharge Elimination System (NPDES) permits, to implement programs and practices to control polluted stormwater runoff. Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of stormwater discharges that have the greatest likelihood of causing continued environmental degradation. Under the Phase II rule all MS4s with stormwater discharges from Census designated Urbanized Areas (UAs) 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 2016 MS4 Permit.

The 2016 MS4 Permit was signed on April 4, 2016 with an effective date of July 1, 2018. A modified permit was signed on December 7, 2020, with an effective date of January 6, 2021. The permit was cosigned by the Massachusetts Department of Environmental Protection (MassDEP) and thus is jointly regulated by EPA and MassDEP.

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## 1.2 MS4 Program Requirements

The permit requires each regulated community to submit a Notice of Intent (NOI) briefly outlining how it will meet the Six Minimum Control Measures (MCMs) and impaired waters requirements of the permit and requesting authorization to discharge under the new permit.

The six MCMs 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.

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.

As required by the 2016 MS4 Permit, the Town of Andover submitted a NOI and required accompanying information, including endangered species, historic preservation, and an outfall map to EPA Region 1 by the September 29, 2018 deadline (**Appendix A**) requesting authorization to discharge under the new permit. Andover received official authorization to discharge stormwater from its MS4 on June 4, 2019 as per the letter from USEPA provided in **Appendix A**. Authorization to discharge expires on June 30, 2022, however, the 2016 Permit is administratively continued and remains in force and effect until a new permit is reissued.

This Stormwater Management Program (SWMP) Plan has been developed by the Town of Andover to detail the activities and measures outlined in the NOI to address the requirements of the 2016 MS4 Permit. This SWMP Plan documents BMPs, 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 will be updated and/or modified as required during the permit term as the Town’s activities are modified, changed or updated to meet permit conditions. The plan has been organized to allow these updates to primarily occur within the appendices.

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### 1.3 Regulated Area

Requirements of the 2016 MS4 Permit are limited to a regulated area, defined as the Town’s Urbanized Area (UA) 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 MS4 permit regulates UA areas based on both the 2000 and 2010 Census (**Appendix A**). Thus, areas that are identified as non-urbanized under the 2010 Census but urbanized under the 2000 Census are still regulated areas. In short, the regulated UA cannot shrink and can only expand. The UA is subject to change every ten years based on the application of the Census definition, thus a larger area may be covered in the future

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## 1.4 How to Use this Plan

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

1. SWMP Plan (this document);
2. Illicit Discharge Detection and Elimination (IDDE) Plan;
3. Operation and Maintenance (O&M) Plan;
4. Stormwater Pollution Prevention Plan (SWPPP) for the Andover Department of Public Works (DPW) Facility;
5. Salt Reduction Plan; and
6. . Phosphorus Source Identification Report for the Merrimack River.

The IDDE Plan, O&M Plan, SWPPP, Salt Reduction Plan, and Phosphorus Source Identification Report are prepared as separate standalone documents to this SWMP Plan. 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 to the storm drain system. Section 5 discusses activities to comply with this measure. A separate standalone IDDE Plan has also been prepared.
- 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 one 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 one 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 infrastructure operations and those at specific facilities and make improvements where needed to minimize pollution to stormwater runoff. Operations and maintenance procedures must be documented in writing. Section 8 discusses activities to comply with this measure. A separate standalone O&M Plan and standalone SWPPP for the DPW Facility have also been prepared.

**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. A separate Salt Reduction Plan has also been prepared.

**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 proposed BMPs outlined in Sections 3 through 9 in a concise format for easy reference.

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## 1.5 Program Responsibilities

This plan is intended to be used by Town of Andover staff whose job involves administering the MS4 permit and associated requirements. The Town’s MS4 program will be headed by the following personnel (**Table 1-1**):

**Table 1-1. MS4 Responsible Personnel**

Name	Title, Department	Contact
Mr. Arthur Martineau	Acting Town Engineer Engineering Division, DPW	(978) 623-8772 <a href="mailto:amartineau@andoverma.gov">amartineau@andoverma.gov</a>

The Town of Andover has 14 departments responsible for implementing portions of its MS4 program as identified in the NOI. **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 within each department listed below. The names of the responsible personnel are not provided so as to avoid the plan frequently becoming out of date due to changes in personnel and positions.

**Table 1-2. Program Responsibilities**

<b>Department / Division</b>	<b>General Responsibilities</b>
Board of Health	Information distribution for public education, IDDE program creation and implementation; ordinance and regulation development; illegal dumping program; TMDL requirements; water quality limited waterbody requirements
Board of Selectmen	Ordinance and regulation development
Conservation Commission	Public participation; site plan review procedures; site inspections and procedures; ordinance and regulation development; site inspections and procedures; as-built submittal
DPW, Engineering	Information distribution for public education, public participation; system mapping; illegal dumping program; site plan review procedures; site inspections and procedures; ordinance and regulation development; public complaint hotline; as-built submittal; target properties to reduce impervious area; develop O&M procedures; SWPPP development and implementation; TMDL requirements; water quality limited waterbody requirements
DPW, Highway	Employee training, develop O&M procedures; catch basin cleaning; street sweeping; road salt optimization program; BMP inspections and maintenance; vehicle washing program
DPW, Water and Sewer	Information distribution for public education, Sanitary Sewer Overflow (SSO) inventory
Fire Department	Vehicle washing program
Information Technology	Public participation
Pesticide Reduction Task Force	Public participation
Planning Board	Ordinance and regulation development; site plan review procedures; site inspections and procedures; public complaint hotline; as-built submittal; target properties to reduce impervious area
Plant and Facilities	Target properties to reduce impervious area; develop O&M procedures; inventory buildings and facilities; SWPPP development and implementation; water quality limited waterbody requirements
Police Department	Vehicle washing program
Schools	Information distribution for public education
Water Department	Public participation; IDDE program creation and implementation

## 2 Town Characteristics

This section provides some background information useful in understanding the Town of Andover's characteristics and resources to develop a tailored Stormwater Management Plan.

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### 2.1 Community Information

Andover is located in eastern Massachusetts within Essex County, approximately 24 miles north of Boston. It is bordered by Methuen and Lawrence, Massachusetts to the north; North Andover, Massachusetts to the east; North Reading and Wilmington, Massachusetts to the south; Tewksbury, Massachusetts to the West; and Dracut, Massachusetts to the northwest. The major interstates of I-495 and I-93 run through the community. Andover is located within the Merrimack River watershed. Select relevant community profile information is provided below:

- Total Area = 32.1 square miles (*source: Wikipedia*)
- 2020 Population = 36,569 (*source: Massachusetts Census Data*)

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### 2.2 Land Use

Based on the land uses within the Town, as shown in **Figure 2-1**, the Town is developed with a mix of residential, commercial and industrial uses, with a significant portion of forested and wetland lands. The education program will target each of these audiences, as well as developers. Impervious areas are shown on **Figure 2-2**.

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### 2.3 303(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 waters with an approved TMDL as of the issuance date of the permit (April 4, 2016) and to address water quality limited waters, including but not limited to waters listed in categories 5 or 4a on the Massachusetts Integrated Report of waters listed pursuant to Clean Water Act section 303(d) and 305(b). **Table 2-1** lists the "impaired waters" for which Andover must meet MS4 permit requirements based on the Final 2018/2020 Massachusetts Integrated List of Waters produced by MassDEP every two years, along with changes to this list from the 2014 303(d) list that was in effect when the NOI was filed. These waterbodies are shown on **Figure 2-3**.

**Table 2-1. Impaired Waters Based on the 2018/2020 303(d) List<sup>1</sup>**

Water Body	Segment ID	Category <sup>2</sup>	Impairment	EPA Approved TMDL	Comments
Ballardvale Impoundment	MA83011	5	(Non-Native Aquatic Plants*)		
			Aquatic Plants (Macrophytes)		
			Mercury in Fish Tissue		
Brackett Pond	MA92004	5	Turbidity		
Collins Pond	MA92010	5	Algae		
			Turbidity		
Fish Brook	MA84A-40	5	Chloride		
			Escherichia coli		
Fosters Pond	MA83005	5	(Non-Native Aquatic Plants*)		
			Dissolved Oxygen		
			Mercury in Fish Tissue		
Frye Pond	MA92023	5	Algae		
Haggetts Pond	MA84022	5	Mercury in Fish Tissue		
Hussey Pond	MA83009	5	Algae		
Merrimack River	MA84A-03	5	(Fish Passage Barrier*)		Added in 2018/2020
			Escherichia coli		
			Mercury in Fish Tissue		
			PCB in Fish Tissue		
			Phosphorus (Total)		
Pomps Pond	MA83014	5	(Non-Native Aquatic Plants*)		
			Mercury in Fish Tissue		
Rabbit Pond	MA83015	5	Turbidity		
Rogers Brook	MA83-04	4a	(Physical substrate habitat alterations*)		
			Escherichia Coli	2587	Added in 2016
			Fecal Coliform	2587	
			Turbidity		Removed in 2016; Category changed from 5 to 4a
Salem Pond	MA92057	5	Turbidity		
Shawsheen River	MA83-18	5	Dissolved Oxygen		
			Escherichia Coli	2587	Added in 2016
			Fecal Coliform	2587	
			Mercury in Fish Tissue		Removed in 2016
Shawsheen River	MA83-19	4a	Dissolved Oxygen		Removed in 2016; Category changed from 5 to 4a
			Escherichia Coli	2587	Added in 2016
			Fecal Coliform	2587	

Water Body	Segment ID	Category <sup>2</sup>	Impairment	EPA Approved TMDL	Comments
Unnamed Tributary to Meadow Brook, known as "Pinnacle Brook"	MA83-15	5	(Dewatering*)		Added in 2016
			Chloride		
			Escherichia Coli	2587	Added in 2016
			Fecal Coliform	2587	
Unnamed Tributary to Shawsheen River	MA83-20	5	Chloride		

1. The information presented in this table is based on the *Final Massachusetts Integrated List of Waters for the Clean Water Act 2018/2020 Reporting Cycle, November 2021*.

2. Category 4a – TMDL is completed.

3. Category 5 – Waters requiring a TMDL. Waters that have an approved TMDL for some pollutants, but not others, remain in Category 5 until TMDLs are approved for all of the pollutants impairing those waters.

\*TMDL not required (Non-pollutant)

Green shading – Impairments removed since NOI.

Blue shading – Impairments added since NOI.

Requirements for TMDL or water quality limited waterbodies related to phosphorus, bacteria, chloride and turbidity are outlined further in **Section 9**. With the exception of monitoring during IDDE investigations, the remaining parameters are not directly covered or addressed by the 2016 MS4 Permit.

## 2.4 Measures to Protect Surface Drinking Water Supplies

Andover’s drinking water comes from Haggetts Pond and the surrounding 1,422 acres of watershed area. The pond is also supplemented with additional waters from Fish Brook and the Merrimack River. The Haggetts Pond and Fish Brook watersheds are shown on **Figure 2-4**. Andover has approximately 38 outfalls in the Haggetts Pond watershed and 85 in the Fish Brook watershed. Outfalls within the water supply watersheds are shown on **Figure 2-4**.

Andover maintains and implements a comprehensive Surface Water Supply Protection Plan, which was reviewed and approved by MassDEP and includes watershed monitoring, treatment plant operations, local road salting practices, emergency response planning and preparedness, educational programs and inter-community cooperation on water supply issues. The plan is reviewed and updated every five years.

Haggetts Pond is impaired for mercury in fish tissue. Fish Brook is impaired for chloride and E. coli and the Merrimack River is impaired for E. coli, mercury in fish tissue, PCB in fish tissue and total phosphorus. The presence of these impairments is factored into prioritization efforts for SWMP activities such as illicit discharge investigations and identification of opportunities for best management practice (BMP) retrofits, particularly where there are phosphorus impairments. The data collected during these efforts will also be used to evaluate opportunities and

appropriateness of implementing pretreatment and/or spill response measures to protect surface water supplies and their tributaries.

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## 2.5 Endangered Species Act Determination

To be eligible to discharge stormwater under the 2016 MS4 Permit, the Town of Andover 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 2018 as meeting “Criterion C” on the NOI with the results also documented in the NOI (**Appendix A**). The Northern Long-eared Bat (*Myotis septentrionalis*) was the only species identified as potentially being present within Andover’s regulated area. No critical habitats were identified.

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## 2.6 National Historic Preservation Act Determination

Regulated MS4s must also evaluate whether its discharges have the potential to affect historic properties. If there have been no relevant changes in existing discharges 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 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.

## 3 MCM 1: Public Education and Outreach

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### 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 four core target audiences, unless one 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 MSGP.

At least two educational messages must be distributed to each audience over the permit term spaced at least a year apart.

### 3.1.2 TMDL and Water Quality Limited Waterbody Requirements

Public education and outreach programs must also address impaired waterbodies which are shown in **Table 2-1**. As noted in **Table 2-1**, Andover has several waterbodies listed as impaired for bacteria, phosphorus and chloride. Each of these impairments have specific education topic requirements as outlined in the 2016 MS4 Permit, and summarized below, and will be included within the education program.

#### Bacteria TMDL and Water Quality Limited Waterbody Requirements (Residents)

- Annual message encouraging the proper management of pet waste, including noting any existing bylaws where appropriate;
- Disseminate educational materials to dog owners at the time of issuance or renewal of a dog license;
- 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.

#### Phosphorus Water Quality Limited Waterbody Requirements (Residents & Businesses)

- Spring (March/April): encourage proper use and disposal of grass clippings and use of slow-release and phosphorus-free fertilizers;
- Summer (June/July): encourage proper management of pet waste, including noting any existing ordinances; and
- Fall (August/September/October): encourage the proper disposal of leaf litter.

#### Chloride Water Quality Limited Waterbody Requirements (Businesses, Industrial, and Private Road Salt Applicators)

- Winter (November/December): annual message on the proper storage and application rates of winter deicing material and steps that can be taken to minimize salt use.

Due to the extent of impaired waters present throughout the Town, each message will be distributed community-wide, with the exception of the winter deicing message, which may be limited to businesses within a chloride impaired watershed.

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## 3.2 Past Public Education Program

In response to requirements under the 2003 permit, Andover has enacted a multifaceted approach to stormwater public education and outreach. The following summarizes the Town’s past public education activities:

- **Newspaper Articles** – the Town has published articles in the online news source *Andover Patch* that include information on stormwater pollution prevention.
- **Educational Flyer** – the Town has published stormwater management information in the annual *Recycling and Trash Collection Guide for Residents* available for download on the Town’s website and in hardcopy at various public buildings.
- **Pet Waste Flyer** – the Town has partnered with the Greenscapes North Shore Coalition to distribute a pet waste informational flyer on pet waste-related stormwater issues.
- **Stormwater Webpage** – the Town’s website has an established “Stormwater Management” section.

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## 3.3 Ongoing Public Education Program

**Tables 3-1** through **3-4** summarize Andover’s public education program by targeted audience, as assisted by Greenscapes North Shore Coalition, to meet the requirements of the 2016 MS4 Permit. Greenscapes North Shore Coalition provides its members, such as Andover, outreach and education to support municipal compliance with water-related regulatory requirements, including the MS4 Stormwater Permit. Measurable goals, responsible departments and a schedule for implementation of all BMPs under the SWMP are provided in **Section 11**.

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## 3.4 Measuring Public Education Program Effectiveness

During completion of the Town’s annual report as detailed further under **Section 10**, Andover will review the effectiveness of each message and the Town’s overall education program. Effectiveness is expected to vary by message, however will generally be measured based on quantities of materials distributed and feedback from town employees based on observations in their area of work. Educational messages and/or distribution techniques will be modified as needed, should program managers determine that they are ineffective.

**Table 3-1. Residential Public Outreach Program**

<b>BMP ID#</b>	<b>BMP Materials/Distribution</b>	<b>BMP Topic Description</b>
<b>1-1</b>	Brochures/Pamphlets	Distribute varying promotional materials, such as a “how-to-guide” on raingardens, literature on “greenscaping, septic system maintenance, and pet waste information.
	Displays, Posters, Kiosks	Create informational displays that include information on proper pet waste management, the importance of “greenscaping”, sewer and septic system maintenance, and ways to avoid illicit discharges.
	School Program	Host the Greenscapes “Keeping Water Clean” Program.
	Social Media	Send periodic social media “blast” within seasonal topic information.
	Story Map	Create a story map with information on LID.
	Presentation	Hold a presentation on the importance of clean water and water conservation.

**Table 3-2. Businesses, Institutions, & Commercial Public Outreach Program**

<b>BMP ID#</b>	<b>BMP Materials/Distribution</b>	<b>BMP Topic Description</b>
<b>1-2</b>	Presentation	Host a presentation with informational topics such as greenscaping, sand/salt storage, and landscape management.
	Presentation	Host a presentation with informational topics such as stormwater BMP use, and impervious surface reduction.

**Table 3-3. Developers Public Outreach Program**

<b>BMP ID#</b>	<b>BMP Materials/Distribution</b>	<b>BMP Topic Description</b>
<b>1-3</b>	Workshops and Literature	<ul style="list-style-type: none"> <li>• Year 1: discuss LID options for reducing runoff and promoting infiltration</li> <li>• Year 3: provide a follow-up session with greater detail.</li> </ul>
	Trade Show	Greenscapes representatives will attend a trade show to reach out to landscapers and developers on “greenscaping” topics.

**Table 3-4. Industrial Public Outreach Program**

<b>BMP ID#</b>	<b>BMP Materials/Distribution</b>	<b>BMP Topic Description</b>
1-4	Brochures	Provide general information on LIDs that assist with stormwater management and pollution prevention targeting environmental contacts or property managers at industrial facilities.
	Presentation	Host a presentation on “greenscaping” at an industrial level targeting environmental contacts or property managers at industrial facilities.

## 4 MCM 2: Public Participation and Involvement

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### 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 be made available so that the public has opportunities to review and comment.

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### 4.2 Past Public Participation and Involvement Opportunities

The following summarizes Andover's past public participation activities:

- **Pesticide Reduction Task Force** – the Town has established a Pesticide Reduction Task Force that developed a Pesticide Use Policy.
- **Stormwater Call Directory** – established a call directory for receiving information submitted by the public, and a database for tracking issues and follow-up actions.
- **Storm Drain Marking** – the Town has stenciled storm drains in the past.
- **Landscape Management Program** – in conjunction with the Greenscapes North Shore Coalition, the Town developed an informational program on landscape management called Greenscapes 101: Create a Healthier Landscape.
- **Partner with Watershed Organizations** – attend meetings with other nearby municipalities as part of the Merrimack Valley Stormwater Collaborative.

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### 4.3 Ongoing Public Participation and Involvement Opportunities

This written SWMP Plan and annual reports are 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 will be posted to the website as additional tasks are completed.

**Table 4-1** summarizes Andover's proposed Public Participation and Involvement Opportunities BMPs to meet the requirements of the 2016 MS4 Permit. Measurable goals, responsible departments and a schedule for implementation of all BMPs under the SWMP are provided in **Section 11**.

**Table 4-1. Public Participation and Involvement Program**

<b>BMP ID#</b>	<b>BMP</b>	<b>BMP Description</b>	<b>Responsible Parties</b>
2-1	Public Review	Make SWMP Plan and annual reports available on website.	Department of Public Works/Engineering/Information Technology
2-2	Public Participation	Continue to implement the pesticide use policy.	Pesticide Reduction Task Force (Town Departments and Residents)
2-3	Public Participation	Continue to track stormwater-related calls.	Department of Public Works/Engineering Dept., Water Dept., and Town Website Manager(s)
2-4	Public Participation	Establish classroom education/field trip program.	Department of Public Works/Engineering Dept., Water Dept., and Education Department
2-5	Public Participation	Continue to stencil catch basins and replace faded markers.	DPW, Engineering Dept., Water Dept., and Volunteers
2-6	Public Participation	Continue to partner with watershed organizations on stormwater improvements.	Department of Public Works/Engineering Dept., Water Dept., and Conservation Commission

## 5 MCM 3: Illicit Discharge, Detection, and Elimination

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### 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. An “illicit discharge” is any discharge to a municipal separate storm sewer that is not composed entirely of stormwater except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire-fighting activities. A summary of the required IDDE activities and timelines are provided below.

- **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 Andover, the ordinance, bylaw, or other regulatory mechanism was required to be effective by May 1, 2008.
- **Sanitary Sewer Overflow** – SSOs are discharges of untreated sanitary wastewater from a municipal sanitary sewer that can contaminate surface waters, cause serious water quality problems and property damage, and threaten public health. SSOs can be caused by blockages, line breaks, sewer defects that allow stormwater and groundwater to overload the system, power failures, improper sewer design, and vandalism. Regulated communities must identify all known locations where sanitary sewer overflows (SSOs) have discharged to the MS4 within the previous 5-years. Permittees must also develop an inventory within 1-year of the effective date 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.
- **System Mapping** – regulated communities must complete a comprehensive map of their stormwater system in two phases. Phase 1 must be completed within two 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 ten 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.
- **Written Illicit Discharge, Detection, and Elimination Plan** – 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 Town has prepared a standalone IDDE Plan separate from this SWMP Plan.

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

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## 5.2 Past IDDE Program

The Town of Andover has conducted multiple efforts to identify and eliminate illicit discharges under the previous permit. The following summarizes Andover’s past IDDE activities:

- **Stormwater System Mapping** – the Town has mapped all known outfalls and the majority of other drainage infrastructure. Results have been incorporated into a town-wide GIS system. A copy of the stormwater system mapping is provided in **Appendix B**.
- **Outfall Inspections** – the Town has performed outfall inspections under dry weather conditions.
- **Illicit Discharge Inspections** – the Town performs comprehensive illicit discharge investigations as a result of outfall screening and complaints received from the public.
- **Legal Authority** – the Town has adopted Illicit Discharge Rules and Regulations to address legal requirements under the Town’s General Bylaws, Article XVI, “Stormwater Management and Erosion Control” and is provided in **Appendix C**.

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## 5.3 Ongoing IDDE Program

Andover has a separate written IDDE plan that outlines legal authority, program responsibilities, ranks catchment areas, and outlines procedures for investigation and removal in accordance with the permit. This written plan will be updated and refined as needed to incorporate findings of field investigations.

**Table 5-1** outlines Andover’s IDDE program to meet permit requirements. The measurable goals, responsible departments and schedule for implementation of all BMPs under the SWMP are provided in **Section 11**.

**Table 5-1. IDDE Program**

<b>BMP ID#</b>	<b>BMP</b>	<b>BMP Description</b>	<b>Responsible Parties</b>
3-1	SSO Inventory	The Town tracks all SSOs, including those that have discharged to the MS4 system within the past five years as documented in the IDDE Plan and will report on any new SSOs in its annual report.	Department of Public Works/Water & Sewer Division
3-2	Storm Sewer System Map	The Town has mapped all of its known stormwater outfalls and most of the storm drain infrastructure. The Town will continue to update mapping ( <b>Appendix B</b> ) as new information becomes available such that the full system will be mapped within ten years of the effective date of the permit.	Department of Public Works/Engineering Dept., Consultant
3-3	Written IDDE Program	A written IDDE program has been developed as a separate document from this SWMP.	Department of Public Works/Engineering Dept., Water Dept., Board of Health, and Consultant
3-4	Implement IDDE Program	The IDDE program will be implemented following the program plan developed in the IDDE Plan. All illicit discharges will be documented and follow-up catchment investigations will be conducted.	Department of Public Works/Engineering Dept., Water Dept., Board of Health, and Consultant
3-5	Employee Training	IDDE training for employees will be conducted before activities commence.	Highway Department
3-6	Conduct Dry Weather Screening	Andover will conduct dry weather screening in accordance with screening procedures as outlined in the IDDE Plan.	Department of Public Works/Engineering Dept.
3-7	Wet Weather Screening	Andover will conduct wet weather screening in accordance with screening procedures as outlined in the IDDE Plan.	Department of Public Works/Engineering Dept.
3-8	Ongoing Screening	Andover will conduct dry weather and wet weather screening (as necessary) as outlined in the IDDE Plan.	Department of Public Works/Engineering Dept.

**Table 5-1 (continued). IDDE Program**

<b>BMP ID#</b>	<b>BMP</b>	<b>BMP Description</b>	<b>Responsible Parties</b>
3-9	IDDE Plan – Illegal Dumping Program	Establish a procedure to receive calls. This will be tracked under BMP 2-3.	Department of Public Works/Engineering Dept., and Board of Health
3-10	IDDE Ordinance/Bylaw	Andover will continue to enforce its existing Illicit Discharge bylaw ( <b>Appendix C</b> ).	Planning Board, Board of Health, and Selectmen
3-11	Public Education	Incorporate information on illicit discharges into public education.	Department of Public Works/Engineering Dept., Water Dept., and Board of Health

## 6 MCM 4: Construction Site Stormwater Runoff Control

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### 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 one acre within the regulated area. This program shall also regulate disturbances less than one acre if they are part of a larger common plan of development or sale that would disturb one or more acres. A summary of the required Construction Site Stormwater Runoff Control Program activities and timelines are provided below:

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

- **Construction Site Stormwater Runoff Control Program** – the 2016 MS4 Permit requires preparation of written Construction Site Stormwater Runoff Control Program procedures that include the following:
  - Pre-construction plan review of the site design, planned operations, planned BMPs during the construction phase, and planned BMPs to manage runoff after development that includes consideration of potential water quality impacts, and procedures for the receipt and consideration of information submitted by the public. The site plan review procedure shall also include evaluation of opportunities for use of low impact design and green infrastructure;
  - Site inspections and enforcement actions to take place both during construction of BMPs and after construction of BMPs. Procedures must define the person responsible for site inspections, qualifications necessary to perform inspections, who has authority to implement enforcement procedures, the ability to impose sanctions to ensure program compliance, the use of standardized inspection forms (if appropriate), and how the number of inspections and enforcement actions will be tracked for reporting in the Annual Report; and
  - Requirements for construction site operators to implement a sediment and erosion control program that includes BMPs appropriate for the conditions at the construction site.

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## 6.2 Past Construction Site Stormwater Runoff Control Measures

The following summarizes Andover’s past Construction Site Stormwater Runoff Control Program activities:

- **Stormwater Management Legal Authority** – the Town of Andover enacted the “Stormwater Management and Erosion Control Bylaw”, along with accompanying regulations for all activities disturbing one acre or more.
- **Sediment and Erosion Controls** – the “Stormwater Management and Erosion Control Bylaw” accompanying regulations require use of erosion and sediment controls, and proper management of on-site construction and waste materials.
- **Construction Site Inspections** – the “Stormwater Management and Erosion Control Bylaw” accompanying regulations require regular inspections of construction sites, including a preconstruction meeting, at least weekly throughout the construction process, and a final inspection. Results are documented on a standardized construction form.
- **Plan Reviews** – the “Stormwater Management and Erosion Control Bylaw” accompanying regulations establish an Interdepartmental Review Committee that includes representatives from varying town departments, including DPW, Conservation, Planning, Health, Public Safety, and Building who complete plan reviews prior to construction commencement.

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## 6.3 Ongoing Construction Site Stormwater Runoff Control Program

The Town has reviewed its existing Stormwater Management and Erosion Control bylaw and regulations for compliance with the 2016 MS4 Permit (refer to **Appendix C**) and found they generally satisfy all requirements. **Table 6-1** outlines Andover’s ongoing Construction Site Stormwater Runoff Control Program. Measurable goals, responsible department and schedule for implementation of all BMPs under the SWMP are provided in **Section 11**.

**Table 6-1. Construction Site Stormwater Runoff Control Program**

<b>BMP ID#</b>	<b>BMP</b>	<b>BMP Description</b>	<b>Responsible Parties</b>
4-1	Site Inspection and Enforcement of Erosion Sediment Control (ESC) Measures	Existing regulations require site inspections and the ability to impose sanctions. Inspections may be performed by the Planning Board or an Environmental Site Monitor who must be a professional engineer or trained professional. The authority for site inspection and enforcement is clearly designated to the Planning Board. No further action is needed.	Planning Board, Dept. of Public Works/ Engineering Dept., Conservation Commission, & Consultant
4-2	Site Plan Review	Existing regulations require application submittal and outline procedures for site plan review, including a pre-construction review of the site design with a public hearing and notification of abutters. Developers must submit a plan that includes planned construction site operations and phasing, planned BMPs during construction, and planned BMPs to manage stormwater after development. Andover will also track the number of site reviews for annual reporting purposes.	Planning Board, Dept. of Public Works/ Engineering Dept., Conservation Commission, & Consultant
4-3	Erosion and Sediment Control	Existing regulations require construction operators to install erosion and sediment controls at construction sites and meet the Massachusetts Stormwater Management Standards. No further action is needed.	Planning Board and Selectmen
4-4	Waste control	Existing regulations require construction operators to properly manage on-site construction and waste materials, including concrete truck washout, chemicals, litter and sanitary waste. No further action is needed.	Planning Board, Dept. of Public Works/ Engineering Dept., Conservation Commission
4-5	Construction Public Complaint Hotline	Establish a procedure for the receipt of information submitted by the public. This will be tracked under BMP 2-3.	Planning Board and Department of Public Works/Engineering Dept.

# 7 MCM 5: Stormwater Management in New Development and Redevelopment

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## 7.1 Summary of Permit Requirements

### 7.1.1 Core 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 one or more acres and discharge into an MS4 system. This program shall also regulate disturbances less than one acre if they are part of a larger common plan of development or sale that would disturb one 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:

**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 enacted or updated within three years of the effective permit date to:

- Require LID site planning and design strategies to maximum extent feasible;
- Meet many of the requirements of the Massachusetts Stormwater Handbook and associated stormwater standards;
- Incorporate runoff volume storage and/or pollutant removal requirements, specifically:
  1. Stormwater management systems on new development sites shall be designed to:
    - a) Not allow untreated stormwater discharges (Standard 1), control peak runoff rates (Standard 2), recharge groundwater (Standard 3), eliminate or reduce discharge of pollutants from land uses with higher pollutant loads (Standard 5), protect Zone II or Interim Wellhead Protection Areas (Standard 6), and implement long term maintenance practices (Standard 9); and
    - b) Require that all stormwater management systems be designed to:
      - Retain the volume of runoff equal to at least 1.0 inches over the total post-construction impervious surface area on the site and/or
      - Remove 90% of the average annual Total Suspended Solids (TSS) load and 60% of the average annual Total Phosphorus (TP) load from the total post-construction impervious surface area on the site.
  2. Redevelopment Requirements:
    - a) Stormwater management systems on Redevelopment sites shall meet the following to the maximum extent feasible:

- Standards 1, 2, and 3, and pretreatment and structural BMP requirements of Standards 5 and 6.
  - b) Stormwater management systems on Redevelopment sites shall also improve existing conditions by requiring stormwater BMPs be designed to:
    - Retain the volume of runoff equal to at least 0.80 inches over the total post-construction impervious surface area on the site and/or
    - Remove 80% of the average annual TSS load and 50% of the TP load from the total post-construction impervious area on the site.
  - c) Redevelopment activities that are limited to maintenance and improvement of existing roads, (including widening less than a single lane, adding shoulders, improving existing drainage systems, and repaving projects) shall improve existing conditions where feasible and are exempt from other parts above.
- **As-Built Submittals** – the permittee must require the submission of as-built drawings within two years after completion of construction projects and include structural and non-structural controls.
- **Operation and Maintenance** – the program must include procedures to ensure adequate long-term O&M of BMPs are established after completion of a construction project, along with a dedicated funding source within two years of the effective permit date.
- **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. A report documenting the assessment must be completed within four years of the effective permit date.
- **Identification of Potential Retrofit Sites** – the permittee must identify municipal properties and infrastructure within four years of the effective permit date to determine at least five properties that could be modified or retrofitted with stormwater BMP improvements. The permittee must report on all properties that have been modified or retrofitted with BMPs to mitigate impervious area and maintain an ongoing list of five sites until such time as less than five sites remain.

### 7.1.2 TMDL and Water Quality Limited Waterbody Requirements

The Town of Andover must also address requirements for impaired waterbodies which are shown in **Table 2-1**. As noted in **Table 2-1**, Andover has waterbodies with impairments for

phosphorus, chloride, and turbidity. Each of these impairments have specific post-construction stormwater requirements as outlined in the 2016 MS4 Permit, and summarized below.

- **Legal Authority (Phosphorus)** – mandate the use of stormwater BMPs optimized for phosphorus removal as part of new development and redevelopment projects for those located within the Merrimack River watershed.
- **Retrofit Sites (Phosphorus)** – retrofit opportunities must consider opportunities for constructing infiltration BMPs for properties within the Merrimack River watershed.
- **Legal Authority (Chloride)** – require measures to prevent exposure of any salt stockpiles to precipitation and runoff at all privately owned commercial and industrial properties within watersheds draining to waterbodies impaired for chloride.
- **Salt Use Minimization (Chloride)** – establish procedures and requirements to minimize salt usage and require use of salt alternatives where determined necessary.
- **Spill Containment and Water Quality Treatment (Turbidity)** – stormwater systems designed on commercial and industrial land use area draining to the water quality limited waterbody shall incorporate designs that allow for shutdown and containment where appropriate to isolate the system in the event of an emergency spill or other unexpected event. Any stormwater management system designed to infiltrate stormwater on commercial or industrial sites must provide the level of pollutant removal equal to or greater than the level of pollutant removal provided through the use of biofiltration of the same volume of runoff to be infiltrated, prior to infiltration.

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## 7.2 Past Post Construction Stormwater Management

The Town of Andover has established some measures for post construction stormwater management. The following summarizes Andover’s past Post-Construction Site Stormwater Management Program activities:

- **Legal Authority** – Andover enacted “Stormwater Management and Erosion Control Bylaw”, along with accompanying regulations for all activities disturbing one acre or more.
- **Submittal of As-Built Plans** – the “Stormwater Management and Erosion Control Bylaw” accompanying regulations require the submittal of as-built plans detailing the actual stormwater management system as installed, and that they be certified by a Professional Engineer.

- **Submittal of an Operation and Maintenance Plan** – the “Stormwater Management and Erosion Control Bylaw” accompanying regulations require development of an O&M Plan that in part requires a maintenance agreement with responsible parties, schedule for maintenance, and financing responsibilities.
- **Design Guidelines** – the “Stormwater Management and Erosion Control Bylaw” accompanying regulations include design criteria related to the latest edition of MassDEP’s Stormwater Management Handbook and Andover’s Subdivision Rules and Regulations including stormwater recharge, pretreatment, flooding protection, channel protection, water quality volume requirements, and hydrologic/hydraulic design criteria.
- **Homeowners Association BMP Inspection and Maintenance** – the Town tracks BMP inspections and maintenance for all Homeowners Associations (HOAs) with stormwater BMPs. HOAs must submit annual reports to the Town documenting work performed during the previous year.

### 7.3 Ongoing Post-Construction Stormwater Management Program

**Table 7-1** outlines Andover’s Post-Construction Stormwater Management Program to meet the requirements of the 2016 MS4 Permit. Measurable goals, responsible department and schedule for implementation of all BMPs under the SWMP are provided in **Section 11**.

**Table 7-1. Post-Construction Site Stormwater Management Program**

BMP ID#	BMP	BMP Description	Responsible Parties
5-1	As-built plans for on-site stormwater control	The Town of Andover currently requires final submittal of as-built drawings of all structural stormwater controls and treatment BMPs required for the site and that they be certified by a Professional Engineer. Andover also requires development of an O&M Plan that in part requires a maintenance agreement with responsible parties, schedule for maintenance, and financing responsibilities. Andover will review its existing regulations to determine if further changes are required. This has been completed with regulatory updates documented in <b>Appendix C</b> .	Planning Board, Dept. of Public Works/ Engineering Dept., Conservation Commission

**Table 7-1 (continued). Post-Construction Site Stormwater Management Program**

BMP ID#	BMP	BMP Description	Responsible Parties
5-2	Target properties to reduce impervious areas	Andover will complete an inventory of municipal properties ( <b>Appendix D</b> ) that could be retrofitted with stormwater BMPs by Year 4, along with a review of existing site conditions. This inventory will be updated continuously starting in Year 5. Retrofit opportunities must also consider the potential to reduce phosphorus discharges for properties within the Merrimack River watershed. As BMPs are constructed, the inventory will be updated so that it always contains at least five sites in the inventory for potential improvement.	Planning Board, Dept. of Public Works/ Engineering Dept., Plant & Facilities
5-3	Allow green infrastructure	Andover will develop a report assessing existing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist. The report was completed and is included in <b>Appendix C</b> .	Planning Board
5-4	Street design and parking lot guidelines	Andover will 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 LID options. The report was completed and is included in <b>Appendix C</b> .	Planning Board
5-5	Ensure any stormwater controls or management practices for new development and redevelopment meet permit retention or treatment requirements and the Massachusetts Stormwater Handbook	Andover is reviewing its existing regulations and a sample bylaw and determining changes that must be made to suit the Town. This has been completed with updates documented in <b>Appendix C</b> .	Planning Board & Conservation Commission

## 8 MCM 6: Good Housekeeping and Pollution Prevention

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### 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 developing procedures 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 Stormwater Operation and Maintenance Plans

The permittee must complete an inventory of all parks and open space, buildings and facilities where pollutants are exposed to stormwater runoff, and vehicles and equipment within two 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 O&M Plan within two 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 landscaping 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 keep 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.

### **Phosphorus Water Quality Limited Waterbody Requirements**

- Reducing fertilizer and/or using slow release fertilizers on Town-owned properties;
- Properly managing grass cuttings and leaf litter on Town-owned property; and
- Prohibiting blowing organic waste onto impervious surfaces.

## 8.1.2 Infrastructure Operation and Maintenance Plan

The permittee must establish written procedures as part of an O&M Plan within one year 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:

### **Catch Basin Cleaning**

- 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 two 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.

### **Street Sweeping**

- Sweeping all streets and permittee-owned parking lots, with the exception of rural uncurbed roads with no catch basins or high-speed limited access highways at least once 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;
- Increasing street sweeping frequency of all municipal owned streets and parking lots to a minimum of two times per year; once in the spring (following winter activities such as sanding) and at least once in the fall (following leaf fall) for areas that discharge to water quality limited waterbodies and their tributaries where phosphorus is the cause of the impairment; and
- Increasing street sweeping to a schedule determined by the permittee to target areas with potential for high pollutant loads for areas that discharge to water quality limited waterbodies and their tributaries where solids, oil and grease, or metals is the cause of impairment.

### **Catch Basin and Street Sweeping Residuals Management**

- Ensure proper storage of catch basin cleanings and street sweepings prior to disposal or reuse such that they do not discharge to receiving waters.

### **Winter Operation and Maintenance**

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

### 8.1.3 Stormwater Pollution Prevention Plans

The permittee must establish written Stormwater Pollution Prevention Plans (SWPPPs) within two years of the permit effective date 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.

### 8.1.4 Stormwater BMP Inspections

The permittee must establish and implement written inspection and maintenance procedures and frequencies for all structural stormwater treatment structures, such as infiltration and detention basins, proprietary stormwater treatment structures, gravel wetlands, etc. All permittee-owned stormwater treatment structures (excluding catch basins) shall be inspected at least annually.

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## 8.2 Past Good Housekeeping and Pollution Prevention Program

The following summarizes Andover's past good housekeeping and pollution prevention activities:

- **Street and Parking Lot Sweeping** – Andover sweeps streets and Town-owned parking lots twice a year. High priority areas, such as heavily developed areas, are also swept more frequently, as needed.

- **Catch Basin Cleaning** – the Town cleans approximately ½ of its catch basins per year.
- **BMP Inspection and Maintenance** – the Town inspects all known stormwater BMPs annually using a standardized inspection form and performs maintenance as needed.
- **Winter Roadway Maintenance Optimization** – Andover prepared and documented existing and proposed winter O&M items. These are included under a separate O&M document as noted under Section 1.4.
- **Operation and Maintenance Program** – the Town developed an extensive O&M program that includes various non-structural BMPs, including material storage, floor drain compliance, vehicle washing, spill prevention, pesticide and herbicide application, and compliance with other permits such as Spill Prevention Control and Countermeasures (SPCC) regulations. Additionally, all applicable employees are trained on stormwater-related topics annually.

### 8.3 Ongoing Good Housekeeping and Pollution Prevention Program

**Table 8-1** outlines Andover’s plans to meet the requirements of the 2016 MS4 Permit to establish a Good Housekeeping and Pollution Prevention Program. Measurable goals, responsible department and schedule for implementation of all BMPs under the SWMP are provided in **Section 11**.

**Table 8-1. Good Housekeeping and Pollution Prevention Program**

<b>BMP ID#</b>	<b>BMP</b>	<b>BMP Description</b>	<b>Responsible Parties</b>
6-1	O&M procedures	Andover will create written O&M procedures for parks and open spaces, buildings and facilities, and vehicles and equipment to supplement its existing program as needed. These have been incorporated into a separate O&M Plan.	Department of Public Works/Engineering and Plant & Facilities
6-2	Inventory all permittee-owned parks and open spaces, buildings and facilities, and vehicles and equipment	Andover will create an inventory of all Town facilities for incorporation into the O&M Plan. An inventory of facilities has been incorporated into the separate O&M Plan.	Plant & Facilities

**Table 8-1 (continued). Good Housekeeping and Pollution Prevention Program**

BMP ID#	BMP	BMP Description	Responsible Parties
6-3	Infrastructure O&M	Establish and implement written program for repair and rehabilitation of MS4 infrastructure. Infrastructure O&M SOPs are included in the Town’s O&M Plan.	Department of Public Works/Engineering and Plant & Facilities
6-4	Stormwater Pollution Prevention Plans (SWPPPs)	<p>Andover will perform a preliminary analysis of its maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater to determine which facilities, if any, are located within areas that drain to the MS4.</p> <p>A SWPPP is required for the Town’s DPW facility. The SWPPP was prepared and is maintained as a standalone document.</p>	Department of Public Works/Engineering and Plant & Facilities
6-5	Catch basin cleaning	<p>The town has ~4,755 town-owned catch basins. Given the large number of basins and expense of cleaning, catch basins are cleaned approximately every other year, with a select number of “priority” basins inspected and cleaned more frequently. The Town has developed a plan for prioritizing catch basin cleaning with a goal that no catch basins are more than 50% full of sediment at any time, which is provided in <b>Appendix E</b>. Catch basin cleaning SOPs are also included in the prioritization plan and have been included in the Town’s O&amp;M Plan.</p>	Department of Public Works/Highway Division and Consultant
6-6	Street sweeping program	<p>Andover sweeps all streets and permittee-owned lots twice a year. Street sweeping schedule and SOPs are found in in <b>Appendix F</b>.</p>	Department of Public Works/Highway Division
6-7	Road salt use optimization program	<p>Andover developed a SOP for winter road maintenance that optimizes the use of salt. This is included in the Town’s separate O&amp;M Plan. The Town also has a Salt Reduction Plan due to chloride impaired waters in the town.</p>	Department of Public Works/Highway Division

**Table 8-1 (continued). Good Housekeeping and Pollution Prevention Program**

<b>BMP ID#</b>	<b>BMP</b>	<b>BMP Description</b>	<b>Responsible Parties</b>
6-8	Inspection and maintenance of stormwater treatment structures	An inventory of known structural stormwater BMPs within the Town’s regulated area is included in <b>Appendix G</b> . SOPs for performing inspections and maintenance are included in the separate O&M Plan.	Department of Public Works/Highway Division, Plant and Facilities Dept., Water/Sewer Dept.

## 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. Impaired 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. As shown in **Table 2-1**, the Town of Andover has multiple waterbodies on the Massachusetts Integrated List, however, not all of these impairments are associated with pollutants and not all must be addressed under the 2016 MS4 Permit.

As shown in **Table 9-1**, the Town has three waterbodies with an approved TMDL (those that have been approved by EPA as of the effective date of the permit, or July 1, 2018) for fecal coliform and are regulated under the 2016 MS4 Permit. Thus, the Town is required to implement the requirements as outlined in Appendix F of the 2016 MS4 Permit.

Additionally, the Town has multiple waterbodies classified as water quality limited waterbodies for phosphorus, E. coli, chloride, and turbidity (**Table 9-2**) and thus is required to implement requirements as outlined in Appendix H of the 2016 MS4 Permit.

**Table 9-1. TMDL Requirements**

<b>Waterbody Names</b>	<b>Impairment</b>	<b>2016 Permit Requirements</b>	<b>Responsible Parties</b>
<ul style="list-style-type: none"><li>• Rogers Brook</li><li>• Shawsheen River (MA83-18 and -19)</li><li>• Unnamed Trib. to Meadow Brook, known as "Pinnacle Brook"</li></ul>	Fecal Coliform and E. coli	Appendix F, Part A.II	Plant & Facilities, Department of Public Works, Board of Health

**Table 9-2. Water Quality Limited Requirements**

<b>Waterbody Names</b>	<b>Impairment</b>	<b>2016 Permit Requirements</b>	<b>Responsible Parties</b>
<ul style="list-style-type: none"> <li>• Merrimack River (MA84A-03)</li> </ul>	Phosphorus	Appendix H, Part II	Plant & Facilities, Department of Public Works
<ul style="list-style-type: none"> <li>• Fish Brook</li> <li>• Merrimack River (MA84A-03)</li> </ul>	E. coli	Appendix H, Part III	Plant & Facilities, Department of Public Works, Board of Health
<ul style="list-style-type: none"> <li>• Fish Brook</li> <li>• Unnamed Trib to Shawsheen River starts near Dascomb Rd</li> <li>• Unnamed Trib. to Meadow Brook, known as "Pinnacle Brook"</li> </ul>	Chloride	Appendix H, Part IV	Plant & Facilities, Department of Public Works
<ul style="list-style-type: none"> <li>• Brackett Pond</li> <li>• Collins Pond</li> <li>• Salem Pond</li> <li>• Rabbit Pond</li> </ul>	Turbidity	Appendix H, Part V	Plant & Facilities, Department of Public Works

### 9.1.1 Fecal Coliform/E. coli TMDL & E. coli Limited Water Quality Requirements

Bacteria TMDL and water quality limited waters have the same requirements under the permit. To address discharges to these waters, the Town must implement the following requirements as outlined under Appendix F, Part III and Appendix H, Part III of the 2016 Permit.

- **Public Education** – supplement the Residential education 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. Education materials shall describe the detrimental impacts of improper management of pet waste, requirements for waste collection and disposal, and penalties for non-compliance. The Town also 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, and Elimination** – designate catchments draining to pathogen impaired segments as “Problem Catchments” or “High” priority.

Public education requirements have been incorporated into future public education outreach components as described in Section 3. IDDE requirements have been incorporated into Andover’s IDDE Plan.

## 9.1.2 Phosphorus Water Quality Limited Waterbody Requirements

To address the discharge of phosphorus to the Merrimack River and its tributaries from its MS4, the Town of Andover must implement the following requirements as outlined under Appendix H, Part II of the 2016 Permit.

- **Public Education** – supplement the Residential and Business/Commercial/Institution education programs with additional annual messages as follows:
  - Spring (April-May): Proper use and disposal of grass clippings and use of slow-release and phosphorus-free fertilizers;
  - Summer (June-July): Proper management of pet waste; and
  - Fall (August-October): Proper disposal of leaf litter.
- **Stormwater Management in New Development and Redevelopment** – supplement standard permit bylaw requirements to also mandate the use of stormwater BMPs optimized for phosphorus removal as part of new development and redevelopment projects. Additionally, retrofit opportunities must consider opportunities for constructing infiltration BMPs for properties within the Merrimack River watershed.
- **Good Housekeeping and Pollution Prevention** – establish requirements for reducing fertilizer usage and/or using slow-release fertilizers on Town-owned properties, procedures for properly managing grass cuttings and leaf litter on Town-owned property, and prohibit blowing organic waste onto impervious surfaces. Additionally, street sweeping must be increased to at least twice per year, once in the spring and once in the fall.

The Town of Andover must also prepare a Phosphorus Source Identification Report by the end of Year 4 that generally does the following:

- Identifies, delineates, and prioritizes areas of town at the catchment-level that have the highest phosphorus loading potential based on land use and other factors;
- Accounts for the urbanized area that discharges within the Merrimack River watershed;
- Determines impervious area based on catchment delineations;
- Accounts for any screening results performed under MCM 3 when developing conclusions; and
- Identifies potential retrofit opportunities for installing structural BMPs during redevelopment.

The Phosphorus Source Identification Report progress is documented in **Appendix H**. A Phosphorus Source Identification Plan was prepared and is maintained as a standalone document.

The Town will provide a list of planned structural BMPs, along with a plan and schedule for implementation by the end of Year 5. At least one BMP must be designed and constructed as a demonstration project by the end of Year 6 that targets a catchment with a high phosphorus load potential. Remaining structural BMPs must be constructed according to the provided plan and schedule. Phosphorus removals must be tracked and reported annually.

### 9.1.3 Chloride Water Quality Limited Waterbodies Requirements

To address the discharge of chlorides to chloride impaired waters as outlined in **Table 9-2**, the Town must implement the following requirements as outlined under Appendix H, Part IV of the 2016 Permit.

- **Develop a Salt Reduction Plan** – The Town will develop a Salt Reduction Plan that includes specific actions designed to achieve salt reduction on municipal roads and facilities and on private facilities that discharge to its MS4 within three years of the effective date of the permit and implement the plan within five years. Planned activities for salt reduction on municipal facilities may include but are not limited to:
  - Operational changes such as pre-wetting, pre-treating the salt stockpile, increasing plowing prior to de-icing, monitoring of road surface temperature, etc.;
  - Implementation of new or modified equipment providing pre-wetting capability, better calibration rates, or other capability for minimizing salt use;
  - Training for municipal staff and/or contractors engaged in winter maintenance activities;
  - Adoption of guidelines for application rates for roads and parking lots;
  - Regular calibration of spreading equipment;
  - Designation of no-salt and/or low salt zones; and
  - Measures to prevent exposure of salt stockpiles (if any) to precipitation and runoff.

The plan should include an estimate of the total tonnage of salt reduction expected by each activity and a schedule for implementation of planned activities. The completed plan must be submitted to EPA along with the annual report following the Salt Reduction Plan's completion, and each annual report must provide an update on progress made.

- **Public Education** – supplement the educational program with an annual message to private road salt applicators, commercial, and industrial site owners on proper storage and application rates of winter deicing material and steps that can be taken to minimize salt use in the November/December timeframe.
- **Stormwater Management in New Development and Redevelopment** – establish procedures and requirements to minimize salt usage and require use of salt alternatives where determined necessary.

- **Regulatory Mechanism** – establish a regulatory mechanism requiring measures to prevent exposure of any salt stockpiles to precipitation and runoff at all privately owned commercial and industrial properties;
- **Tracking** – The Town of Andover must track the amount of salt applied to all municipally owned and maintained surfaces and report salt use during annual reporting beginning in Year 4.

Progress towards meeting the chloride requirements is documented in **Appendix H**. The Salt Reduction Plan was prepared and is maintained as a standalone document.

#### 9.1.4 Turbidity Water Quality Limited Waterbodies Requirements

To address discharges from the MS4 to turbidity impaired waters outlined in **Table 9-2**, the Town must implement the following requirements as outlined under Appendix H, Part III of the 2016 Permit.

- **Stormwater Management in New Development and Redevelopment** – Stormwater management systems designed on commercial and industrial land use areas draining to the water quality limited waterbody shall incorporate designs that allow for shutdown and containment where appropriate to isolate the system in the event of an emergency spill or other unexpected event. Any stormwater management system designed to infiltrate stormwater on commercial or industrial sites must provide the level of pollutant removal equal to or greater than the level of pollutant removal provided through the use of biofiltration of the same volume of runoff to be infiltrated, prior to infiltration.
- **Good Housekeeping and Pollution Prevention** – increase street sweeping frequency of all municipal streets and parking lots to a schedule determined by Andover to target areas with potential for high pollutant loads. This may include increased sweeping in commercial and high-density residential areas, or largely impervious drainage areas. Prioritize inspection and maintenance for catch basins to ensure that no sump is more than 50 percent full. Clean catch basins more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings. Include street sweeping schedule developed to target high pollutant loads in each annual report.

Stormwater management requirements for new and redevelopment were addressed as part of the regulatory and other program updates completed during Years 2 and 3. The Town of Andover has addressed street sweeping and catch basin cleaning requirements under Section 8.3.

## 10 Annual Reporting

The Town of Andover will submit annual reports each year of the permit term. The reporting period will be 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 approximately by September 29 of each year. The annual reports must contain the following relevant information which should be tracked throughout the year, with documentation maintained 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 six MCMs:
  - 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 Town 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 Andover's Best Management Practices Plan as outlined in the Town's NOI (**Appendix A**) is summarized in **Table 11-1**.

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

1. Public Education and Outreach;
2. Public Participation and Involvement;
3. Illicit Discharge Detection and Elimination;
4. Construction Site Stormwater Runoff Control;
5. Stormwater Management in New Development and Redevelopment;
6. Good Housekeeping and Pollution Prevention; 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 will also perform 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 outlined in **Table 11-1**.
2. **Record Keeping** – maintain records that pertain to the Stormwater Management Program for a period of at least five 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>

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities

BMP ID	BMP Description	Implementation	Responsible Dept./Person	Measurable Goal	Year / Schedule						BMP Status
					1	2	3	4	5	6+	
					7/1/18-6/30/19	7/1/19-6/30/20	7/1/20-6/30/21	7/1/21-6/30/22	7/1/22-6/30/23	7/1/23-6/30/24	
<b>1. Public Education and Outreach</b>											
1-1	Resident Education Program	<b>Brochures/Pamphlets:</b>	External Contractor								Ongoing
		A "how-to-guide" for residents on how rain gardens work and how to install them at their home.		Number distributed.	*	*	*	*	*		
		An updated version of <b>comprehensive literature</b> , discussing the importance of "greenscaping", small-scale stormwater management practices, sewer/septic system maintenance and other ways to avoid illicit		Number distributed.	*						
		<b>Pet Waste literature</b> available in two forms (one page info sheet) and can be redistributed as necessary.		Number distributed.		*	*	*	*		
		"What not to Flush" rack card will raise resident awareness of the damages of flushing things like wipes and grease in their toilets/sinks.		Number distributed.				*			
		<b>Displays/Posters/Kiosks:</b>	External Contractor								Ongoing
		Informational poster will be posted in area with heavy dog/walker traffic. Poster will describe <b>proper pet waste management and disposal</b> .		Location and time frame posted. Pilot surveys may be conducted before and after message postings.	*						
		An updated version of <b>informational display</b> , discussing the importance of "greenscaping", small-scale stormwater management practices, sewer/septic system maintenance and other ways to avoid illicit		Location and time frame posted.	*						
		Greenscapes will provide content for a <b>social media</b> "blast" on town Facebook, etc. Topics may include an autumnal Facebook post describing proper disposal of leaf collection, or springtime post about proper lawn/fertilizer maintenance.	External Contractor	Page views. Resident testimonials before and after posting.	*	*	*	*	*		Ongoing
		<b>Elementary Schools</b> will host Greenscapes "Keeping Water Clean" Program.	Schools	Attendance numbers.	*	*	*	*	*		
<b>Story Map</b> will outline and describe different examples of existing low-impact-developments in the North Shore Community.	External Contractor	Number of map views.			*	*	*	*			
"Greenscapes 101" <b>presentation</b> for residents at site of community's choosing. Presentation will discuss the importance of clean and plentiful water.	External Contractor	Number of attendees.					*		Ongoing		
1-2	Businesses, Institutions, and Commercial Education Program	<b>Presentation</b> will discuss proper "greenscaping" practices on a business/commercial level. Content will be targeted to property managers and will include sand/salt storage and landscape management.	External Contractor	Number of attendees.			*				
		<b>Stormwater presentation</b> will discuss specific BMPs for parking lots; how to reduce impervious surfaces, and maintain the space more sustainably.		Number of attendees.		*					
1-3	Developer and Construction Education Program	<b>Workshops and Associated Literature:</b>	External Contractor	Number of attendees, increase in LID use	*					Ongoing	
		Year 1: Discuss <b>LID options for reducing runoff</b> and promoting on-site infiltration. <b>Pricing, maintenance and ordinances</b> will also be discussed.									
		Year 3: Greater detail, following the workshop regarding LID held in year one. City ordinances and associated incentives will be outlined.	DPW	Number of attendees.			*				
1-4	Industrial Education Program	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.	External Contractor	Number distributed.		*				Ongoing	
		Presentation will discuss proper "greenscaping" practices on an industrial level. Content will be targeted to property managers and will include sand/salt storage and landscape management.		Number of attendees			*				

**Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities**

BMP ID	BMP Description	Implementation	Responsible Dept./Person	Measurable Goal	Year / Schedule						BMP Status
					1	2	3	4	5	6+	
					7/1/18-6/30/19	7/1/19-6/30/20	7/1/20-6/30/21	7/1/21-6/30/22	7/1/22-6/30/23	7/1/23-6/30/24	
<b>2. Public Participation &amp; Involvement</b>											
2-1	Make SWMP Publicly Available on Website	Post SWMP Plan on Town website, along with contact name, email address and/or phone number of a contact person at the Town to contact for information or submit comments.	DPW/Engineering, Information Technology	Annual review of stormwater management plan and posting on website.	*	*	*	*	*	*	SWMP completed Updated annually
		Allow the public to request information or submit comments.		Allow public to comment on the plan at least annually.	*	*	*	*	*		
2-2	Pesticide Use Policy	Continue to reduce pesticide usage in the Fish Brook watershed through a pesticide use policy that encourages public education/awareness of the effects of pesticides and organic lawn care practices while discouraging the use of pesticides on public and private property.	Pesticide Reduction Task Force (Town Departments and Residents)	Continue to implement the pesticide use policy.	*	*	*	*	*	*	Ongoing
2-3	Stormwater Call Directory	Continue to track stormwater-related calls.	DPW/Engineering, Water Dept., and Town Website Manager(s)	Track number of calls to each department on the directory.	*	*	*	*	*	*	Ongoing
2-4	Establish Classroom Education	Establish a classroom education/field trip program.	DPW/Engineering Dept, and Education Dept.	Host one annual classroom educational event or field trip.	*	*	*	*	*	*	Ongoing
2-5	Catch Basin Stenciling	Continue to stencil catch basins and replace faded markers.	DPW/Engineering, Water Dept., and Volunteers	100% of storm drains marked, perform additional marking and door hanger distribution as needed.	*	*	*	*	*	*	Will be implemented as budget & resources
2-6	Watershed Organization Involvement	Work with Greenscapes North Shore Coalition, Salem Sound Coastwatch, Ipswich River Watershed Association, the Great Marsh Committee, Merrimack River Watershed Council and Eight Towns to provide "Greenscapes 101: Create a Healthier Landscape" educational program. Member of Merrimack Valley Stormwater Collaborative.	DPW/Engineering, Water Dept., and Conservation Commission	Document quarterly meeting topics and attendance.	*	*	*	*	*	*	Ongoing

**Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities**

BMP ID	BMP Description	Implementation	Responsible Dept./Person	Measurable Goal	Year / Schedule						BMP Status
					1	2	3	4	5	6+	
					7/1/18-6/30/19	7/1/19-6/30/20	7/1/20-6/30/21	7/1/21-6/30/22	7/1/22-6/30/23	7/1/23-6/30/24	
<b>3. Illicit Discharge Detection and Elimination</b>											
3-1	Complete SSO Inventory	The Town tracks all SSOs, including those that have discharged to the MS4 system within the past five years as documented in the IDDE Plan and will report on any new SSOs in its annual report.	DPW/Water & Sewer Division	Report SSOs in annual report.	*	*	*	*	*	*	Ongoing
3-2	Phase I Storm Sewer System Map	The Town has mapped all of its known stormwater outfalls and most of the storm drain infrastructure. Update outfalls, conveyances receiving waters, interconnections, MS4-owned BMPs & initial catchment delineations.	DPW/Engineering, Consultant	Updated map within 2 years of effective date of permit.	*	*					Completed
	Phase II Storm Sewer System Map	Update outfall spatial location, pipe connectivity, manholes, catch basins, refined catchment delineations as new information becomes available.		Updated map within 10 years of effective date of permit.	*	*	*	*	*	*	Completed Updated as new information becomes available
3-3	Written IDDE Program	A written IDDE program has been developed as a separate document from this SWMP.	DPW/Engineering, Water Dept., Board of Health, and Consultant	Complete within 1 year of the effective date of permit and update as required.	*						Completed
		Update outfall and interconnection priority ranking annually with new information.			*	*	*	*	*	*	Ongoing
3-4	Implement IDDE Program	Inspect key catchment structures (manholes, catch basins) in all catchments during dry weather conditions. Where flowing water is observed, collect samples for analysis.	DPW/Engineering, Water Dept., Board of Health, and Consultant	Implement catchment investigations according to program and permit conditions (Problem Outfalls by July 1, 2025, all outfalls by July 1, 2028).	*	*	*	*	*	*	Ongoing
3-5	Perform Employee IDDE Training	Provide annual training to employees involved in the IDDE program.	Highway Department	Train applicable employees annually.	*	*	*	*	*	*	Ongoing
3-6	Conduct Dry Weather Screening	Inspect drainage outfalls classified as High or Low priority during dry weather.	DPW/Engineering	Complete in accordance with outfall screening procedure and permit conditions by July 1, 2021.	*	*	*				Completed
		Investigate potential illicit discharges, if any.			*	*	*	*	*	*	Ongoing
		Enforce removal of illicit discharges, if any.			*	*	*	*	*	*	Ongoing
3-7	Conduct Wet Weather Screening	Sample select outfalls with System Vulnerability Factors under wet weather conditions. Sampling can be done upon completion of any dry weather investigation, but must be completed before catchment investigation is marked as complete.	DPW/Engineering	Complete in accordance with outfall screening procedure within 10 years of the effective permit date.			*	*	*	*	Complete by 2028
3-8	Ongoing Screening	Upon completion of catchment investigations, reprioritize outfalls for ongoing screening.	DPW/Engineering	Conduct ongoing dry and wet weather outfall screening upon completion of the IDDE program.	To begin upon completion of all catchment investigations						
		Continue performing dry and wet weather sampling according to the new prioritization at least once every 5 years.									
3-9	IDDE Plan - Illegal Dumping Program	Establish a procedure to receive calls. This will be tracked under BMP 2-3.	DPW/Engineering, and Board of Health	Log of complaints and actions taken.	*	*	*	*	*	*	Ongoing
3-10	Enact and Enforce IDDE Bylaw	Enforce existing IDDE Program.	Planning Board, Board of Health, and Selectmen	Enforcement actions.	*	*	*	*	*	*	Ongoing
3-11	Public Education	Incorporate information on illicit discharges into public education.	DPW/Engineering, Water Dept., and Board of Health	Copies of materials.	*	*	*	*	*	*	Ongoing

**Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities**

BMP ID	BMP Description	Implementation	Responsible Dept./Person	Measurable Goal	Year / Schedule						BMP Status
					1	2	3	4	5	6+	
					7/1/18-6/30/19	7/1/19-6/30/20	7/1/20-6/30/21	7/1/21-6/30/22	7/1/22-6/30/23	7/1/23-6/30/24	
<b>4. Construction Site Stormwater Runoff Control</b>											
4-1	Site Inspections and Enforcement	Existing regulations require site inspections and the ability to impose sanctions. Inspections may be performed by the Planning Board or an Environmental Site Monitor who must be a professional engineer or trained professional. The authority for site inspection and enforcement is clearly designated to the Planning Board. Existing regulations meet requirements, continue to enforce.	Planning Board, DPW/ Engineering, Conservation Commission, & Consultant	Complete within 1 year of the effective date.	*	*	*	*	*	*	Completed regulation Ongoing enforcement
4-2	Site Plan Review	Existing regulations require application submittal and outline procedures for site plan review, including a pre-construction review of the site design with a public hearing and notification of abutters. Developers must submit a plan that includes planned construction site operations and phasing, planned BMPs during construction, and planned BMPs to manage stormwater after development. Existing regulations meet requirements, continue to enforce. Track number of site reviews for annual reporting purposes.	Planning Board, DPW/ Engineering, Conservation Commission, & Consultant	Track number of reviews.	*	*	*	*	*	*	Completed regulation Ongoing enforcement
4-3	Erosion and Sediment Control	Existing regulations require construction operators to install erosion and sediment controls at construction sites and meet the Massachusetts Stormwater Management Standards. Existing regulations meet requirements, continue to enforce.	Planning Board and Selectmen	Complete within 1 year of the effective date.	*	*	*	*	*	*	Completed regulation Ongoing enforcement
4-4	Waste Control	Existing regulations require construction operators to properly manage on-site construction and waste materials, including concrete truck washout, chemicals, litter and sanitary waste. Existing regulations meet requirements, continue to enforce.	Planning Board, DPW/Engineering, Conservation Commission	Complete within 1 year of the effective date.	*	*	*	*	*	*	Completed regulation Ongoing enforcement
4-5	Construction Public Complaint Hotline	Establish a procedure for the receipt of information submitted by the public. This will be tracked under BMP 2-3.	Planning Board and DPW/Engineering	Record number of phone calls, copies of articles.	*	*	*	*	*	*	Ongoing

**Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities**

BMP ID	BMP Description	Implementation	Responsible Dept./Person	Measurable Goal	Year / Schedule						BMP Status
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<b>5. Stormwater Management in New Development and Redevelopment</b>											
5-1	Require Stormwater As-Built Plan Submittal	Existing regulations likely meet requirements. Regulations will be reviewed and updated as necessary. Continue to enforce.	Planning Board, DPW/ Engineering, Conservation Commission	Update regulations within 3 years of permit effective date.	*	*	*				Completed
5-2	Target Properties to Reduce Impervious Area	Identify 5 properties for potential retrofits to stormwater impacts.	Planning Board, DPW/ Engineering, Plant & Facilities	Complete inventory within 4 years of the permit effective date and update annually on retrofitted properties.				*			Completed
		Track and report annually properties that have been modified or retrofitted with BMPs. Update inventory as needed to keep 5 properties in inventory at all times.					*	*	*	Ongoing	
5-3	Allow Green Infrastructure	Review existing by-laws, regulations and guidance to determine the feasibility of making green practices allowable.	Planning Board	Complete within 4 years of the permit effective date.		*	*	*			Completed
		Prepare a report assessing existing local regulations to determine the feasibility of allowing green roofs, infiltration practices, and water harvesting devices.					*				
5-4	Street Design and Parking Lot Guidelines	Review existing by-laws, regulations and guidance pertaining to current street and parking lot design and all regulations for ability to incorporate LID into designs.	Planning Board	Complete within 4 years of the permit effective date.		*	*	*			Completed
		Prepare a report assessing whether existing street and parking lot design regulations allow for incorporation of LID practices and recommendations for changes.					*				
5-5	Update Bylaw	Update the stormwater bylaw and regulations to meet the retention or treatment requirements of the 2016 MS4 Permit. Include a requirement that stormwater management BMPs that ultimately discharge to a phosphorus impaired water body be optimized for phosphorus removal. The bylaws are currently under review.	Planning Board, DPW/ Engineering, Conservation Commission	Complete bylaw updates within 3 years of the permit effective date.		*	*				Completed
		Enforce post-construction stormwater management bylaw.					*	*	*	*	Ongoing

**Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities**

BMP ID	BMP Description	Implementation	Responsible Dept./Person	Measurable Goal	Year / Schedule						BMP Status
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					7/1/18-6/30/19	7/1/19-6/30/20	7/1/20-6/30/21	7/1/21-6/30/22	7/1/22-6/30/23	7/1/23-6/30/24	
<b>6. Good Housekeeping and Pollution Prevention</b>											
6-1	<b>Establish Operation and Maintenance Procedures</b>	Evaluate practices at MS4 properties (parks and open spaces, building and facilities, vehicles and equipment) and develop written Facilities O&M Plan.	DPW/Engineering and Plant & Facilities	Create written O&M Plan for open spaces, buildings and facilities, and vehicles and equipment within 2 years of the permit effective date.	*						Completed
		Distribute written O&M/SOPs as part of employee training.				*					Ongoing
6-2	<b>Inventory Open Spaces, Buildings and Facilities, and Vehicles and Equipment</b>	Inventory all permittee-owned parks and open spaces, building and facilities (including storm drains), and vehicles and equipment in the regulated area.	Plant & Facilities	Complete inventory of open spaces, buildings and facilities, and vehicles and equipment within 2 years of the permit effective date.	*						Completed
6-3	<b>Infrastructure O&amp;M Procedures</b>	Develop written O&M procedures or SOPs for repair and rehabilitation of MS4 infrastructure.	DPW/Engineering and Plant & Facilities	Create write O&M Plan for stormwater system within 2 years of the permit effective date.	*						Completed
		Distribute written O&M/SOPs as part of employee training.				*					Ongoing
6-4	<b>Develop SWPPPs for Applicable Facilities</b>	Evaluate the need for SWPPPs for municipal maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater.	DPW/Engineering and Plant & Facilities	Document whether a SWPPP is needed and where required.	*						Completed
		Complete SWPPP or document No Exposure as applicable.		Prepare SWPPPs if needed by July 1, 2020.	*						
6-5	<b>Catch Basin Cleaning</b>	A cleaning schedule with a goal of maintaining catch basins so that they remain less than 50% full of sediment has been developed.	DPW/Highway Division and Consultant	Clean catch basins on established schedule and report number of catch basins cleaned and volume of material moved annually.	*						Ongoing
		Clean catch basins as needed according to schedule.			*	*	*	*	*	*	
		Properly manage storage of catch basin residuals.			*	*	*	*	*	*	
6-6	<b>Street Sweeping</b>	Street sweeping procedures have been developed as part of the O&M plan. All streets and permittee owned properties are swept 2 times a year.	DPW/Highway Division	Sweep all streets and parking lots in accordance with permit conditions. At least annually and sweep all streets twice a year if within nutrient-impaired waterbody watersheds.	*						Completed
		Sweep streets in accordance with procedures and permit conditions.			*	*	*	*	*	*	
		Properly manage storage of street sweeping residuals.			*	*	*	*	*	*	Ongoing
6-7	<b>Road Salt Optimization Program</b>	Procedures for proper winter road maintenance, including use and storage of salt and sand, and procedures to minimize the use of road salt have been developed as part of the O&M plan.	DPW/Highway Division	Implement salt use optimization during winter maintenance operations.	*						Completed
		Implement winter operation and maintenance items.			*	*	*	*	*	*	Ongoing
6-8	<b>Inspect and Maintain Stormwater BMPs</b>	Written inspection and maintenance procedures and frequencies for inspection of all structural stormwater BMPs have been established as part of the O&M plan.	DPW/Highway Division, Plant and Facilities Dept., Water/Sewer Dept.	Create written O&M Plan for stormwater BMPs within 2 years of the permit effective date.	*						Completed
		Annually inspect MS4-owned stormwater treatment BMPs. Document inspections and maintenance performed.		Inspect BMPs annually and maintain as needed.	*	*	*	*	*	*	Ongoing
6-9	<b>Paving Equipment Storage</b>	Store paving tools and equipment indoors.	DPW/Highway Division	Designated indoor storage area. Record of memo.	*	*	*	*	*	*	Ongoing
6-10	<b>Marking Paint Equipment</b>	Rinse marking paint equipment into the sanitary sewer.	DPW/Highway Division	Designated indoor storage area. Record of memo.	*	*	*	*	*	*	Ongoing
6-11	<b>Sediment Reduction into Storm Drain</b>	Reduce sediment entering the storm drain system through sweeping and inspections.	DPW/Highway Division	Records of sweeping and inspection records.	*	*	*	*	*	*	Ongoing
6-12	<b>Vehicle Washing</b>	Wash highway vehicles in accordance with MassDEP regulations.	DPW/Highway Division/Police/Fire	Record of memo.	*	*	*	*	*	*	Ongoing
6-13	<b>Fueling Station BMPs</b>	Implement stormwater BMPs at the fueling station.	Plant and Facilities Dept.	Repair records. As-built sketches or plans. Record of memo.	*	*	*	*	*	*	Controls are present
6-14	<b>CaCl Storage</b>	Develop a use and storage plan for CaCl at the Town Yard.	DPW/Highway Division	Use and storage plan. As-built sketches or action taken. Record of memo.	*						

**Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities**

BMP ID	BMP Description	Implementation	Responsible Dept./Person	Measurable Goal	Year / Schedule						BMP Status
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					7/1/18-6/30/19	7/1/19-6/30/20	7/1/20-6/30/21	7/1/21-6/30/22	7/1/22-6/30/23	7/1/23-6/30/24	
<b>7. TMDL and Impaired Waters Controls</b>											
<b>Pathogen TMDL &amp; Water Quality Limited - Rogers Brook, Shawsheen River, Pinnacle Brook, Fish Brook, Merrimack River</b>											
7-1 (covered under 1-1)	<b>Public Education</b>	Andover has included management of pet waste and septic system maintenance with the Residential public education program.	Plant & Facilities, DPW, Board of Health	Issue additional annual messages.	*	*	*	*	*	*	Ongoing
7-2 (covered under 3-3)	<b>IDDE Catchment Prioritization</b>	Andover has designated catchments draining to bacteria/pathogen impaired segments as "Problem Catchments" or "High" priority catchments in IDDE ranking.	Plant & Facilities, DPW, Board of Health	Include in the IDDE Plan.	*	*	*	*	*	*	Ongoing - updates as new information is collected
<b>Phosphorus Water Quality Limited - Merrimack River</b>											
7-3 (covered under 1-1 & 1-2)	<b>Public Education</b>	Supplement the Residential and Business/Commercial/Institution education programs with additional annual messages: - Spring (April-May): Proper management of grass clippings, use of fertilizers - Summer (June-July): Proper management of pet waste - Fall (August-October): Proper disposal of leaf litter	Plant & Facilities, DPW	Distribute materials with Residential and Commercial education programs.		*	*	*	*	*	Ongoing
7-4 (covered under 5-1)	<b>Regulatory Updates</b>	Include a requirement in the regulatory mechanism that new development and redevelopment stormwater management BMPs be optimized for phosphorus removal.	Plant & Facilities, DPW	Complete bylaw updates within 2 years of the permit effective date.		*					Completed
7-5 (covered under 5-2)	<b>Retrofit Opportunities</b>	Consider BMPs to reduce phosphorus discharges when identifying MS4 properties for retrofits.	Plant & Facilities, DPW	Evaluate stormwater BMPs for phosphorus removal during facility inventory and retrofit analysis.		*	*	*			Initial inventory and BMP identification completed for developed properties
7-6 (covered under 6-1)	<b>Grounds Maintenance</b>	Incorporate phosphorus reduction practices into Town good housekeeping practices such as fertilizer use and managing grass cuttings and leaf litter.	Plant & Facilities, DPW	Create written O&M Plan for open spaces, buildings and facilities, and vehicles and equipment within 2 years of the permit effective date.		*					Incorporated into O&M Plan SOPs
7-7 (covered under 6-6)	<b>Street Sweeping</b>	Increase street sweeping to twice per year (spring and fall) for catchment areas within phosphorus-impaired waterbody watersheds.	Plant & Facilities, DPW	Sweep all streets and parking lots within phosphorus-impaired waterbody watersheds twice per year.	*	*	*	*	*	*	Completed
7-8	<b>Phosphorus Identification Report</b>	Prepare a Phosphorus Source Identification Report to identify high priority areas within the community, determine impervious areas, evaluate results of screening activities performed under minimum control measure 3, and outline potential retrofit opportunities.	Plant & Facilities, DPW	Complete Phosphorus Source Identification Report within 4 years of the permit effective date.				*			Completed
7-9	<b>Demonstration BMP</b>	Evaluate municipal properties for potential BMPs to construct one BMP that will treat phosphorus, determine estimated costs, and determines engineering and regulatory feasibility.	Plant & Facilities, DPW	Evaluate municipal facilities within 5 years of the permit effective date to determine candidates for a phosphorus BMP.					*	*	Initial inventory and BMP identification completed for developed properties
		Design and construct at least one BMP as a public demonstration project.		Installed BMP within 6 years of the permit effective date.					*		Not started
		Track BMPs installed, including type, location, total area treated, design storage volume and estimated phosphorus removal and report annually.		Summary progress table.					*		Not started

**Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities**

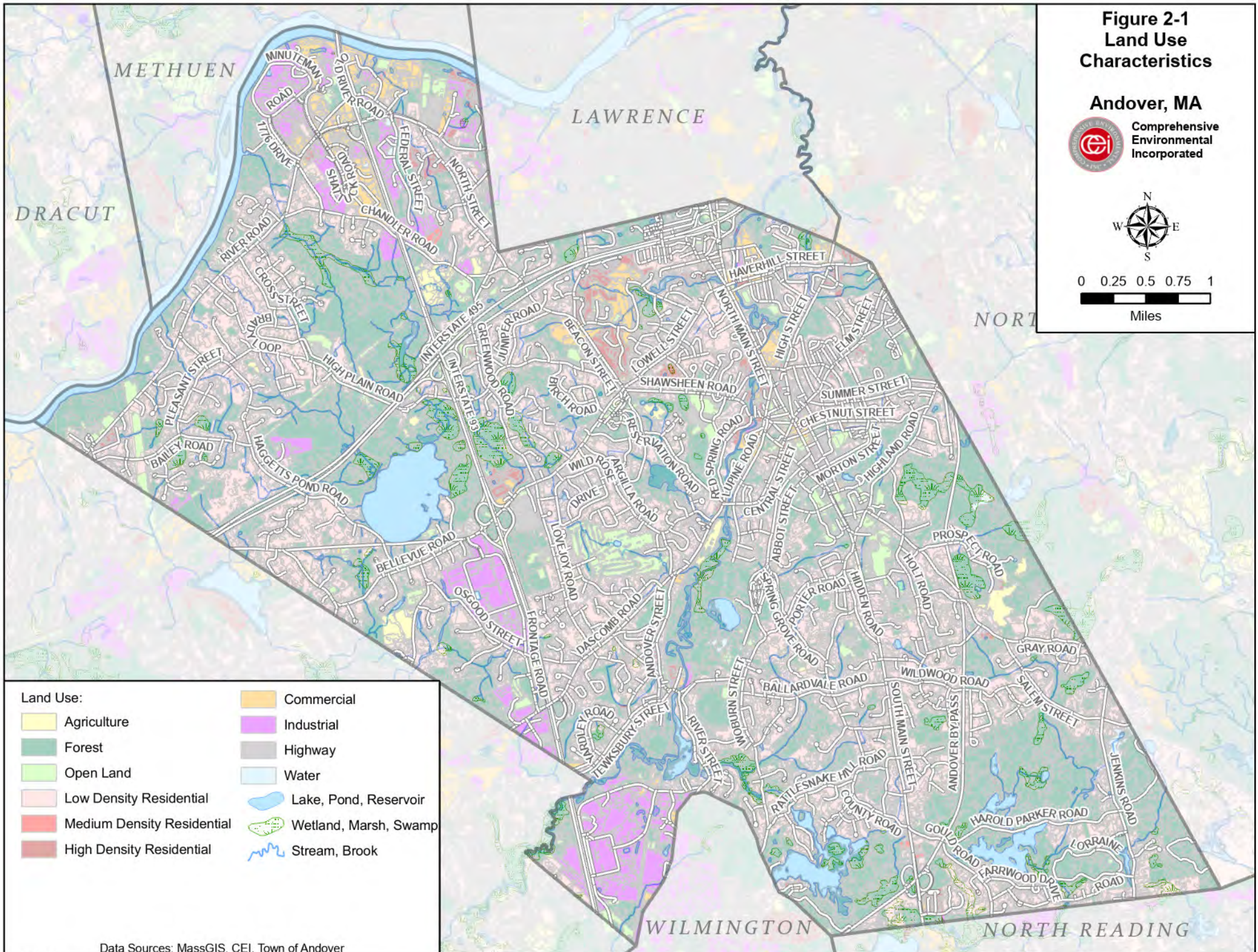
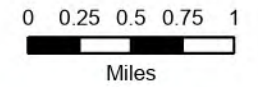
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<b>7. TMDL and Impaired Waters Controls</b>											
<b>Chloride Water Quality Limited - Fish Brook, Unnamed Tributary to Shawsheen River starts near Dascomb Road, Pinnacle Brook</b>											
7-10	Salt Reduction Plan	Develop a Salt Reduction Plan and schedule designed to achieve salt reduction on municipal roads and facilities and on private facilities that discharge to its MS4.	Plant & Facilities, DPW	Develop Salt Reduction Plan within 3 years of the permit effective date.			*				Completed
		Implement Salt Reduction Plan.		Implement Salt Reduction Plan within 5 years of the permit effective date.				*	*	In progress	
7-11 (combine with 1-2 & 1-4)	Public Education	Supplement Commercial/Industrial education program with an annual message to private road salt applicators and commercial and industrial site owners on the proper storage and application rates of winter deicing material.	Plant & Facilities, DPW	Distribute materials throughout entire public education program.			*	*	*	*	Education materials posted online
7-12 (also see 6-7)	Salt Management	Establish procedures and requirements to minimize salt usage and require use of salt alternatives where determined necessary.	Plant & Facilities, DPW	Complete bylaw updates within 3 years of the permit effective date.			*				Completed
7-13	Salt Tracking	Track and report amount of salt applied to all municipally owned surfaces during annual reporting upon completion of Salt Reduction Plan.	Plant & Facilities, DPW	Summary progress table.			*	*	*	*	Ongoing
<b>Turbidity Water Quality Limited - Brackett Pond, Rogers Brook, Collins Pond, Salem Pond, Rabbit Pond</b>											
7-14	Design Standards	Mandate that designs of stormwater systems on commercial and industrial land uses allow for spill containment.	Plant & Facilities, DPW	Adopt new design guidelines for commercial and industrial construction within 2 years of the effective permit date.		*					Completed
7-15 (covered under 6-6)	Street Sweeping	Enhanced BMPs - Good Housekeeping and Pollution Prevention. Increase street sweeping for areas with higher pollutant loads. This has been addressed under BMP 6-6.	Plant & Facilities, DPW	Increase street sweeping if needed.	*	*	*	*	*	*	Completed
7-16 (covered under 6-5)	Catch Basin Cleaning	Enhanced BMPs - Good Housekeeping and Pollution Prevention. Increase catch basin cleaning if inspections indicate that more frequent cleaning is necessary. This as been addressed under BMP 6-5.	Plant & Facilities, DPW	Increase catch basin cleaning if needed.	*	*	*	*	*	*	Completed - priority areas identified based on past cleaning

**Figure 2-1  
Land Use  
Characteristics**

**Andover, MA**



Comprehensive  
Environmental  
Incorporated



Land Use:	
	Agriculture
	Forest
	Open Land
	Low Density Residential
	Medium Density Residential
	High Density Residential
	Commercial
	Industrial
	Highway
	Water
	Lake, Pond, Reservoir
	Wetland, Marsh, Swamp
	Stream, Brook

Data Sources: MassGIS, CEI, Town of Andover

Figure 2-2  
Impervious Area

Andover, MA



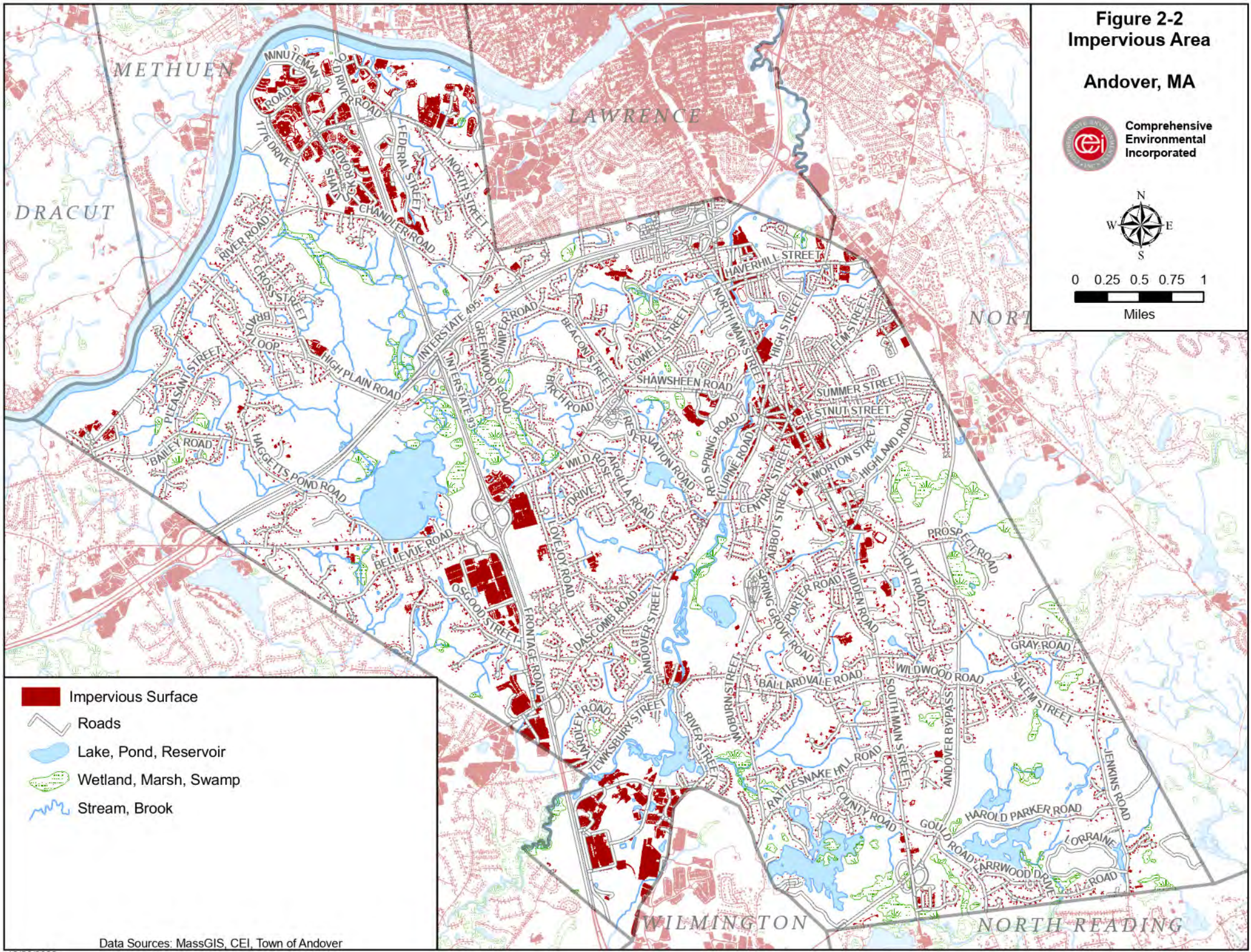
Comprehensive  
Environmental  
Incorporated



0 0.25 0.5 0.75 1



Miles

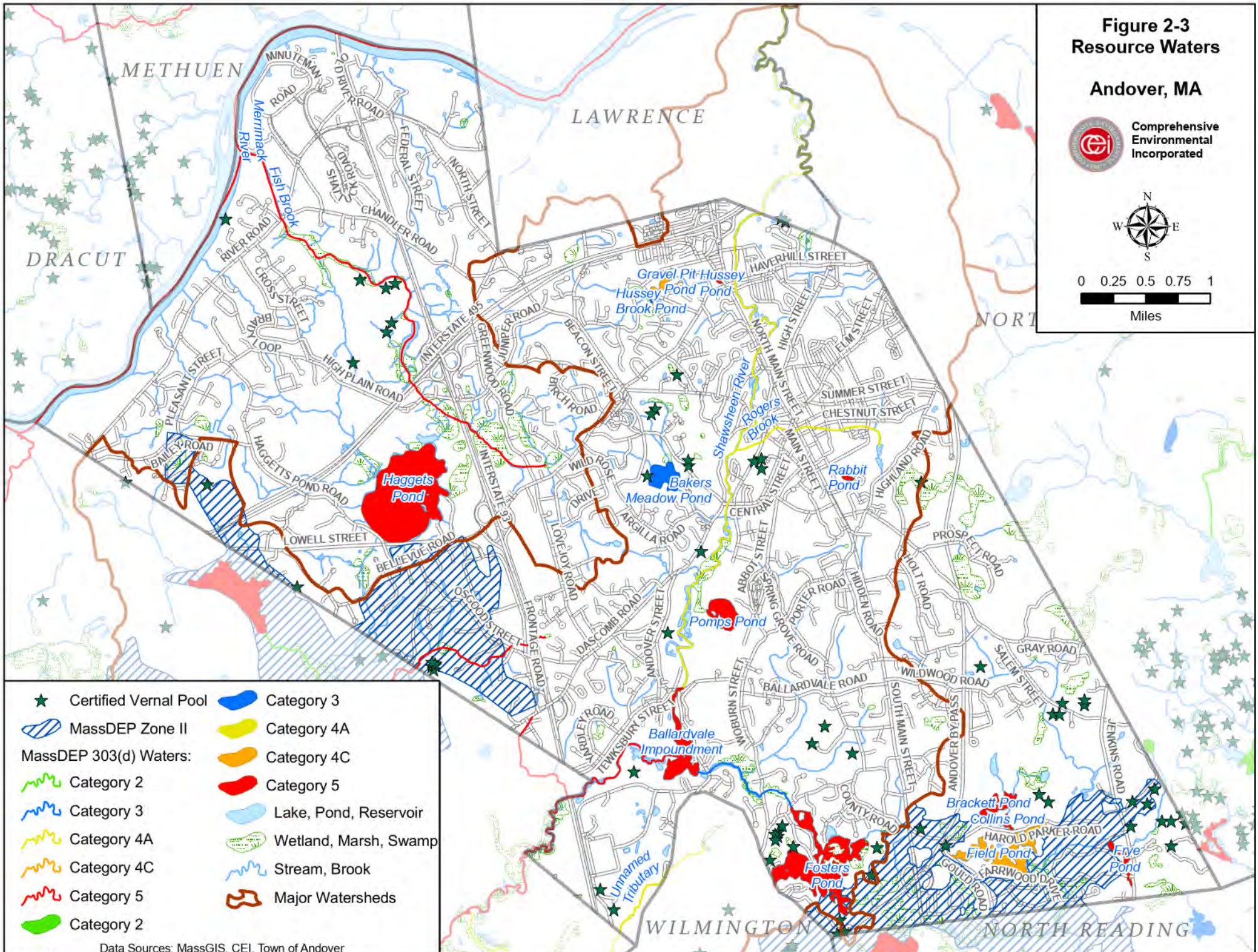
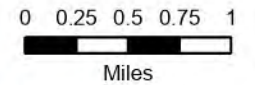


- Impervious Surface
- Roads
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook

Data Sources: MassGIS, CEI, Town of Andover

**Figure 2-3  
Resource Waters**

**Andover, MA**



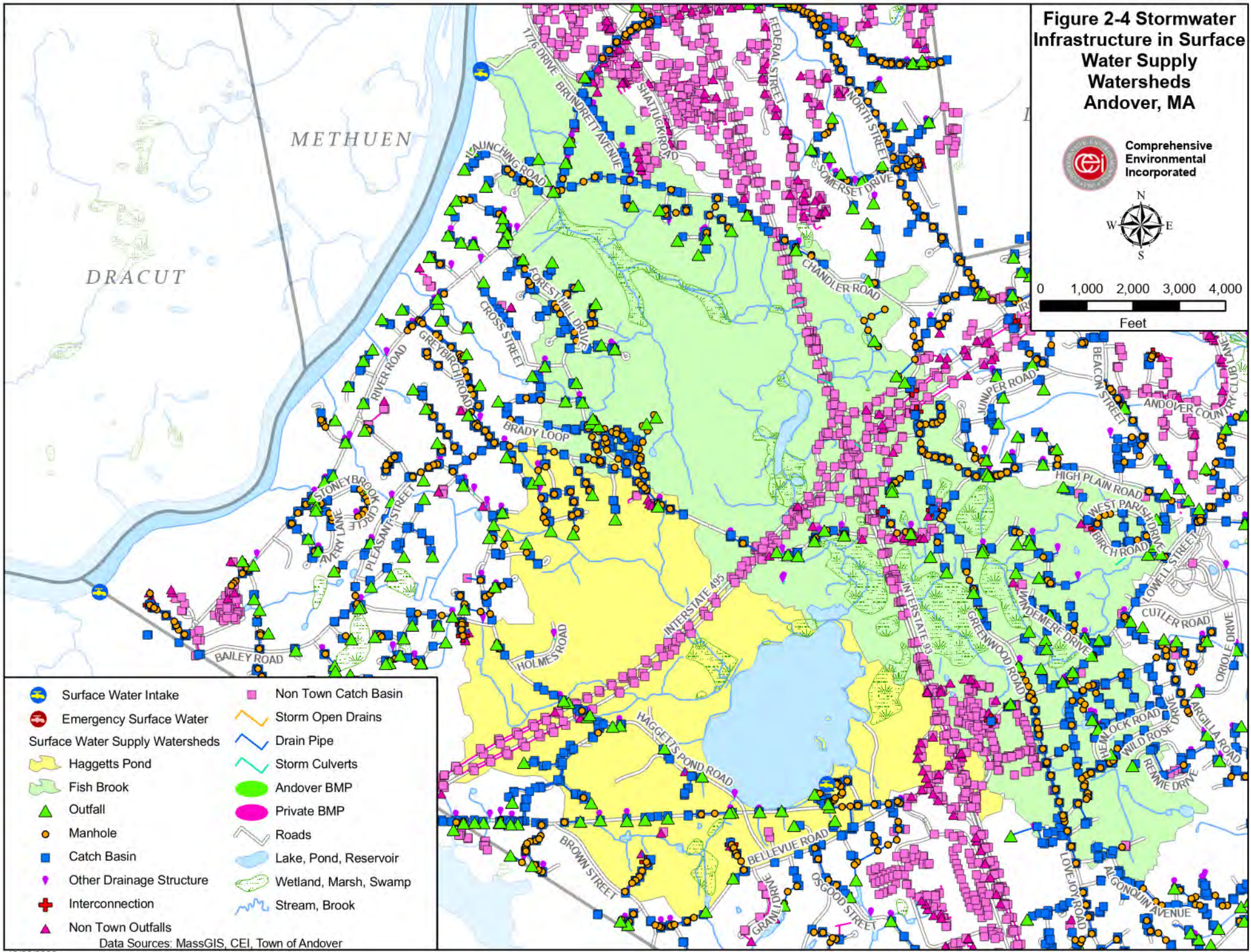
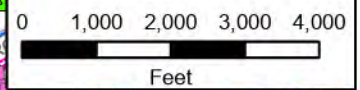
- ★ Certified Vernal Pool
- ▨ MassDEP Zone II
- MassDEP 303(d) Waters:
- Category 2
- Category 3
- Category 4A
- Category 4C
- Category 5
- Category 2
- Category 3
- Category 4A
- Category 4C
- Category 5
- Category 2
- Category 3
- Category 4A
- Category 4C
- Category 5
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook
- Major Watersheds

Data Sources: MassGIS, CEI, Town of Andover

**Figure 2-4 Stormwater Infrastructure in Surface Water Supply Watersheds Andover, MA**



Comprehensive Environmental Incorporated



- |                                 |                       |
|---------------------------------|-----------------------|
| Surface Water Intake            | Non Town Catch Basin  |
| Emergency Surface Water         | Storm Open Drains     |
| Surface Water Supply Watersheds | Drain Pipe            |
| Haggetts Pond                   | Storm Culverts        |
| Fish Brook                      | Andover BMP           |
| Outfall                         | Private BMP           |
| Manhole                         | Roads                 |
| Catch Basin                     | Lake, Pond, Reservoir |
| Other Drainage Structure        | Wetland, Marsh, Swamp |
| Interconnection                 | Stream, Brook         |
| Non Town Outfalls               |                       |

Data Sources: MassGIS, CEI, Town of Andover

## Appendix A

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### 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:  State:

EPA NPDES Permit Number (if applicable):

### Primary MS4 Program Manager Contact Information

Name:  Title:

Street Address Line 1:

Street Address Line 2:

City:  State:  Zip Code:

Email:  Phone Number:

Fax Number:

### Other Information

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

### Eligibility Determination

Endangered Species Act (ESA) Determination Complete?  Eligibility Criteria (check all that apply):  A  B  C

National Historic Preservation Act (NHPA) Determination Complete?  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)  If 100% of 2003 requirements not met, enter an estimated date of completion (MM/DD/YY):

Web address where MS4 map is published:   
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)  Effective Date or Estimated Date of Adoption (MM/DD/YY):

Construction/Erosion and Sediment Control (ESC) Authority Adopted? (Part II, III, IV or V, Subpart B.4.(a.) of 2003 permit)  Effective Date or Estimated Date of Adoption (MM/DD/YY):

Post- Construction Stormwater Management Adopted? (Part II, III, IV or V, Subpart B.5.(a.) of 2003 permit)  Effective Date or Estimated Date of Adoption (MM/DD/YY):

## 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](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	Pollutants									Other pollutant(s) causing impairments
		Chloride	Chlorophyll-a	Dissolved Oxygen/DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	
MA83-16 Tributary to Foster Pond, known as "Fosters Brook"	20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No impairments
MA83002 Bakers Meadow Pond (BMP)	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No impairments
MA83008 Hussey Brook Pond	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	No impairments
MA83-18 Shawsheen River (SR)	3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mercury In Fish Tissue, Fecal Coliform
MA83-19 Shawsheen River (SR)	56	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Fecal Coliform
MA92004 Brackett Pond		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
MA92010 Collins Pond		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Excess Algal Growth
MA92023 Frye Pond	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Excess Algal Growth, Noxious Aquatic Plants
MA92057 Salem Pond		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
MA84A-40 Fish Brook	12	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
MA84022 Haggets Pond	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mercury in Fish Tissue
MA83011 Ballardvale Impoundment (BI)	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Non-native Aquatic Plants, Aquatic Plants (Macrophytes), Mercury in Fish Tissue
MA83005 Fosters Pond (FP)	4	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Non-native Aquatic Plants, Mercury in Fish Tissue, Metals, Exotic Species
MA83009 Hussey Pond	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Excess Algal Growth
MA83014 Pumps Pond		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Non-Native Aquatic Plants, Mercury in Fish Tissue
MA83015 Rabbit Pond	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
MA83-04 Rogers Brook	16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Physical Substrate Habitat Alterations, Fecal Coliform, Pathogens
MA84A-03 Merrimack River (MR)	19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		





		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
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		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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

<b>BMP Media/Category</b> (enter your own text to override the drop down menu)	<b>BMP Description</b>	<b>Targeted Audience</b>	<b>Responsible Department/Parties</b> (enter your own text to override the drop down menu)	<b>Measurable Goal</b>	<b>Beginning Year of BMP Implementation</b>
Brochures/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	External Contractor	- Number distributed - Resident testimonials	2018-22
Brochures/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	External Contractor	- Number distributed - Resident testimonials	2018
Workshop/ Info Sheet	Workshop and associated literature will discuss LID options for reducing runoff and promoting on-site infiltration. Pricing, maintenance and ordinances will also be discussed.	Developers (construction)	External Contractor	- Number of attendees - Increase in LID use	2018

<p>Displays/Posters/Kiosks</p>	<p>Informational poster will be posted in area with heavy dog/walker traffic. Poster will describe proper pet waste management and disposal.</p>	<p>Residents</p>	<p>External Contractor</p>	<p>- Pilot surveys may be conducted before and after message postings</p>	<p>2018</p>
<p>Social Media Post</p>	<p>Greenscapes will provide content for a social media "blast" on town Facebook etc. EX. Autumnal facebook post describing proper disposal of lead collection, or springtime post about proper lawn/fertilizer maintenance.</p>	<p>Residents</p>	<p>External Contractor</p>	<p>- Residents testimonials before and after posting - Reduction in water impairment</p>	<p>2018-22</p>
<p>School Curricula/Programs</p>	<p>"Elementary School Name" will host Greenscapes "Keeping Water Clean" Program.</p>	<p>Residents</p>	<p>Schools</p>	<p>- Number of students/ teachers/ volunteers in attendance - Students may be evaluated before and after the program</p>	<p>2018-22</p>
<p>Brochures/Pamphlets</p>	<p>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.</p>	<p>Industrial Facilities</p>	<p>External Contractor</p>	<p>- Number distributed - Phone call follow-up</p>	<p>2019</p>

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	External Contractor	- Number of attendees - Number of presentations re-distributed to commercial representatives.	2019
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	External Contractor	- Number distributed - Resident testimonials	2019
Brochures/Pamphlets	Pet Waste literature is available in two forms (one page info sheet or rack card) and can be redistributed as necessary.	Residents	External Contractor	- Number distributed - Resident testimonials	2019-22
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)	DPW Construction	- Number of attendees	2020
Workshop	Story Map will outline and describe different examples of existing low-impact-developments in the North Shore Community.	Residents	External Contractor	- Number of map views - Resident testimonials on LID awareness	2020

<p>Meeting/ Presentation</p>	<p>Presentation will discuss proper "greenscaping" practices on a business/commercial level. Content will be targeted to property managers and will include sand/salt storage and landscape management.</p>	<p>Businesses, Institutions and Commercial Facilities</p>	<p>External Contractor</p>	<p>- Number of attendees</p>	<p>2021</p>
<p>Meeting/ Presentation</p>	<p>Presentation will discuss proper "greenscaping" practices on an industrial level. Content will be targeted to property managers and will include sand/salt storage and landscape management.</p>	<p>Industrial Facilities</p>	<p>External Contractor</p>	<p>- Number of attendees</p>	<p>2021</p>
<p>Brochures/Pamphlets</p>	<p>"What not to Flush" rack card will raise resident awareness of the damages of flushing things like wipes and grease in their toilets/sinks.</p>	<p>Residents</p>	<p>External Contractor</p>	<p>- Number distributed - Resident testimonials</p>	<p>2021</p>
<p>Meeting/ Presentation</p>	<p>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.</p>	<p>Residents</p>	<p>External Contractor</p>	<p>- Number of attendees - Residential testimonials</p>	<p>2022</p>

<p>Special Events/Festivals/Fairs</p>	<p>Greenscapes representatives will attend a trade show expo, with the intent of sharing "Greenscaping" practices and the importance of LIDs with Landscapers and Developers.</p>	<p>Developers (construction)</p>	<p>External Contractor</p>	<p>- Number of attendees</p>	<p>2022</p>

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

Part III: Stormwater Management Program Summary (continued)

**MCM 2: Public Involvement and Participation**

<b>BMP Categorization</b>	<b>Brief BMP Description</b> (enter your own text to override the drop down menu)	<b>Responsible Department/Parties</b> (enter your own text to override the drop down menu)	<b>Additional Description/ Measurable Goal</b>	<b>Beginning Year of BMP Imple- mentation</b>
Public Review	SWMP Review	Department of Public Works/Engineering	Allow annual review of stormwater management plan and posting of stormwater management plan on website	2019
Public Participation	Public Surveys - Opinions, behaviors, etc.	Department of Public Works/Engineering/Information Technology	Allow public to comment on stormwater management plan annually	2019
Public Participation	Reduce Pesticide Usage in the Fish Brook Watershed	Pesticide Reduction Task Force (Town Departments and Residents)	Implement a Pesticide Use Policy	2017
Public Participation	Establish a Stormwater Call Directory	Department of Public Works/Engineering Dept., Water Dept., and Town Website I	Record number of calls to each Department	2017
Public Participation	Establish Classroom Education/Field Trip Program	Department of Public Works/Engineering Dept. Water Dept., and Education Depa	Host one annual classroom educational event or field trip	2003
Public Participation	Catch Basin Stenciling/Markers	DPW, Engineering Dept., Water Dept., and Volunteers	100% of storm drains marked, with door hangers placed in associated neighborhoods.	2003
Public Participation	Work With Watershed Organizations to Incorporate Stormwater Inform	Department of Public Works/Engineering Dept., Water Dept., and Conservation C	Document quarterly meeting topics. Agenda, meeting notes, and attendance sheets. Copies of advertisements and articles about programs.	2003



## 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)

<b>BMP Categorization</b> (enter your own text to override the drop down menu)	<b>BMP Description</b>	<b>Responsible Department/Parties</b> (enter your own text to override the drop down menu)	<b>Measurable Goal</b> (all text can be overwritten)	<b>Beginning Year of BMP Implementation</b>
SSO inventory	Develop SSO inventory in accordance of permit conditions	Department of Public Works/Water & Sewer Division	Complete within 1 year of effective date of permit	2012
Storm sewer system map	Create map and update during IDDE program completion	Department of Public Works/Engineering Dept., Consultant	Update map within 2 years of effective date of permit and complete full system map 10 years after effective date of permit	2003
Written IDDE program	Create written IDDE program	Department of Public Works/Engineering Dept., Water Dept., Board of Health	Complete within 1 year of the effective date of permit and update as required	2003
Implement IDDE program	Implement catchment investigations according to program and permit conditions	Department of Public Works/Engineering Dept., Water Dept., Board of Health	Complete 10 years after effective date of permit	2003
Employee training	Train employees on IDDE implementation	Highway Department	Train annually	2003
Conduct dry weather screening	Conduct in accordance with outfall screening procedure and permit conditions	Department of Public Works/Engineering Dept.	Complete 3 years after effective date of permit	2018
Conduct wet weather screening	Conduct in accordance with outfall screening procedure	Department of Public Works/Engineering Dept.	Complete 10 years after effective date of permit	2020
Ongoing screening	Conduct dry weather and wet weather screening (as necessary)	Department of Public Works/Engineering Dept.	Complete ongoing outfall screening upon completion of IDDE program	2018
IDDE Plan - Illegal Dumping Program	Establish a Procedure to Receive Calls	Department of Public Works/ Engineering Dept., and Board of Health	Log of complaints and actions taken.	2011
IDDE Ordinance/Bylaw	Develop Illicit Discharge Prohibition Ordinance	Planning Board, Board of Health, and Selectmen	Obtain authorization to control inputs to the municipal drainage system.	2003



### 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

<b>BMP Categorization</b> (enter your own text to override the drop down menu or entered text)	<b>BMP Description</b>	<b>Responsible Department/Parties</b> (enter your own text to override the drop down menu)	<b>Measurable Goal</b> (all text can be overwritten)	<b>Beginning Year of BMP Implementation</b>
Site inspection and enforcement of Erosion and Sediment Control (ESC) measures	Complete written procedures of site inspections and enforcement procedures	Planning Board, Dept. of Public Works/ Engineering Dept., Conservation Commis:	Complete within 1 year of the effective date of permit	2009
Site plan review	Complete written procedures of site plan review and begin implementation	Planning Board, Dept. of Public Works/ Engineering Dept., Conservation Commis:	Complete within 1 year of the effective date of permit	2009
Erosion and Sediment Control	Adoption of requirements for construction operators to implement a sediment and erosion control program	Planning Board and Selectmen	Complete within 1 year of the effective date of permit	2008
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	Planning Board, Dept. of Public Works/ Engineering Dept., Conservation Commis:	Complete within 1 year of the effective date of permit	2008
Construction Public Complaint Hotline	Establish a Procedure for the Receipt of Information Submitted by the Public	Planning Board and Department of Public Works/ Engineering Dept.	Record number of phone calls, copies of articles.	2003



### 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**

<b>BMP Categorization</b> (enter your own text to override the drop down menu or entered text)	<b>BMP Description</b>	<b>Responsible Department/Parties</b> (enter your own text to override the drop down menu)	<b>Measurable Goal</b> (all text can be overwritten)	<b>Beginning Year of BMP Implementation</b>
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 Board, Dept. of Public Works/ Engineering Dept., Conservation Commis:	Require submission of as-built plans for completed projects	2019
Target properties to reduce impervious areas	Identify at least 5 permittee-owned properties that could be modified or retrofitted with BMPs to reduce impervious areas and update annually	Planning Board, Dept. of Public Works/ Engineering Dept., Plant & Facilities	Complete 4 years after effective date of permit and report annually on retrofitted properties	2018
Allow green infrastructure	Amend the Stormwater Regulations as needed to allow green infrastructure practices when appropriate site conditions exist.	Planning Board	Complete 4 years after effective date of permit and implement recommendations of report	2019
Street design and parking lot guidelines	Research feasibility and implement as appropriate design standards for streets and parking lots to support low impact design options.	Planning Board	Complete 4 years after effective date of permit and implement recommendations of report	2019



### 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

<b>BMP Categorization</b> (enter your own text to override the drop down menu or entered text)	<b>BMP Description</b>	<b>Responsible Department/Parties</b> (enter your own text to override the drop down menu)	<b>Measurable Goal</b> (all text can be overwritten)	<b>Beginning Year of BMP Implementation</b>
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	Department of Public Works/Engineering and Plant & Facilities	Complete and implement 2 years after effective date of permit	2003
Inventory all permittee-owned parks and open spaces, buildings and facilities, and vehicles and equipment	Create inventory	Plant & Facilities	Complete 2 years after effective date of permit and implement annually	2019
Infrastructure O&M	Establish and implement program for repair and rehabilitation of MS4 infrastructure	Department of Public Works/Engineering and Plant & Facilities	Complete 2 years after effective date of permit	2003
Stormwater Pollution Prevention Plan (SWPPP)	Create SWPPP for the Municipal Services Facility on Campanelli Drive	Department of Public Works/Engineering and Plant & Facilities	Complete and implement 2 years after effective date of permit	2019
Catch basin cleaning	Establish schedule for catch basin cleaning such that each catch basin is no more than 50% full and clean catch basins on that schedule	Department of Public Works/Highway Division and Consultant	Clean catch basins on established schedule and report number of catch basins cleaned and volume of material moved annually	2003
Street sweeping program	Sweep all streets and permittee-owned parking lots in accordance with permit conditions	Department of Public Works/Highway Division	Sweep all streets and permittee-owned parking lots once per year in the spring	2003
Road salt use optimization program	Establish and implement a program to minimize the use of road salt	Department of Public Works/Highway Division	Implement salt use optimization during deicing season	2003

Inspections and maintenance of stormwater treatment structures	Establish and implement inspection and maintenance procedures and frequencies	Department of Public Works/Highway Division, Plant and Facilities Dep	Inspect and maintain treatment structures at least annually. Written policy. Records of inspections and maintenance.	2003
O&M Program (General)	Store Paving Tools and Equipment Indoors	Department of Public Works/Highway Division	Designated indoor storage area. Record of Memo.	2003
O&M Program (General)	Rinse Marking Paint Equipment into the Sanitary Sewer	Department of Public Works/Highway Division	Designated indoor storage area. Record of Memo.	2003
O&M Program (General)	Reduce Sediments Entering Storm Drain System	Department of Public Works/Highway Division	Records of sweeping and inspection records.	2003
O&M Program (Vehicle Washing)	Washing Highway Vehicles in accordance with MassDEP Regulations	Department of Public Works/Highway Division/Police/Fire	Record of Memo.	2003
O&M Program (General)	Implement Stormwater BMPs at the Fueling Station	Plant and Facilities Dept.	Repair Records. Better housekeeping for small spills. As-built sketches or plans. Record of memo.	2003
O&M Program (Grounds Care/Integrate Pest Management)	Develop a Use and Storage Plan for CaCl at the Town Yard	Department of Public Works/Highway Division	Use and Storage Plan. As-built sketches or action taken. Record of memo.	2018



### 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 <small>(enter your own text to override the drop down menu)</small>
Turbidity	MA92004, MA92010, MA92057, MA83015, MA83-04	Adhere to requirements in part V of Appendix H	Plant & Facilities, Department of Public Works
Fecal Coliform	MA83-18, MA83-19, MA83-04, MA83-15	Adhere to requirements in part III of Appendix H	Plant & Facilities, Department of Public Works, Board of Health
E. Coli	MA84A-40, MA84A-03, MA84A-04	Adhere to requirements in part III of Appendix H	Plant & Facilities, Department of Public Works, Board of Health
Chloride	MA84A-40, MA83-15, MA83-20	Adhere to requirements in part IV of Appendix H	Plant & Facilities, Department of Public Works
Phosphorus	MA84A-03, MA84A-04	Adhere to requirements in part II of Appendix H	Plant & Facilities, Department of Public Works
	Not needed	Adhere to requirements in part IV of Appendix H	
	Not needed	Adhere to requirements in part III of Appendix H	
	Not needed	Adhere to requirements in part II of Appendix H	
	Not needed	Adhere to requirements in part I of Appendix H	
	Not needed	Adhere to requirements in part IV of Appendix H	
	Not needed	Adhere to requirements in part IV of Appendix H	
	Not needed	Adhere to requirements in part II of Appendix H	
	Not needed	Adhere to requirements in part II of Appendix H	

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

## Part IV: Notes and additional information

Use the space below to indicate the part(s) of 2.2.1 and 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.

The proposed action under the permit is not likely to adversely affect any Federally-listed endangered or threatened species, including the Northern Long-eared Bat or its formally designated critical habitat. US Fish and Wildlife will be consulted as needed during the permit term on any future BMPs.

Please ignore any "Action Descriptions" where all other columns are blank in Part III: Actions for Meeting Requirements Related to Water Quality Limited Waters. The submission only includes the first five (5) rows listed on page 22.

# 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:

Title:

Signature: 

Date:

[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



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

**VIA EMAIL**

June 4, 2019

Andrew Flanagan  
Town Manager

And;

Andrew Flanagan  
Town Manager  
36 Bartlet Street  
Andover, MA. 01810  
aflanagan@andoverma.gov

Re: National Pollutant Discharge Elimination System Permit ID #: MAR041178, Town of Andover

Dear Andrew Flanagan:

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

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

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

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

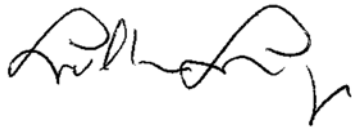
any questions regarding this permit please contact Newton Tedder at [tedder.newton@epa.gov](mailto:tedder.newton@epa.gov) or (617) 918-1038.

Sincerely,



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

and;



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

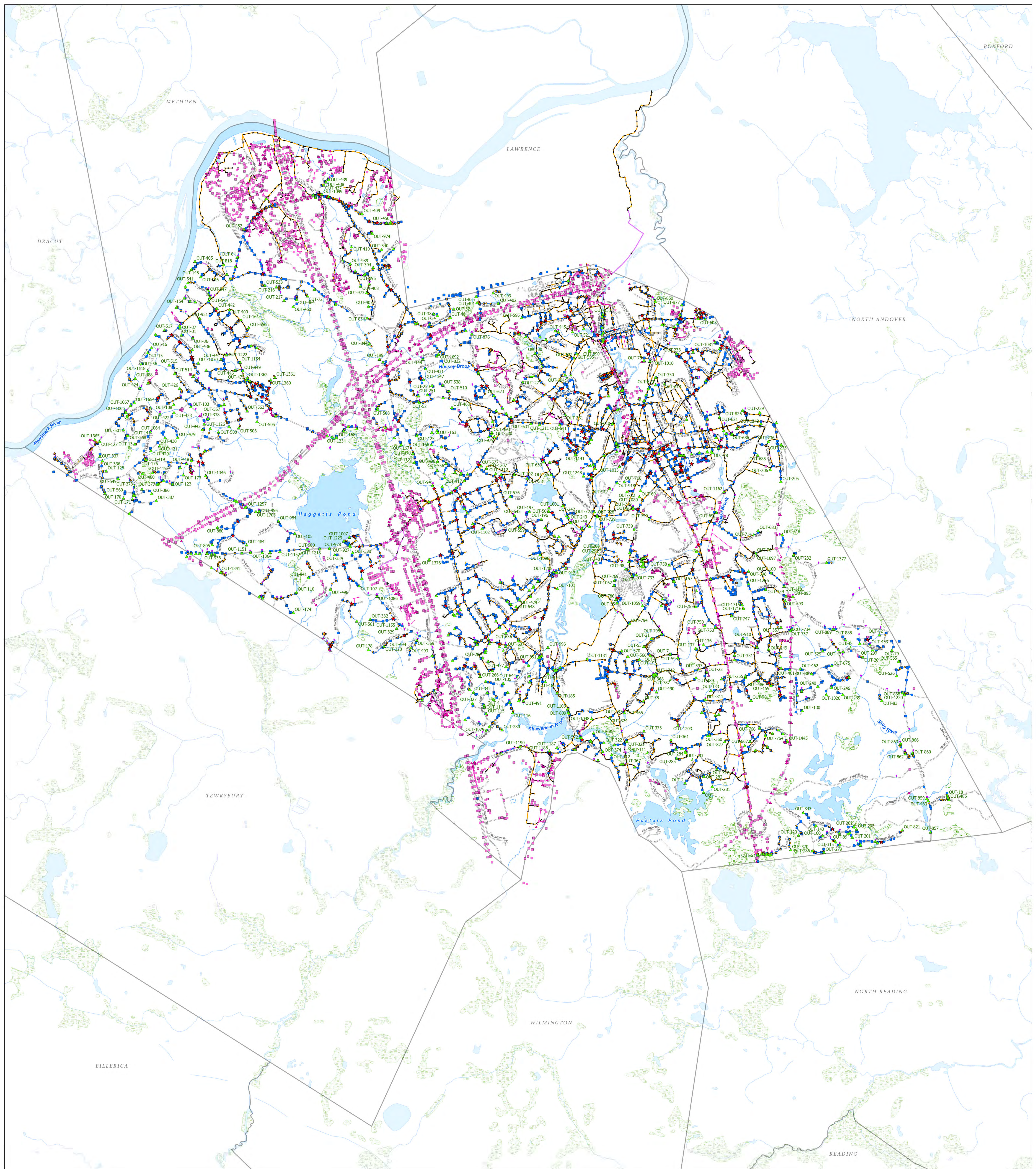
## Appendix B

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### Stormwater System Mapping

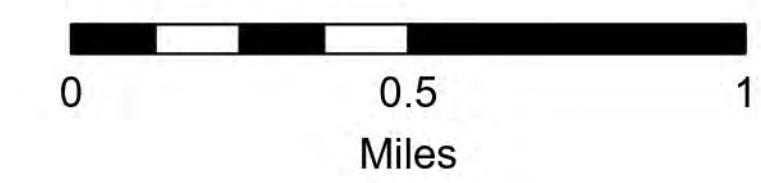
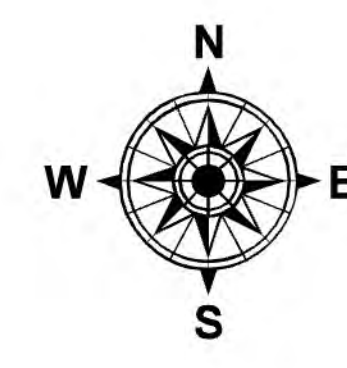
## Mapping Status

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



**Legend**

- ▲ Outfall
- Manhole
- Catch Basin
- ◆ Other Drainage Structure
- ★ Interconnection
- ★ Key Junction Structure
- ▲ Non Town Outfalls
- ▲ Non Town Catch Basin
- ▲ Drain Pipe
- ▲ Storm Culverts
- ▲ Storm Open Drains
- ▲ Non Town Drain Pipe
- ▲ Andover BMP
- ▲ Private BMP
- ▲ Sewer Gravity Mains
- ▲ Sewer Pressurized Mains
- ▲ Roads
- ▲ Lake, Pond, Reservoir
- ▲ Wetland, Marsh, Swamp
- ▲ Stream, Brook



**Stormwater Infrastructure Map**

**Andover, MA**

Comprehensive  
Environmental  
Incorporated



Note: All of Andover is within Urbanized Area.  
Data Sources: CEI, MassGIS, Town of Andover

## Appendix C

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### Regulatory Review and Legal Authority

MS4 Regulatory Review  
Regulations

LID and Green Infrastructure Regulatory Review

## MS4 Regulatory Review

# MS4 REGULATORY REVIEW – TOWN OF ANDOVER

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**TO:** Town of Andover  
**FROM:** Nick Cristofori P.E., CEI  
**DATE:** May 21, 2019  
**SUBJECT:** MS4 Regulatory Review

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Comprehensive Environmental, Inc. has performed a preliminary review of Andover’s existing bylaws and applicable regulations to determine compliance with Section 2.3.4.a of Minimum Measure 3 – Illicit Discharge Detection and Elimination (IDDE) Program, and Section 2.3.5 of Minimum Measure 4 – Construction Site Stormwater Runoff Control of the 2016 Massachusetts MS4 General Permit. The bylaws and regulations that were reviewed include the following:

- General Bylaws, Article XVI, “Stormwater Management and Erosion Control,” adopted 4/30/2008
- Stormwater Management and Erosion Control Regulations, adopted 2/10/2009

The MS4 Permit requires regulated communities to develop or modify, as appropriate, its regulatory mechanism for post construction stormwater management by the end of Year 2 of the permit term. The revisions will include the incorporation of specific design criteria as outlined in the permit. Given the minor nature of the comments below, CEI recommends that all updates be performed at the same time during Year 2. Written procedures outside of the regulations, such as inspection checklists, can be developed in the interim to satisfy the MS4 requirements.

The following table summarizes the requirements of the permit, existing regulatory mechanisms in the Town that address the requirements and to what extent, and recommendations for regulatory updates or supplemental information for full compliance.

<b>Minimum Measure 3 – Illicit Discharge, Detection, and Elimination</b>		
<b>Required Elements</b>	<b>Current Municipal Regulatory Requirements</b>	<b>Recommended Changes</b>
<p><b>Section 2.3.4.a.</b>            Have adequate legal authority to:</p> <ul style="list-style-type: none"> <li>• Prohibit illicit discharges.</li> <li>• Investigate suspected illicit discharges.</li> <li>• Eliminate illicit discharges, including those from properties not owned or controlled by the Town.</li> <li>• Implement appropriate enforcement procedure and actions.</li> </ul>	<p><u>General Bylaws, Article XVI, “Stormwater Management and Erosion Control,” Section 4 “Applicability”</u> prohibits illicit connections. Other sections of Article XVI give the town the authority to investigate and eliminate illicit connects, and enforce the bylaw.</p>	<p>No changes recommended. Current bylaws meet requirements of Section 2.3.4.a.</p>

# MS4 REGULATORY REVIEW – TOWN OF ANDOVER

Minimum Measure 4 – Construction Site Stormwater Runoff Control		
Required Elements	Current Municipal Regulatory Requirements	Recommended Changes
<p><b>Section 2.3.5.a.</b> Implement program that reduces stormwater pollutants at construction sites &gt;1 acre, or &lt; 1 acre if part of a common plan that will disturb &gt;1 acre.</p>	<p><u>General Bylaws, Article XVI, “Stormwater Management and Erosion Control,” Section 4, “Applicability”</u> establishes a program regulates construction sites that disturb &gt;43,560 sq. ft. of land (1.0 ac.), or if part of a common plan that will disturb &gt;43,560 sq. ft. Several exemptions to the bylaw are given, which may cause some required construction activities to be unregulated.</p>	<p>On preliminary review, the current bylaws appear to meet the requirements of section 2.3.5.a. as written. CEI recommends that the exemptions are reviewed in detail to ensure that all required sites are properly regulated.</p>
<p><b>Section 2.3.5.c.i. and iv.</b> Regulatory mechanism that requires the use of sediment and erosion control practices at construction sites.</p> <p>Ordinance must include requirement for construction site operators to control other wastes on construction sites, such as demolition debris, litter, concrete truck wash-out, and chemicals.</p>	<p><u>Stormwater Management and Erosion Control Regulations, Section IX “Design Criteria,”</u> requires that erosion and sediment controls must be implemented.</p> <p><u>Stormwater Management and Erosion Control Regulations, Section VI “Form and Contents of the Permit Application,”</u> requires a plan which must be designed to properly manage on-site construction and waste materials, which specifically includes concrete truck washout, chemicals, litter and sanitary waste.</p>	<p>Current bylaws meet the requirements of section 2.3.5.c.i and iv. as written. No changes are recommended.</p>

# MS4 REGULATORY REVIEW – TOWN OF ANDOVER

Minimum Measure 4 (continued) – Construction Site Stormwater Runoff Control		
Required Elements	Current Municipal Regulatory Requirements	Recommended Changes
<p><b>Section 2.3.5.c.ii. and v.</b> Written procedures for site inspections and enforcement:</p> <ul style="list-style-type: none"> <li>• Inspection procedures.</li> <li>• Statement that sanctions may be imposed.</li> <li>• Procedures for tracking number of site reviews, inspections, and enforcement actions.</li> </ul> <ul style="list-style-type: none"> <li>• Who’s responsible for inspecting.</li> <li>• Inspector qualifications.</li> <li>• Inspections to occur during and after BMP construction.</li> </ul> <ul style="list-style-type: none"> <li>• Who has authority to implement enforcement.</li> </ul> <ul style="list-style-type: none"> <li>• Using standard inspection form (if appropriate).</li> </ul>	<p><u>Stormwater Management and Erosion Control Regulations, Section VIII “Inspection and Site Supervision,”</u> requires inspections certifying that the site is in compliance with the stormwater management permit. It also states that sanctions may be imposed. Permits and certifications are recorded at the registry of deeds, although no procedures are given for tracking inspections and enforcement actions.</p> <p>This section designates 2 inspectors. The Planning Board’s agent conducts the final inspection and reviews the inspections of the Environmental Site Monitor (ESM). The ESM is a Town approved professional engineer or trained professional, hired by the applicant. Either the applicant or the ESM must conduct weekly inspections. The Board may require the use of an ESM. Qualifications are not given for the Planning Board’s agent.</p> <p><u>General Bylaws, Article XVI, “Stormwater Management and Erosion Control,” Section 2, “Definitions”</u> gives the Planning Board, its employees, or designated agent the authority to enforce the bylaw.</p> <p>No standard inspection form is publicly available.</p>	<p>The current Town bylaws and regulations are mostly in compliance with the permit requirements. CEI recommends that the Town develop a standardized inspection form, and procedures for tracking the number of inspections and enforcement actions, if it hasn’t done so already. CEI also recommends that the Planning Board’s agent be required to conduct their own inspection during BMP construction. Currently they are only required to conduct a final inspection, or review of the ESM’s report.</p>

# MS4 REGULATORY REVIEW – TOWN OF ANDOVER

Minimum Measure 4 (continued) – Construction Site Stormwater Runoff Control		
Required Elements	Current Municipal Regulatory Requirements	Recommended Changes
<p><b>Section 2.3.5.c.iii.</b> Requirements for construction site runoff control programs to include BMPs. Program may reference state or Town BMP design standards.</p>	<p><u>Stormwater Management and Erosion Control Regulations, Section IX “Design Criteria,”</u> requires compliance with the Massachusetts Stormwater Management Standards, which requires construction site runoff controls to include BMPs.</p>	<p>No changes are recommended. The current bylaws meet the requirements of section 2.3.5.c.iii. as written.</p>
<p><b>Section 2.3.5.c.v.</b> Written procedures for site plan review:</p> <ul style="list-style-type: none"> <li>• Pre-construction review of the site design.</li> <li>• Procedures for the receipt and consideration of information submitted by the public.</li> <li>• Evaluation of Low Impact Development (LID) and Green Infrastructure (GI) opportunities.</li> <li>• Planned construction site operations.</li> <li>• Consideration of water quality impacts.</li> <li>• Planned BMPs during construction.</li> <li>• Planned BMPs to manage stormwater after development.</li> </ul>	<p><u>Stormwater Management and Erosion Control Regulations, Section VII, “Review and Approval Procedure,”</u> lays out the procedures for the site plan review, including a pre-construction review of the site design with a public hearing and notification of abutters. The Planning Board must find that the plan is consistent with the purpose of the bylaw and meets the design requirements.</p> <p>While an evaluation of LID/GI opportunities is not specifically listed in the procedures, the plans are evaluated for compliance with the Massachusetts Stormwater Management Handbook, which encourages LID/GI.</p> <p><u>Stormwater Management and Erosion Control Regulations, Section VI, “Form and Contents of the Permit Application,”</u> requires the plan to include:</p> <ul style="list-style-type: none"> <li>• Planned construction site operations and phasing.</li> <li>• Information for the evaluation of water quality impacts.</li> <li>• Planned BMPs during construction.</li> <li>• Planned BMPs to manage stormwater after development.</li> </ul>	<p>The current Town bylaws and regulations are generally in compliance with the permit requirements of section 2.3.5.c.v. For clarity, CEI recommends that a specific evaluation of LID/GI opportunities be incorporated into the site plan review procedures.</p>

## Regulations

**Adopted 02-10-09**  
**Amended 05-11-21**

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# STORMWATER MANAGEMENT AND EROSION CONTROL REGULATIONS

## I. PURPOSE

The United States Environmental Protection Agency (EPA) has identified sedimentation and polluted stormwater runoff from land disturbance, land development and redevelopment activities as major sources of water pollution. To address the impact of these sources of water pollution, the Town of Andover has adopted a local Stormwater Management and Erosion Control Bylaw. The bylaw is necessary to protect the Town of Andover water bodies and groundwater resources, to safeguard the health, safety, and welfare of the general public and protect the natural resources of the Town.

Section 5.B of the Town of Andover Stormwater Management and Erosion Control Bylaw authorizes the Permit Granting Authority to adopt regulations to effectuate the purposes of this Bylaw. **The purpose of these regulations is to clearly set forth administrative procedures and design criteria necessary to achieve the objectives of the Town of Andover Stormwater Management and Erosion Control Bylaw:** to prevent or diminish the impacts of sedimentation and polluted stormwater from land disturbance, land development and redevelopment activities by controlling runoff and preventing soil erosion and sedimentation from site construction and development.

## II. AUTHORITY

- a. The Regulations contained herein have been adopted by the Planning Board in accordance with the Town of Andover Stormwater Management and Erosion Control Bylaw, Section 5.B.
- b. Nothing in these Regulations is intended to replace or be in derogation of the requirements of the Town of Andover Wetlands Protection Bylaw or any Rules and Regulations adopted thereunder unless these Regulations are more stringent.
- c. These Stormwater Regulations may be periodically amended by the Planning Board in accordance with the procedures outlined in Section 5.0 of the Town of Andover Stormwater Management and Erosion Control Bylaw.

## III. ADMINISTRATION

### A. Permit Granting Authority

As the Permit Granting Authority, the Planning Board shall administer, implement and enforce these Regulations. Projects and activities approved by

the Planning Board shall be deemed in compliance with the intent and provisions of these Stormwater Management and Erosion Control Regulations.

As the Permit Granting Authority, the Planning Board may waive strict compliance of these regulations for applications including Low Impact Development (LID) if the design criteria of such waiver is allowed by federal, state or local statutes, is in the public interest and is not inconsistent with the purpose and intent of the Town of Andover Stormwater Management and Erosion Control Bylaw, Article XVI.

## **B. Designated Agents**

In accordance with Section 5.0 of the Town of Andover Stormwater Management and Erosion Control Bylaw, the Planning Board defines as “designated agents” and hereby delegates to such agents the administration, implementation, and enforcement of these Stormwater Management and Erosion Control Regulations as specified below.

### **1. Planning Division Staff**

Under the supervision of the Director of Planning, the Planning Division Staff shall act as the designated agent in the administration, implementation, and enforcement of these regulations as follows:

- a. Receipt and review of applications for completeness
- b. Communications to applicants on the Planning Board’s behalf
- c. Distribution of applications and documentation to Town departments for review
- d. Procurement of Outside Consultants and Environmental Monitors
- e. Scheduling of public meetings and hearings
- f. Public notices
- g. Maintenance of all records and drawings associated with the Stormwater Management Permit.
- h. Review and granting of minor modifications to applications as described in Section IV. G. of these Regulations.
- i. Recordation of permits and certificates at the Registry.
- j. Any other administrative task necessary for the orderly administration of these regulations not specifically assigned to a different designated agent.

### **2. Interdepartmental Review Committee**

The Planning Board delegates to a committee of Town Staff, which shall be known as the Interdepartmental Review (IDR) Committee and shall include a representative from each of the Departments of Public Works, Conservation, Planning, Health, Public Safety and Building, the responsibility for the technical review of applications, documentation, inspections and enforcement for compliance with these Regulations and the Stormwater Management Permit.

The IDR committee may require additional information from the applicant or review by outside consultants and/or environmental site monitor when deemed necessary and as outlined in these Regulations and the Stormwater Management Permit.

Such representatives shall be selected by the Department Directors and approved by the Town Manager.

### **3. Persons Aggrieved**

Any persons aggrieved by a decision or action of a designated agent appointed by the Planning Board under Section 5A of the Stormwater and Erosion Control Bylaw, including but not limited to matters regarding completeness of application, inspections, and compliance with technical design criteria may, within thirty (30) days of such decision or action, request a public meeting with the Planning Board. In such cases, following the decision of the Planning Board, the provisions of Section 6.F.1 of the bylaw shall apply.

## **IV. GENERAL PROCEDURES**

Stormwater Management Permit issuance is required prior to any activity disturbing 43,560 square feet or more of land, or activities that are part of a larger common plan of development or sale disturbing greater than 43,560 square feet, as listed in Section 4 of the Stormwater and Erosion Control Bylaw (“Bylaw”), except as excluded in Section 4.B. of the Bylaw, or unless the Planning Board has determined that the provisions of this Bylaw should be waived for the particular activity pursuant to Section 5.D of the Bylaw. A larger common plan of development or sale means a contiguous area where multiple separate and distinct construction activities are planned to occur at different times on different schedules under one plan, e.g., a housing development of five 1/4 acre lots. A single operator with multiple, but separate and distinct, construction activities not part of a larger common plan of development or sale, as defined in this paragraph, need not apply for a permit so long as each distinct construction activity disturbs less than 43,560 square feet of land.

The owner of the property or his Agent shall file for the permit in accordance with the procedures outlined below.

### **A. Application**

An application shall be made to the Planning Board in the form and containing information as specified in these Regulations. Permit Applications shall be accompanied by payment of the appropriate fees. Fees, including those associated with postage for the mailing of notices to the project abutters shall be received by the Planning Board prior to any review. Any application not accompanied by the appropriate fee shall be deemed incomplete.

**B. Completeness of Application**

The Planning Board or its designated agent shall make a determination as to the completeness of the application and adequacy of the materials submitted within 45 business days of submission. No review by the Interdepartmental Review Committee shall take place until the application has been found to be complete.

**C. Information Requests**

The Planning Board or its designated agent may request additional information as is necessary to enable the Planning Board to determine whether the proposed land disturbance activity will comply with the provisions of the Stormwater Management and Erosion Control Bylaw and Regulations.

**D. Consent of property owner required for all applications**

When the applicant does not own the property shown on a plan filed with an application pursuant to these Rules and Regulations, the applicant shall state the nature of his or her interest in the property and shall submit the written consent of the property owner by having the property owner appropriately sign the application for the Stormwater Permit as the applicant. An application shall not be considered complete unless the property owner has signed the application form. Where the owner is a partnership, trust or corporation, documents must be submitted indicating who has signing authority to enter into agreement on behalf of the partnership, trust or corporation. If the property owner subsequently withdraws consent to the application after the application is filed, the Board may deny the application for this lack of consent of the owner.

**E. Employment of Outside Consultants**

The Planning Board or its designated agent may require an independent Registered Professional Engineer, an Environmental Site Monitor, and/or other professional consultant to advise the Planning Board or its designated agents on any or all aspects of the project. All costs of said independent consultants shall be at the applicant's expense.

**F. Modifications to an Application**

The permittee, or the permittee's agent, must notify the Planning Board or its designated agent in writing of any change or alteration of a land-disturbing activity before the change or alteration occurs. Modifications resulting in grade changes under one (1) foot shall be considered minor and may be granted by the Planning Board's designated agent. If the Planning Board or its designated agent determines that the change or alteration is significant, based on the design criteria in these Regulations, the Planning Board may require that an amended application or a new application (including application fees unless waived by the Planning Board) be filed. If any change or alteration from the Stormwater Management Permit occurs during land disturbing

activities, including significant changes in schedule, the Planning Board or its designated agent may require the installation of interim erosion and sedimentation control measures before considering the change or alteration.

**G. Access Permission**

To the extent permitted by state law, and as authorized by the owner at the time of the application or other party in control of the property, the Planning Board, its Agents as specified in Section III.B. of these Regulations, officers, and employees may enter upon privately owned property for the purpose of performing their duties under the Bylaw and its regulations and may make or cause to be made such examinations, surveys or sampling as the Planning Board deems reasonably necessary to determine compliance with the permit.

**H. Public Notification**

The Planning Board will post notice of the public meeting and will be responsible for sending abutter notification based on the list obtained from the Town by the applicant and provided to the Planning Board. The applicant shall pay all costs associated with the notification requirements.

**I. Exclusions from Permit Requirements**

Projects that are defined as ““Exempt Activities” in Section 4.B of the Bylaw do not require approvals under these Regulations, nor shall the area of land disturbed in connection with such Exempt Activities be included in the calculation of the area of land disturbed by construction activities.

Activities exempted under Section 4.B(1) of the Bylaw shall include normal maintenance and improvement of publicly or privately-owned water and sewer lines, electrical and communications conduits, steam pipes, and gas pipelines.

**V. PERMIT APPLICATION FILING REQUIREMENTS**

**A. Planning Board**

The Stormwater Management Permit Application package to be submitted to the Planning Board shall include the following:

1. A completed Application Form with original signatures of all owners;
2. One (1) electronic version of all plans and documents submitted (USB or other);
3. Six (6) full size (24” x 36”) and seven (7) 11” x 17” size of the design plans;
4. Four (4) copies of the Stormwater Management Plan as specified in Section 6.0 of these regulations;
5. Thirteen (13) copies of the Stormwater Narrative as specified in Section 6.0 of these regulations;

6. Thirteen (13) copies of the Operation and Maintenance Plan as specified in Section 6.0 of these regulations,
7. Payment of the application and review fees.

**B. Town Clerk**

One (1) copy of the Application Form shall be filed with the Town Clerk by Planning Staff.

**C. Other Boards or Commissions**

Applicants shall submit an additional complete application to all Boards and/or Commissions which are currently reviewing other permits for the same project.

**D. Notice requirements**

The applicant shall provide a map indicating the Assessor's map and parcel as well as the address of the site to the Planning Department. A list of the names and mailing addresses of all abutting property owners as they appear in the most recent tax list(s) shall be obtained from the Assessor's Office by the Planning Department. This list shall not be more than six (6) months old. The list must include property owners on the opposite side of any street abutting the site and abutters to abutting property owners within three hundred feet of the property under development consideration. If the site is within three hundred feet (300') of a municipal boundary, the applicant shall include a certified abutters list and corresponding tax map from the abutting municipality that includes all abutters within three hundred feet (300') from the site boundaries.

**E. Review Fee Schedule**

Fees shall be payable to the Town of Andover in the form of a money order, bank or certified check.

Professional review fees include engineering review, legal review, and clerical fees associated with the review and permit processing. When an independent consultant is required by the Planning Board, the consultant shall provide a fee estimate. The applicant may be required to deposit funds in a revolving account with the Town to cover these fees. The Planning Board may require additional fees if deemed necessary for proper review of an application or to ensure compliance.

An Applicant's failure to pay any additional review or inspection fee within five business days of receipt of the notice that further fees are required may be grounds for disapproval of the application.

**VI. FORM AND CONTENTS OF THE PERMIT APPLICATION**

The Stormwater Permit Application shall contain the following documents.

**A. Complete Application for Stormwater Management Permit Form**

See Appendix A.

**B. Stormwater Management Plan and Narrative**

The Stormwater Management Plan and Narrative shall contain sufficient information for the Planning Board to evaluate the environmental impact, effectiveness, and compliance of the measures proposed by the applicant to these Regulations and the Massachusetts Department of Environmental Protection Stormwater Management Handbook. The information provided shall describe the nature and purpose of the proposed development, pertinent conditions of the site and the adjacent areas, and proposed best management practices for the permanent management and treatment of stormwater.

**1. Stormwater Management Plan**

The Stormwater Management Plan shall be prepared by a Massachusetts licensed professional engineer on a print of 24"x36" containing the following information:

**a. General Project Information**

**(1) Plan Certification**

**(a)** The plan(s) shall be sealed by (1) a professional engineer registered in Massachusetts in the field of civil engineering and (2) a registered land surveyor registered in Massachusetts. The engineer shall certify that the plan complies with all the rules and regulations of the Stormwater Management & Erosion Control Bylaw and the Stormwater Management & Erosion Control Rules and Regulations, except as noted. Failure to have these certifications shall result in denial of the application.

**(2) Identification Information**

**(a)** Names, addresses, and telephone numbers of the owner, applicant, and person(s) or firm(s) preparing the plan.

**(b)** Title, date, north arrow, names of abutters, scale (1"=20' or 1"=40'), legend, and locus map (1"=800').

**(c)** Existing zoning designation.

**(d)** Existing and proposed land use of the site.

**(e)** A signature block to record the action of the Planning Board.

**(3) Notations Regarding Revisions**-all revised plans shall contain a notation listing and describing all revisions, additions, and deletions made to the originally submitted plans and the date of each. Each revision shall be clearly shown on the plans and shall be identified by a triangle symbol with the corresponding revision number within the triangle.

**b. Boundaries and Location Data**

(1) Surveyed property lines showing distances and monument locations, all existing and proposed easements, rights-of-way, utilities and other encumbrances, the size of the entire parcel, and the delineation and number of square feet of the land area to be disturbed.

(2) Location, delineation and description of habitats mapped by the Massachusetts Natural Heritage & Endangered Species Program as Endangered, Threatened or of Special Concern, Estimated Habitats of Rare Wildlife and Certified Vernal Pools, Potential Vernal Pools, and Priority Habitats of Rare Species within five hundred (500) feet of any construction activity.

(3) The location of the one hundred year (100) flood boundary, as shown on the Flood Insurance Map (FIRM), in and within one hundred feet (100') of the lot;

(4) Location of all proposed wells, and septic systems in the project including all required setback dimensions to lot lines, wells and septic systems.

**c. Streets, Impervious Areas and Site Improvements**

(1) Lines of existing abutting streets showing drainage and driveway locations and curb cuts.

(2) Existing and proposed impervious surfaces, drainage structures and facilities, if applicable.

(3) Existing and proposed improvements including location of buildings or other structures, impervious surfaces, and drainage facilities, if applicable.

(4) Footprints of any structure on abutting properties with the names of the abutters, including properties on the opposite side of the street or way that abuts the site. Existing and proposed driveways shall also be shown.

**d. Topography**

(1) The location and elevation of one benchmark using NGVD Datum within 50 to 75 feet of the parcel which is not subject to dislocation or loss during construction.

(2) Existing and proposed topography described in full contour detail, at two foot (2') intervals, with area of steep slope over 15%-25%, and over 25% delineated for pre-development and post-development with spot elevations provided when needed.

(3) Existing topography fifty feet (50') beyond the perimeter of the parcel as it appears on the most current Town of Andover topographic mapping shall be shown.

**e. Drainage and Water**

(1) Location, delineation and description of all existing and proposed watercourses, water bodies, and Wetland Resource Areas

on or entering the site, or adjacent to the site, or into which stormwater flows, collects or percolates including the direction, flow rate, and volume of surface runoff under existing and proposed conditions. Information regarding their water quality, including any listing on the most recent Massachusetts Integrated List of Waters and/or established Total Maximum Daily Loads (TMDLs), and current water quality classification shall be included.

(2) Location, delineation and description of environmental and hydrological conditions, riparian zones and all floodplain information, including the 100-year flood elevation based upon the most recent Flood Insurance Rate Map, or as calculated by a professional engineer for areas not assessed on these maps.

(3) A description and drawings of all components of the proposed drainage system including:

(a) locations, cross sections, and profiles of all brooks, streams, drainage swales and their method of stabilization,

(b) all measures for the detention, retention or infiltration of water,

(c) all measures for the protection of water quality,

(d) the structural details for all components of the proposed drainage systems and stormwater management facilities.

(4) **Notes on drawings specifying materials to be used, construction specifications, and typical details.** Drainage patterns, watersheds and subwatersheds, with calculations of proposed land disturbance within each subwatershed and areas of soil to be disturbed in each watershed throughout the duration of the proposed land disturbance activity.

**f. Soils**

(1) Surface extent of each soil type as determined by the United States Department of Agriculture, Natural Resources Conservation Service Soil Survey, with an accompanying analysis of the best use potential of the soils and the hydrological soil group (HSG) classification.

(2) An accurate field determination of seasonal high groundwater elevation in each area to be used for stormwater retention, detention, or infiltration with direction, rate of flow and seasonal fluctuations made by a Massachusetts Licensed Soil Evaluator or other Certified Professional such as a Geotechnical Engineer. Locations of borings/test pits should be accurately represented on submitted plan sets.

**g. Landscaping**

(1) The general outline of existing vegetation, wooded areas, significant trees, unique species and tree clusters.

- (2) The extent of all vegetation, wooded areas, significant mature trees, unique species and/or tree clusters to be removed.

**h. Site Disturbance and Erosion Control Measures**

- (1) Limit of clearing and grading.
- (2) Locations and methods of all proposed erosion/sedimentation controls, showing key dimensions and other important details.
- (3) The location of proposed stockpiling area(s) for “earth” materials.
- (4) Detailed drawings and types of both temporary and permanent erosion and sediment control structures.
- (5) The location of critical areas on the site (areas that have potential for serious erosion problems).
- (6) Path and mechanism to divert uncontaminated water around disturbed areas, to the maximum extent practicable.
- (7) Location of temporary and permanent seeding, vegetative controls, and other temporary and final stabilization measures.
- (8) Location of proposed storage areas for construction and waste materials expected to be stored on-site.

**2. Stormwater Narrative**

The Stormwater Narrative shall include the following information:

**a. Scheduling and Construction Sequences**

- (1) The timing, schedules, and sequence of development including clearing, stripping, rough grading, construction, final grading, and vegetative stabilization.
- (2) A description of construction and waste materials expected to be stored on-site, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes. The narrative shall include a description of controls to reduce pollutants from these materials, including storage practices to minimize exposure of the materials to stormwater, and spill prevention and response.
- (3) A description of provisions for phasing the project
- (4) A narrative of the construction sequence/phasing of the project, including both operation and maintenance for structural and non-structural measures, interim grading, and material stockpiling areas.
- (5) A maintenance schedule for the period of construction.

**b. Hydrological Conditions and Soils**

- (1) Detailed description of the existing environmental and hydrological conditions of the site and of the receiving waters and Wetland Resource Areas.

- (2) A description of all surface watercourses, water bodies, and Wetland Resource Areas on or entering the site, or adjacent to the site, or into which stormwater flows. Information regarding their water quality, including any listing on the Massachusetts Integrated List of Waters and/or established Total Maximum Daily Loads (TMDLs), and current water quality classification shall be included.
- (3) The runoff coefficient and/or Curve Number for each of the existing and proposed vegetation and ground surfaces.
- (4) Existing soils (type, hydrologic soil group, erodibility) and the volume and nature of imported soil materials.
- (5) Calculations of proposed land disturbance within each subwatershed and areas of soil to be disturbed in each watershed throughout the duration of the proposed land disturbance activity.

**c. Drainage Systems**

- (1) A description of all components of the proposed drainage system including:
  - (a) locations, cross sections, and profiles of all brooks, streams, swales
  - (b) the method of stabilization,
  - (c) all measures for the detention, retention or infiltration of water,
  - (d) all measures for the protection of water quality,
  - (e) the structural details for all components of the proposed stormwater management facilities,
  - (f) notes on drawings specifying materials to be used, construction specifications, and details, and
  - (g) expected hydrology with supporting calculations.

**d. Erosion Control**

- (1) Description of and implementation schedule for temporary and permanent seeding, vegetative controls, and other temporary and final stabilization measures.

**C. Operation and Maintenance Plan**

An Operation and Maintenance Plan (O&M Plan) for the permanent storm water management system is required at the time of application for all projects. The O&M Plan shall be designed to ensure compliance with these Regulations and the Massachusetts Surface Water Quality Standards contained in 314 CMR 4.00 in all seasons and throughout the life of the system.

Once approved by the Planning Board, the Operation and Maintenance Plan shall be recorded at the Essex North Registry of Deeds by the Planning Board or its agent at the expense of the current owner(s), shall remain on file with the

Planning Board and shall be an ongoing requirement.

The Operation and Maintenance Plan shall conform to the requirements listed below.

**1. Operation and Maintenance Plan Requirements.**

An Operation and Maintenance Plan prepared by a Massachusetts licensed Professional Engineer shall include:

- a. The name(s) of the owner(s) for all components of the system
- b. Maintenance agreements that specify:
  - (1) The names and addresses of the person(s) responsible for operation and maintenance
  - (2) The person(s) responsible for financing maintenance and emergency repairs.
  - (3) A Maintenance Schedule for all drainage structures, including swales and ponds, that includes routine inspections along with routine and non-routine maintenance tasks for each BMP.
  - (4) A list of easements with the purpose and location of each.
  - (5) The signature(s) of the property owner(s).
  - (6) Estimated operation and maintenance budget.
  - (7) A simple sketch indicating where the stormwater practices to be maintained are located.
- c. Stormwater Management Easement(s)
  - (1) Stormwater management easements to the Town are required for all areas used for off-site stormwater control associated with Town accepted public ways, unless a waiver is granted by the Planning Board.
  - (2) Easements shall be recorded with the Essex North Registry of Deeds prior to issuance of a Certificate of Completion.
  - (3) Stormwater management easements shall be provided and located by the property owner(s) as are necessary for:
    - (a) access for facility inspections and maintenance,
    - (b) preservation of stormwater runoff conveyance, infiltration, and detention areas and facilities, including flood routes for the 100-year storm event; and
    - (c) direct maintenance access by heavy equipment to structures requiring regular cleanout maintenance.

**2. Changes to Operation and Maintenance Plans**

- a. The owner(s) of the stormwater management system must notify the Planning Board or its Agent 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 Stormwater Management and Erosion Control Bylaw and Regulations 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. Once the amended Plan is signed the Planning Board shall file it at the Registry of Deeds at the expense of the current owner(s).

### **3. Annual Report Submittal**

The Responsible Parties must submit an annual report by September 1st to the Planning Board documenting the inspection and maintenance that has been performed over the last 12 months of the BMPs for which they are responsible. The Planning Board, at its discretion and depending on the complexity of the BMP, may require the Annual Report submittal be prepared by a Professional Engineer (P.E.). The reports must include:

- a. Descriptions of the condition of the BMPs,
- b. Descriptions of maintenance performed,
- c. Signature of the responsible party,
- d. Signature of the Professional Engineer, where applicable and,
- e. Receipts showing payment for maintenance performed.

## **VII. REVIEW AND APPROVAL PROCEDURE**

### **A. Evaluation of Application for Completeness**

Applications shall be reviewed for form and contents in accordance with Section VI. of these Regulations. The Planning Staff shall notify the Applicant of any deficiencies in the application package within 14 days of receipt. Application packages with uncorrected deficiencies after 45 days of the filing date shall not be distributed for Interdepartmental Review. Instead a public meeting before the Planning Board shall be scheduled. The Planning Board may deny an application due to lack of completeness.

### **B. Distribution of Complete Application**

Within forty-five (45) days of the filing of a complete application, the Planning Board or its designated agent shall distribute the application materials for technical review and schedule an Interdepartmental Review Committee meeting.

### **C. Application for Public Viewing**

Application materials will be made available for viewing by the public inspection during normal business hours in the Planning Department.

### **D. Interdepartmental Review**

1. Within sixty (60) days of the filing of a complete application, an Interdepartmental Review will be held in the Town Offices. The applicant and its representatives will be notified of the time and location of the Review.

2. The Interdepartmental Review of a Stormwater Permit application may be held concurrently with other interdepartmental review permitting procedures.
3. Upon completing the review and before the Planning Board public meeting, the Town Engineer shall provide a written recommendation to the Planning Board itemizing all instances where the applicant has failed to meet the specifications and standards of the latest edition of the Massachusetts Department of Environmental Protection Stormwater Management Handbook, or the Design Criteria as described in Andover's Subdivision Regulations if applicable, or of the requirements and criteria as set forth in these Regulations, whichever is more stringent.
  - a. In making its final decision, the Planning Board and its designated agents will consider natural features, proximity of site to water bodies and wetlands, extent of impervious surfaces, size of the site, slopes, the types of stormwater management structures, and potential need for ongoing maintenance activities when making this decision.
4. In addition to the Interdepartmental Review, the Planning Board or its designated agent may require review of the application by an independent licensed professional at the Applicant's expense. Such determination shall be made within forty-five (45) days of the filing of the application.

**E. Public Meeting Notification**

Within forty-five (45) days, the Planning Board or its designated agent will arrange agenda time for a meeting and prepare notifications. Such notice shall be made no later than seven (7) days prior to the public meeting and shall include a posting and first class mailings to abutters.

**F. Public Meeting**

Within ninety (90) days of the filing of the application, the Planning Board will hold a public meeting on the application where comments and questions from the public regarding the application will be addressed.

Once begun, the public meeting may not continue for more than sixty (60) days unless such time is extended by written agreement between the applicant and the Planning Board to a date certain announced at the meeting.

**G. Planning Board Action**

The Planning Board shall take final action within twenty-one (21) days of the public meeting discussion. Should the Planning Board fail to act within the allowed time, the application shall be deemed approved.

**H. Digital Filing**

Prior to the start of construction, the applicant shall provide a USB flash drive or equivalent electronic storage media to the Planning Board containing a

digital AutoCAD file of the plan including all information required in these Regulations. The digital data shall be delivered in the Massachusetts Coordinate System, North American Datum 1983 and North American Vertical Datum 1988, in U.S. Survey Feet. The file formats required are AutoCAD DWG (or ASCII DXF) using the most recent version and Adobe PDF of each sheet in the application package. The digital file shall be reviewed by the Department of Public Works prior to the start of construction.

**I. Surety**

Before the start of construction, the Planning Board may require the permittee to post an acceptable surety to ensure that the work will be completed in accordance with the permit and these Regulations. The form of the surety shall be approved by Town Counsel and shall be in an amount deemed sufficient by the Planning Board.

**J. Town Clerk Verification**

Prior to the start of construction, the applicant must obtain written verification from the Town Clerk that no appeals of the Planning Board's decision are pending.

**VIII. INSPECTIONS AND SITE SUPERVISION**

**A. Preconstruction Meeting**

Prior to clearing, excavation, construction, or any land disturbing activity requiring a permit, the applicant, the applicant's technical representative, the general contractor, pertinent subcontractors, and any person with authority to make changes to the project, shall meet with the Planning Board's designated Agent and representative from the Interdepartmental Review to review the permitted plans and proposed implementation.

**B. Site Inspections during Construction**

**1. Planning Board's Designated Agent Inspections**

The Planning Board's designated agent shall make inspections as hereinafter required and/or shall review site inspection reports provided by an Environmental Site Monitor and shall either approve that portion of the work completed or shall notify the permittee wherein the work fails to comply with the approved plans and any conditions of approval.

- a. One copy of the permit plans and conditions of approval signed by the Planning Board shall be maintained at the site during the progress of the work.
- b. A copy of the NPDES Construction General Permit and Stormwater Pollution Prevention Plan (if applicable) shall be kept on site as well.

## **2. Permittee Inspections.**

During construction, the permittee or his/her Agent shall conduct and document inspections of all control measures no less than weekly or as specified in the permit, and prior to and following anticipated storm events. The purpose of such inspections will be to determine the overall effectiveness of the Erosion and Sedimentation Control Plan, and the need for maintenance or additional control measures.

- a. As a condition of approval, the Planning Board may require an Environmental Site Monitor, approved by the Planning Board, be retained by the applicant to conduct such inspections and prepare and submit such reports to the Planning Board's designated Agent.**
- b. The permittee or his/her Agent shall submit monthly reports to the Planning Board's designated Agent in a format approved by the Planning Board.**

## **C. Final Inspection**

1. After the stormwater management system has been constructed and before the surety has been released, the applicant must submit an as-built plan detailing the actual stormwater management system as installed.
2. The applicant must submit an explanation detailing any differences between the plans approved with the permit and the as-built plans. This explanation must be stamped by a Massachusetts licensed Professional Engineer.
3. The Planning Board's designated Agent shall inspect the system to confirm its "as-built" features. The designated Agent may require the Environmental Site Monitor to make such inspection and provide a report of its findings. 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, at which time a Certificate of Completion will be issued.
4. 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 permittee to the satisfaction of the Planning Board before the performance guarantee is released.
5. If the permittee fails to act, the Town of Andover may withhold the Certificate of Completion and pursue Enforcement as outlined in the Bylaw Section 11. Examples of inadequacy are: errors in the infiltrative capability, errors in the maximum groundwater elevation, failure to properly define or construct flow paths, or erosive discharges from basins.

## **D. Final Report**

Upon completion of the work, the permittee shall submit a report (including certified as-built construction plans) from a Massachusetts licensed

Professional Engineer (P.E.) and a Massachusetts licensed land surveyor, certifying that all erosion and sediment control devices, and approved changes and modifications, have been completed in accordance with the conditions of the approved permit. Any discrepancies should be noted in the cover letter.

#### **E. Certificate of Completion**

Prior to the issuance of the Certificate of Completion, digital files of the as-built conditions including all information and in the same formats as required in Section VII Paragraph H shall be submitted to the Planning Board.

The Planning Board will issue a letter certifying completion upon receipt and approval of the final reports and/or upon otherwise determining that all work of the permit has been satisfactorily completed in conformance with this Bylaw. The Certificate of Completion shall be recorded at the Registry of Deeds by the Planning Board at the Owner(s) expense.

### **IX. DESIGN CRITERIA**

In addition to the following criteria, the applicant is to refer to the criteria, specifications and standards in the latest edition of the Massachusetts Department of Environmental Protection Stormwater Management Handbook and the Town of Andover's Subdivision Rules and Regulations and is to incorporate the most stringent criteria in the protection of the Town's environmental and infrastructure resources.

#### **A. Low Impact Development**

Low Impact Development (LID) site planning and design strategies must be implemented unless infeasible in order to reduce the discharge of stormwater from development sites.

All projects must consider and, unless impracticable, propose and implement Low Impact Development (LID) BMPs listed in the Massachusetts Stormwater Handbook. Applicants shall demonstrate compliance with design standards for LID BMPs through generally accepted methods. LID BMPs should be considered for their impact on overall site climate change resilience, improvements to water quality, and ability to handle water quantity.

The applicant must document in writing why LID strategies are not appropriate when not used to manage stormwater.

#### **B. Stormwater Recharge**

Impervious and disturbed surfaces from development alter the natural hydrologic cycle by discharging stormwater directly to streams, rather than allowing it to infiltrate through the soils and into groundwater as it did before development. This increases flooding and reduces the baseflow to streams that

is needed in the summer months when there is little precipitation. The increased runoff from impervious surfaces also increases stream temperatures, since pavement and other impervious surfaces absorb substantial amounts of heat in the summer due to their dark coloring and lack of shade, which is transferred to runoff passing over the surface. The result is runoff that is dramatically warmer than natural groundwater inflow would have been under a natural hydrologic cycle. The purpose of this criteria is to maintain existing recharge rates to preserve existing groundwater levels and stream baseflows.

### **1. Recharge Calculation**

The volume of water to be recharged shall be calculated per the latest version of the Massachusetts Stormwater Handbook.

### **2. Additional Recharge Criteria**

The following criteria shall also apply:

- a.** The recharge volume provided at the site shall be directed to the most permeable soil available.
- b.** The recharge volume criteria does not apply to any portion of a site designated as a stormwater hotspot. Hotspots are defined as sites with higher potential pollutant loads, including:
  - Stormwater discharges subject to an individual National Pollutant Discharge Elimination System (NPDES) permit of the NPDES Multi-Sector General Permit (MSGP)
  - Auto salvage yards (auto recycler facilities)
  - Auto fueling facilities (gas stations)
  - Fleet storage areas (cars, buses, trucks, public works)
  - Vehicle service and maintenance areas
  - Vehicle and equipment cleaning facilities
  - Commercial parking lots with average trip generation rates of 1,000 or greater per day, such as fast-food restaurants, convenience stores, high-turnover (chain) restaurants, shopping centers, and supermarkets
  - Road salt storage and loading areas (if exposed to rainfall)
  - Commercial nurseries
  - Flat metal (galvanized metal or copper) rooftops of industrial facilities
  - Outdoor storage and loading/unloading areas of hazardous substances
  - SARA 312 generators (if materials or containers are exposed to rainfall)
  - Marinas (service, repainting, and hull maintenance areas)

- c. The Planning Board may alter or eliminate the recharge volume requirement if the site is situated on unsuitable soils (i.e., marine clays), karst or in an urban redevelopment area. In this situation, non-structural practices (filter strips that treat rooftop or parking lot runoff, sheet flow discharge to stream buffers, and grass channels that treat roadway runoff) should be implemented to the maximum extent practicable and the remaining or untreated volume included in the water quality volume.

### **C. Pretreatment**

1. Pre-treatment basins must be designed and located to be easily inspected and accessible to facilitate maintenance. Pre-treatment devices must also be sized to accommodate a minimum of one-year's worth of sediment and debris.
2. The following standards shall be followed to ensure that the device will permit sufficient treatment to treat stormwater and allow for a reasonable required maintenance frequency for the Stormwater Treatment System (STS):
  - a. Pre-treatment devices shall be provided for each STS; and
  - b. Pre-treatment devices shall be designed to accommodate a minimum of one-year's worth of sediment; and
  - c. Pre-treatment devices shall be designed to capture anticipated pollutants, such as oil and grease; and
  - d. Pre-treatment devices shall be designed and located to be easily accessible to facilitate inspection and maintenance; and
  - e. The Revised Universal Soil Loss Equation (RUSLE)<sup>1</sup> shall be used to calculate sediment deposits that would occur from pervious areas adjacent to the BMP; and
  - f. Pretreatment structures shall be sized to hold an annual sediment loading. An annual sediment load shall be calculated using a sand application rate of 750 lbs/acre for sanding of roadways, parking areas and access drives within the subcatchment area, a sand density of 90 lbs per cubic foot and assuming a minimum frequency of ten sandings per year.

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<sup>1</sup> Developed by the Natural Resources Conservation Service, USDA to predict soil erosion due to water.

To obtain an annual sediment volume, perform the following calculation:

$$\frac{\text{Area to be sanded (acres)} \times 750 \text{ pounds}}{\text{Acre-storm}} \div 90 \frac{\text{pounds}}{\text{ft}^3} \times 10 \frac{\text{storms}}{\text{year}} = \text{cubic ft of sediment/yr}$$

3. The permittee shall maintain any STSs used to trap sediment during construction to prevent sediment from leaving the site, and shall remove all sediment from all STSs when construction is finished and the site is stabilized.

#### D. Pollutant Removal

1. Stormwater management systems shall be designed to remove a percentage of the average annual load of total suspended solids (TSS) and total phosphorus (TP) from the total post-construction impervious surface area on the site, as follows:

Pollutant	Removal from New Development Sites	Removal from Redevelopment Sites
Total Suspended Solids (TSS)	90%	80%
Total Phosphorus (TP)	60%	50%

- a. Average annual pollutant removal requirements for TSS and TP are met 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:

- (a) For *new developments*, one (1.0) inch multiplied by the total post-construction impervious surface area on the new development site;

- (b) For *redevelopments*, 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 new development or redevelopment site.
  - b. 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 and are exempt from Section IX.D.1.a. 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 Section IX.D.1.a.
- 2. Discharges to water bodies or their tributaries subject to one or more approved Total Maximum Daily Load (TMDL) or impaired waterbodies and their tributaries, listed as Category 4b or 5 in the current Massachusetts Integrated List of Waters listed pursuant to the Federal Clean Water Act Sections 303(d) and 305(b) without an EPA approved TMDL:
  - a. To the extent that a new development or redevelopment project will discharge, directly or indirectly, to a water body subject to one or more pollutant-specific TMDLs, the project shall implement structural and non-structural stormwater best management practices (BMPs) that are consistent with each such TMDL.
  - b. For any new development or redevelopment project that discharges stormwater to a water body impaired due to nitrogen, the stormwater management system shall be designed using BMPs optimized for nitrogen removal.
  - c. For a new development or redevelopment project that discharges stormwater to a waterbody identified as impaired due to phosphorus, the stormwater management system shall be designed using BMPs optimized for phosphorus removal.
  - d. For a new development or redevelopment project that discharges stormwater to a waterbody identified as impaired due to chloride, the applicant shall include measures in the required Operation and Maintenance (O&M) Plan to minimize salt usage or use alternative deicing materials and practices. The applicant shall consult with the Andover Department of Public Works to develop these O&M provisions.
  - e. For a new development or redevelopment project that is a *commercial or industrial land use* and discharges stormwater to a waterbody identified as impaired due to solids (e.g., turbidity), metals or oil and grease (hydrocarbons):
    - (1) The stormwater management system shall be designed to allow shutdown and containment in the event of an emergency spill or other unexpected event;

(2) Any stormwater management system designed to infiltrate stormwater shall provide the level of pollutant removal equal to or greater than the level of pollutant removal provided through the use of biofiltration of the same volume of runoff to be infiltrated, prior to infiltration.

#### **E. Flooding Protection**

The following standards shall be followed to control peak discharge rates and improve the overall effectiveness of the stormwater treatment systems. These are minimum design standards.

1. The post-development peak discharge rate shall be equal to or less than the pre-development peak discharge rate (based on a 2-year, 10-year, 25-year, and 100-year, 24-hour storm); and
2. The applicant shall account for all run-on and run-off (including off-site impacts) in both pre- and post-development conditions; and
3. The applicant shall prepare hydrographs for pre- and post-development conditions; and
4. Use Curve Number (CN) values as provided in Table 1 to calculate stormwater runoff rates for pre/post construction ground surface conditions; and
5. Any site that was wooded within the last five years must be considered undisturbed woods for all pre-construction runoff conditions, regardless of clearing or cutting activities that may have occurred on the site during that pre-application period; and
6. The calculation of runoff volumes and peak rates shall be based on precipitation data provided in National Oceanic and Atmospheric Administration (NOAA) – National Weather Service “NOAA Atlas 14” unless otherwise authorized by the Planning Board.
7. Use TR-55 or TR-20 to develop hydrographs and peak flow rates for the proposed development site. Make sure all areas are accounted for in the pre/post runoff calculations. The total tributary area that contributes flow from the proposed site, including runoff entering the site through piped drainage or surface runoff from off-site sources, must be included even if a portion does not contribute flow to the BMP. The objective is for the development’s storm drain design to account for total runoff leaving the site; and
8. Off-site areas should be modeled as “present land use condition” in good hydrologic condition for the 2 and 10-year storm events for both pre and post development calculations; and

9. The length of overland sheet flow used in time of concentration (tc) calculations shall be limited to no more than 50 feet for pre- and post-development conditions.

**Table 1  
Approved CN Values for the SCS Methods (TR-20, TR-55)**

<b>Pre-Construction Runoff Curve Number (CN Values)</b>	<b>Hydrologic Soil Group</b>			
	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Open space such as lawns, parks, and cemeteries <sup>2</sup>	39	61	74	80
Woods and forest <sup>3</sup>	30	55	70	77
Impervious areas such as paved parking lots, driveways and roofs	98	98	98	98
Gravel roads (processed, dense graded)	76	85	89	91
Dirt roads	72	82	87	89
Newly graded pervious areas (no vegetation)	77	86	91	94
<b>Post-Construction Runoff-Curve Number (CN Value)</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
Open space such as lawns, parks, and cemeteries <sup>2</sup>	68	79	86	89
Woods and forest <sup>3</sup>	30	55	70	77
Impervious areas such as paved parking lots, driveways and roofs	98	98	98	98
Gravel roads (processed, dense graded)	76	85	89	91
Dirt roads	72	82	87	89
Newly graded pervious areas (no vegetation)	77	86	91	94

Source: TR-55, 1986

*Notes:*

1. The runoff curve numbers are for use in calculating runoff with TR-55 or other approved models.
2. The open space CN values for lawns, parks, and cemeteries assumes a "good" condition for pre-construction and a "poor" condition for post-construction grass cover since the post-construction amount of grass cover cannot be predicted or guaranteed.
3. The pre-construction and post-construction CN value for woods and forest is based on a "good" condition where the woods are undisturbed and brush adequately covers the soil.

## **F. Channel Protection**

The following method shall be used:

24 hours extended detention of the post-development 1-year, 24-hour return frequency storm event shall be provided.

## **G. Water Quality Volume**

Stormwater treatment devices shall be used to handle water quantity as well as treat water quality. The required water quality volume shall be such that the pollutant removal requirement of Section IX.D. are met and at a minimum equals 1.0 inch of runoff times the total impervious area of the development project site.

## **H. Erosion Control**

The following standards shall be met for erosion control, prior to any land disturbance activities commencing on the site:

1. Development shall be oriented to the site so that cutting and stripping of vegetation and grading are minimized.
2. Prior to any land disturbance activities commencing on the site, the developer shall physically mark limits of no land disturbance on the site with tape, signs, or orange construction fence, so that workers can see the areas to be protected.
3. Appropriate erosion and sediment control measures shall be installed prior to soil disturbance. Measures shall be taken to control erosion within the project area. Sediment in runoff water shall be trapped and retained within the project area. Wetland areas and surface waters shall be protected from sediment.
4. Runoff shall be controlled and conveyed into storm drains and other outlets so it will not erode the land or cause off-site damage; sediment in runoff shall be trapped by using staked hay bales, silt fencing, or sedimentation traps, or other approved erosion control devices.
5. Sediment basins shall be constructed where necessary to detain runoff and to trap sediment during construction.
6. Sediment shall be removed once the volume reaches  $\frac{1}{4}$  to  $\frac{1}{2}$  the height of the silt fence or hay bale.
7. Offsite runoff shall be diverted from highly erodible soils and steep slopes to stable areas.
8. Erosion and sediment controls shall be coordinated with the sequence of grading, development and construction operations; control measures shall

be in effect prior to commencement of each increment/phase of the process.

9. Land disturbance activities exceeding two acres in size shall not be disturbed without a sequencing plan that requires stormwater controls to be installed and the soil stabilized, as disturbance beyond the two acres continues. Mass clearings and grading of the entire site should be avoided. Prior to any construction on the site, applicant shall submit a construction phasing plan to the Planning Department for review and approval.
10. Soil and other materials shall not be stockpiled or redistributed, either temporarily or permanently, in locations or in such a manner as would cause suffocation of tree root systems.
11. Topsoil shall be stripped from disturbed areas, stockpiled in approved areas and stabilized with temporary vegetative cover if it is to be left for more than thirty (30) calendar days; perimeter sediment controls shall be installed around each area of stockpiled topsoil.
12. Soil stockpiles shall be stabilized or covered at the end of each workday.
13. The area of disturbance shall be kept to a minimum. Disturbed areas remaining idle for more than 14 days shall be stabilized.
14. Grading shall be kept to a minimum; tree removal shall be minimized.
15. For active construction areas such as borrow or stockpile areas, roadway improvements and areas within 50 feet of a building under construction, a perimeter sediment control system shall be installed and maintained to contain soil.
16. A tracking pad shall be constructed at all entrance/exit points of the site to reduce the amount of soil carried onto roadways and off the site.
17. Dust shall be controlled at the site.
18. On the cut side of roads, ditches shall be stabilized immediately with rock rip-rap or other non-erodible liners, or where appropriate, vegetative measures such as sod.
19. All graded areas beyond the Street Right-of-Way shall be covered with four (4") inches of topsoil and planted with a native species of vegetative cover, sufficient to prevent erosion.
20. Temporary seeding, mulching or other suitable stabilization methods shall be used to protect exposed soil areas during construction; as

feasible, natural vegetation shall be retained and protected; during the months of October through March, when seeding may be impractical, an anchored mulch or sod shall be applied as approved by the Planning Board or by its Designee; diversions and/or prepared outlets may be required in critical areas during construction.

21. Permanent seeding should be undertaken in the spring from March through May, and in late summer and early fall from August to October 15. During the peak summer months and in the fall after October 15, when seeding is found to be impractical, an appropriate temporary mulch shall be applied. Permanent seeding may be undertaken during the summer if plans provide for adequate mulching and watering.
22. Permanent vegetation and erosion control structures, as necessary, shall be installed preferably immediately after construction is completed but otherwise no later than the first full spring season immediately thereafter; they shall comply with the erosion and sedimentation vegetative practices recommended by the U.S. Soil Conservation Service.
23. Temporary ground cover or erosion/sedimentation controls shall be established on any unbuilt lots as required by the Planning Board.
24. Native species shall be used for re-vegetation.
25. All slopes steeper than 3:1 (h:v, 33.3%), as well as perimeter dikes, sediment basins or traps, and embankments shall, upon completion, be immediately stabilized with sod, seed and anchored straw mulch, or other approved stabilization measures. Areas outside of the perimeter sediment control system shall not be disturbed.
26. Monitoring and maintenance of erosion and sediment control measures throughout the course of construction shall be required. The applicant shall submit to the Planning Board, a complete Operation and Maintenance Plan for temporary and permanent erosion control measures, as part of the application package.
27. Temporary sediment trapping devices shall not be removed until permanent stabilization is established in all contributory drainage areas. Similarly, stabilization shall be established prior to converting sediment traps/basins into permanent (post-construction) stormwater management facilities. All facilities used as temporary measures shall be cleaned prior to being put into final operation.
28. All temporary erosion and sediment control measures shall be removed after final site stabilization. Disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized within 30

days. The applicant's engineer shall submit written certification that this condition has been met.

#### **I. Engineering Criteria**

Detention, Retention and Infiltration basins shall be designed in accordance with the latest version of the Massachusetts Stormwater Handbook and meet the following requirements:

1. The forebay/sediment trap shall be at least 10 feet long and sized to hold at least the annual sediment loading or 0.1 inches times the impervious area, whichever is greater.
2. Maintenance access shall be planted with grass and be at least 10 feet wide with a maximum slope of 15% and a maximum cross slope of 3%.
3. A means to prevent soil compaction on the floor of the basin during construction shall be provided.
4. The perimeter of all basins shall be curvilinear so that from most edges of the basin, the whole basin will not be in view. A more traditionally shaped (oval or rectangular) basin may be permitted when conditions such as topography, parcel size, or other site conditions warrant. Basins shall follow natural landforms to the greatest extent possible or be shaped to mimic a naturally formed depression.
5. Place inlets and outlets to maximize the flow path through the basin. At a minimum, the flow path shall be twice as long as wide. Baffles, pond shaping or islands can be added within the permanent pool to increase the flow path. If there are multiple inlets, the length-to-width ratio shall be based on the average flow path length for all inlets.
6. A minimum of 1 foot of freeboard shall be provided above the 25-year storm elevation.
7. The interior slopes of the basin within the pool area shall not exceed a slope of three horizontal to one vertical.
8. A minimum of six inches (6") of topsoil shall be provided for all planting ground cover beds or lawn areas.
9. Low flow outlets shall be designed to prevent clogging.

#### **J. Hydrologic and Hydraulic Criteria for All Designs**

1. Impervious cover shall be measured from the site plan and shall include 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: paved parking lots, sidewalks, roof tops, driveways, patios, and paved roads.

2. 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.
3. The specified design storms shall be defined as a 24-hour storm using the precipitation data provided in National Oceanic and Atmospheric Administration (NOAA) – National Weather Service “NOAA Atlas 14” unless otherwise authorized by the Planning Board.
4. 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.

# Andover Planning Board

## Application For Stormwater Management Permit

(Article XVI of the Andover Code of By-laws) GENERAL INSTRUCTIONS

An applicant for a Stormwater Management Permit must file with the Planning Board a completed application package, in accordance with the requirements of the Stormwater Management and Erosion Control Bylaw and Regulations. Timelines concerning the review process will not begin until the Planning Board has determined that the application is complete and decisions from other Boards and Commissions have been concluded.

1. Any application not accompanied by the appropriate fee shall be deemed incomplete. Payment must be made to the Town of Andover money order, bank or certified check payable to the Town of Andover.
2. An Applicant's failure to pay any additional review or inspection fee within five business days of receipt of the notice that further fees are required shall be grounds for disapproval.
3. The Planning Board will publish the public notice. The Planning Board is responsible for sending abutter notifications. The applicant shall pay all costs associated with the publication and notification requirements.

Professional review fees include engineering review, legal review, and clerical fees associated with the public review and permit processing. A fee estimate may be provided by the Planning Board's consultant. The applicant may be required to establish an escrow account with the Town to cover the review fees. If the escrow account becomes depleted, the applicant will be required to renew the escrow account in order to continue the review of the application.

Applicant's Name \_\_\_\_\_ Applicant's Address \_\_\_\_\_  
 \_\_\_\_\_

Applicant's Phone \_\_\_\_\_

Owners' Names(s) \_\_\_\_\_ Owners' Address \_\_\_\_\_  
 \_\_\_\_\_

Owner's Phone \_\_\_\_\_

The Stormwater Management Permit involves property where owner's title to the land is derived under deed from \_\_\_\_\_, dated \_\_\_\_\_, and recorded in the Essex North Registry of Deeds, Book \_\_\_\_\_, Page \_\_\_\_\_, or Land Court Certificate of Title No \_\_\_\_\_, Registered in \_\_\_\_\_ District, Book \_\_\_\_\_, Page \_\_\_\_\_.

The project is located on the parcel shown on Assessors Map \_\_\_\_\_, Parcel \_\_\_\_\_.  
 Project street address \_\_\_\_\_

Give a brief summary of the nature of the project:

The property (building) is described as being located at \_\_\_\_\_;

It is currently used as \_\_\_\_\_,

The changes proposed are \_\_\_\_\_

Planned start date: \_\_\_\_\_, Planned completion date: \_\_\_\_\_

Total area to be disturbed? \_\_\_\_\_ square feet

Total area of the site (lot) \_\_\_\_\_ square feet

Zoning District \_\_\_\_\_

Will there be disturbance of any slope greater than 25-35%? \_\_\_\_\_ Yes \_\_\_\_\_ No

If yes, give the area of the slope disturbance. \_\_\_\_\_ square feet

Please list other narratives and plans (graphics) submitted with this application.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

Attach application fee and supporting documents.

#### Certification

I, the undersigned, hereby certify that I have read and understand the requirements and conditions of the Town of Andover Stormwater Management and Erosion Control Bylaw and Regulations and that the information included in the application materials is accurate and truthful to the best of my knowledge. (sign and print name and date)

Owner Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Name \_\_\_\_\_  
(please print)

Applicant Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Name: \_\_\_\_\_  
(please print)

(Office use only)

SMP # \_\_\_\_\_

## LID and Green Infrastructure Regulatory Review



# ANDOVER REGULATORY ASSESSMENT

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**To:** Arthur Martineau, Town Engineer, Town of Andover  
**From:** Rebecca Balke, P.E., Comprehensive Environmental Inc.  
**Date:** June 30, 2022  
**Subject:** Review of Andover's Regulations for LID and Impervious Cover Creation

The Environmental Protection Agency's (EPA's) 2016 National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, requires regulated communities such as Andover to develop a report assessing existing town regulations as they pertain to Low Impact Development (LID), green infrastructure (GI), and the creation of impervious area.

Comprehensive Environmental Inc. (CEI) performed a preliminary review of Andover's existing bylaws and applicable regulations to assess current street design and parking lot guidelines that affect creation of impervious cover to determine whether changes should be made to support LID (Permit Section 2.3.6.b). The assessment included determining the feasibility of making green infrastructure such as green roofs, infiltration practices, and water harvesting devices allowable where appropriate site conditions exist (Permit Section 2.3.4.c). CEI reviewed the following Town of Andover regulations as part of this assessment:

- Town Charter Article VIII Zoning By-Law (Adopted 04-24-2001, Amendments noted where applicable)
- Town Charter Article XIII Subdivision Rules and Regulations (Adopted 01-11-2011, Amendments noted where applicable)
- Town Charter Article XIV Wetlands Protection By-Law (Adopted 05-11-1999, Amendments noted where applicable)
- Town Charter Article XVI Stormwater Management and Erosion Control By-Law (Adopted 04-30-2008, Amendments noted where applicable)
- Stormwater Management and Erosion Control Regulations (Adopted 02-10-09, Amended 05-11-21)

Table 1 of this memorandum presents the results of this assessment and provides specific recommendations on how to further promote LID in the Town of Andover. Please note that the order of the list in Table 1 is based on general categories and not necessarily the order in the codes.

The recommended regulatory changes should be made as part of the next major regulatory update undertaken by the town for each by-law or regulation referenced.

If you have any questions or would like additional information, please feel free to contact me at 800.725.2550 x308 or [rbalke@ceiengineers.com](mailto:rbalke@ceiengineers.com). Thank you.

Rebecca Balke, P.E.  
Principal, Project Manager



# ANDOVER REGULATORY ASSESSMENT

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

Topic	Reference	Existing Requirement	Recommendations
General design for environmental sensitivity	<u>Subdivision</u> §1. Authority; purpose, B. Purpose.	Provides for due regard of the safety, convenience and welfare of the present and future inhabitants of Andover through providing safe and convenient travel, securing adequate provision for water, sewerage, drainage, etc.	Consider expanding this section to include “precautions to prevent pollution from stormwater runoff”.
	<u>Subdivision</u> §6. Subdivision design standards, A. General.	Requires all natural features be protected and preserved when in the interest of the community and new subdivisions be designed to achieve the least amount of earth disturbance (cutting, filling, regrading).	Consider expanding this section to include minimizing disturbance of steep slopes.
<b>Stormwater Management</b>			
LID and green infrastructure design	<u>Stormwater</u> IX. Design criteria, A. Low Impact Development.	Requires all projects (>1 acre disturbance) to consider LID and document in writing why LID strategies are not appropriate when not used. Refers to the Massachusetts Stormwater Handbook for LID BMPs.	No changes.
	<u>Zoning</u> Section 8. Special District Regulations, 8.7. Historic Mill District, 8.7.8. Design Objectives, Item 11.	Requires the incorporation of LID design techniques to lessen the environmental impact of development along the Shawsheen River.	
	<u>Zoning</u> Section 8. Special District Regulations, 8.8. Senior Residential Community Overlay District (SCROD), 8.8.6. Design Objectives, Item 14.	Requires the incorporation of LID design techniques to lessen the environmental impact of development along the Merrimack River.	



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
	<p><u>Zoning</u> Section 7.0: Special Residential Regulations, 7.1. Cluster Development, 7.2. Planned Development.</p>	<p>No current requirements to explicitly require LID design techniques for site plan and supporting stormwater management features.</p>	<p>Consider requiring all sites to incorporate LID design techniques addressing the following site design strategies:</p> <ul style="list-style-type: none"> <li>• Minimizing pavement, retaining natural drainage paths and features, and treating runoff as close to its source as feasible;</li> <li>• Directing runoff from roofs and pavements into natural or planted areas to “disconnect” runoff from the formal drainage system;</li> <li>• Maximizing the use of infiltration practices to reduce runoff volume that must otherwise be conveyed and treated;</li> <li>• Use of surface-based stormwater management systems (rather than subsurface systems) that incorporate vegetation to enhance stormwater treatment.</li> </ul>
<p>Open drainage</p>	<p><u>Subdivision</u> §7. Road construction standards for subdivision improvements, J. Drainage.</p>	<p>Current requirements focus on piped drainage systems with catch basins.</p>	<p>Consider allowing and providing specifications for open drainage systems, such as standard cross-sections and materials for open channels.</p>
<p>Storm event design</p>	<p><u>Subdivision</u> §6. Subdivision design standards, Item F.8. &amp; F.9.</p>	<p>Requires drainage systems be designed to accommodate the 10-year, 24-hour storm; cross culverts and major drainageways be designed to accommodate at least a 25-year, 24-hour storm. Requires detention basins, retention basins, ponds, and similar structures be designed to accommodate a 2-, 10-, 25-, and 100-year storm.</p>	<p>No changes recommended.</p>



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
	<u>Stormwater</u> IX. Design criteria, E. Flooding protection.	Requires post-development peak discharge rate shall be equal to or less than the pre-development peak discharge rate (based on a 2-year, 10-year, 25-year, and 100-year, 24-hour storm).	
Rain water harvesting	<u>N/A</u>	No current provisions regarding rain water harvesting.	Consider expanding LID language (Stormwater Regulations, <u>IX. Design criteria, A. Low Impact Development</u> ) to encourage reuse of stormwater as part of site design.
<b>Open Space</b>			
Cluster development	<u>Zoning</u> Section 7.0: Special Residential Regulations, 7.1. Cluster Development.	Cluster Development is allowed with a special permit through the Planning Board.	Consider allowing cluster development as a “by right” form of development (no special permit required).
Dedication of open space	<u>Zoning</u> Section 7.0: Special Residential Regulations, 7.1. Cluster Development, 7.1.4. Open Space.	Requires not less than 30% of land within the cluster development be preserved as open space for recreation or conservation.	Consider explicitly allowing LID stormwater management practices (bioretention areas, filter strips, swales, rain gardens, constructed wetlands, etc.) to count towards the fulfillment of required open space areas.
	<u>Zoning</u> Section 7.0: Special Residential Regulations, 7.2. Planned Development, 7.2. Open Area.	Requires at least 20% of lots in a Mixed Use District be maintained as open area which includes landscaped yard setbacks, natural areas, recreation areas, pedestrian walkways, conservation areas, landscaping around buildings and interior landscaping for parking lots.	
	<u>Zoning</u> Section 7.0: Special Residential Regulations, 7.3. New Multi-Family Dwelling	Requires all land not designated for roads, buildings, privately owned yards and which is unsuitable for development (i.e., wetlands or slopes greater than 15%) be designated open space. Open space shall comprise a minimum	



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
	Construction- Attached Cluster, 7.3.5. Open Space.	of 60% of the total area of the lot and at least 50% of open space shall be accessible and usable for recreation purposes.	
	<u>Zoning</u> Section 7.0: Special Residential Regulations, 7.4. Elderly Housing, 7.4.3. Assisted Living Residences - Dimensional Requirements and Design Standards.	Requires an area of common open space equal to at least 30% of the lot area for lots in the SRA and SRB Districts be retained for conservation or passive recreation use.	
	<u>Zoning</u> Section 8.0: Special District Regulations, 8.8. Senior Residential Community Overlay District (SRCOD), 8.8.5. Dimensional Requirements and Design Standards.	Requires an area of Common Open Space of at least 20% of the total area of the parcel or lot.	
Conservation incentives	<u>Zoning</u> Section 8.0: Special District Regulations, 8.8. SRCOD, 8.8.8. Bonus.	Current regulations allow for the proposed number of dwelling units be increased by 15% if the proposed SRCOD provides 50% Protected Open Space instead of the required 30%.	No changes recommended. This requirement encourages increased open space and public access to the Merrimack River.
<b>Street Design</b>			
Width	<u>Subdivision</u> §6. Subdivision design standards, C. Streets, Item 3. Right-of-way and street standards.	Minimum pavement widths: Local – 18’ Minor – 26’ Major – 28’ Collector – 34’ Industrial – 30’	Consider allowing a minimum pavement width of 18-22 feet on low-traffic local/minor streets in residential neighborhoods. Allow narrower pavement widths along sections of roadway where there are no houses, building, or intersections, and where on-street parking is not anticipated. For non-residential mixed-



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
			<p>use roadways, pavement widths should be set based on traffic volume, types of vehicles, parking and pedestrian requirements.</p> <p>Consider specifying maximum pavement widths.</p>
Materials	<p><u>Subdivision</u> §3. Procedures for submission of plans and plan requirements, B. Plan types, Item 1. iv.</p>	<p>Considerations for determining whether an existing private way is adequate to qualify for no approval include traveled way with at least 8 inches of compacted gravel for not more than 2 dwellings or paved with 2 inches of pavement if serving more than 2 dwellings.</p>	<p>Consider allowing the use of permeable materials such as porous pavers, paving stones, and pervious pavement for road shoulders and parking lanes in residential neighborhoods while maintaining the use of conventional paving for travel lanes.</p>
	<p><u>Subdivision</u> §7. Road construction standards for subdivision improvements, A. General, Item 2.</p>	<p>Requires all road materials and construction methods meet the MA DPW Standard Specifications for Highways and Bridges.</p>	
	<p><u>Subdivision</u> §7. Road construction standards for subdivision improvements, O. Pavement.</p>	<p>Provisions for street pavement include Class I bituminous concrete pavement be installed.</p>	
Layout	<p><u>Subdivision</u> §6. Subdivision design standards, C. Streets, Item 2. Location and alignment.</p>	<p>Requires all streets be designed to provide safe vehicular travel and achieve the appropriate usage of land with regard to the situation of homes, privacy, light and space, and access to the street.</p>	<p>Consider expanding this section to require street layout be designed to reduce street length and minimize the total paved area (including cul-de-sacs) with the goal of protecting site hydrology.</p>
Curbs and berms	<p><u>Subdivision</u> §7. Road construction standards for subdivision improvements, P. Curbing.</p>	<p>Requires vertical granite curbing be installed along all sidewalks, bituminous concrete berm curbs be constructed along roadways where the grade is greater than 4%, and bituminous concrete berm curbs/ concrete berms be</p>	<p>Consider explicitly allowing the use of “open drainage” along residential streets. If protection of the roadway edge is a concern, consider allowing alternative designs such as curbs with openings (or “leak-offs”) or</p>



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
	<u>Zoning</u> Section 5.0: General Requirements, 5.3. Landscaping, Buffering and Lighting, 5.3.3. General Business and Mixed Use Districts.	constructed at any other location when deemed necessary by the DPW.  Requires landscaped areas abutting parking areas and/or driveways be protected from vehicular encroachment by curbs or berms.	flush curbs, that enable the use of bioretention, treatment swales, and open drainage instead of requiring piped drainage systems.
ROW width	<u>Subdivision</u> §6. Subdivision design standards, C. Streets, Item 3. Right-of-way and street standards.	Minimum ROW widths: Local & Minor – 40’ Major & Industrial – 50’ Collector – 66’	ROW width is reasonable.
Dead-end streets & cul-de-sacs	<u>Subdivision</u> §6. Subdivision design standards, C. Streets, Item 4. Local streets & Item 5. Minor streets.	Requires dead-end streets have a closed end with a circular turnaround having at least a 120-foot diameter at the property line and at least a 100-foot diameter for the paved roadway.  The Board may waive its circular turnaround requirements to allow a cul-de-sac island. Requires center islands be at grade with the street or depressed with a gravel or stone infiltration sump at the center. Requires center islands be designed as low maintenance features and the Town will assume no responsibility for upkeep or improvements. Any landscaped island shall be maintained by a homeowners’ association.	Consider a smaller diameter cul-de-sac. Paved diameter of 70-90 feet or less are encouraged in LID practices.  Consider allowing alternative layouts for turnarounds, such as “hammerhead” turnarounds.  Consider requiring cul-de-sac islands rather than allowing them as part of a waiver process and allowing the use of vegetated stormwater management practices within the island.
ROW Landscaping	<u>Subdivision</u>	Current provisions allow landscaping within the street ROW by the lot owner in form of	Consider allowing LID stormwater management practices (bioretention areas,



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
	§5. Planning Board conditions and releases of conditions, B. Establishment of conditions, Item 5.x. <u>Subdivision</u> §6. Subdivision design standards, F. Drainage and grading, Item 9.	grass, flowers, and small shrubbery provided it does not interfere with the use or safety of the street.  Current provisions prohibit drainage facilities in the form of detention or retention basins or ponds from being located within any street ROW intended to be conveyed to the Town (except Local Streets).	filter strips, swales, rain gardens, etc.) within street ROWs.
Location of utilities	<u>Subdivision</u> Appendix A: Typical Roadway Section.	Cross section shows water utility placement 6' from the center of the road.	Consider explicitly permitting the placement of utilities under the paved section of the ROW or immediately adjacent to the road edge so that the land adjacent to the roadway can be used for drainage swales.
<b>Sidewalks</b>			
General requirements	<u>Subdivision</u> §6. Subdivision design standards, D. Sidewalks. Item 2.	Requires sidewalks be constructed on at least one side of streets proposed in the SRA, SRB, and SRC Zoning Districts (except on local streets).	No changes recommended.
Materials	<u>Subdivision</u> §7. Road construction standards for subdivision improvements, Q. Sidewalks.	Requires sidewalks be constructed of compacted bank gravel or equivalent with a wearing surface of bituminous concrete.	Consider either requiring or allowing the use of permeable surfaces for sidewalks.
Width	<u>Subdivision</u> §7. Road construction standards for subdivision improvements, Q. Sidewalks.	Requires sidewalks be at least 5 feet in width.	Consider requiring minimum sidewalk width of 4 feet and establishing a maximum width.
Drainage design	<u>Subdivision</u> §7. Road construction standards for subdivision improvements, Q. Sidewalks.	Requires the area between the sidewalk and the street pavement or curb be at least 6 inches of loam with appropriate seeding.	Consider requiring runoff from sidewalks to be “disconnected” from street drainage where feasible, by directing it into qualifying vegetated receiving areas or



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
			landscaped areas such as tree-box filters or rain gardens.
Pedestrian and bicycle paths	<u>Zoning</u> Section 6.0: Special Regulations, 6.8. Alternative Modes of Transportation, 6.8.2. Pedestrian and Bicycle Paths.	Current provisions promote pedestrian and bicycle paths whenever possible to provide safe, efficient, alternative ways of transportation.	Consider providing language explicitly allowing the use of permeable paving or pervious cross-country pathway for pedestrian and bicycle paths.
	<u>Subdivision</u> §6. Subdivision design standards, H. Design standards for cluster subdivisions, Item 4.	Current provisions allow the Board to reserve pedestrian accessways of suitable width in locations suitable for pedestrian movement of different types connecting open space areas within the cluster subdivisions or to other adjacent open spaces.	
<b>Driveways</b>			
Width	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.5. Design Standards, 4. Driveways.	Requires a minimum driveway width for parking areas of 24 feet for two-way traffic and 14 feet for one-way traffic. The maximum width shall not exceed 30 feet.	Consider requiring a minimum driveway width of 18 feet for two-way traffic and 9 feet for one-way traffic, as recommended for LID practices.
	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.6. Parking in Apartment Districts, Item 3.	Spaces located in a driveway providing access to more than one dwelling unit shall not reduce the effective width of the driveway to less than 12 feet.	
Common driveways	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.6.	Any way or driveway providing principal access to six or more dwelling units or eight or more parking spaces shall conform to applicable provisions for minor residential ways.	Consider allowing the use of common residential driveways to serve up to four houses, including cluster development lots that do not meet standard dimensional requirements.



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
	Parking in Apartment Districts, Item 4. <u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.12. Special Permit for Change in Parking Space Requirements, Item 4.	Current provisions allow for joint driveways by special permit in the General Business District serving no more than two lots.	
Materials	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.5. Design Standards, 4. Driveways.	No current regulations regarding driveway materials.	Consider allowing pervious materials (porous pavers, paving stones, pervious concrete) and/or the use of “two-track” driveways, for residential driveways.
<b>Parking Lots</b>			
Size of spaces	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.5. Design Standards, 5.1.5.1. Parking Dimensions, Appendix A: Table 4.	Table of Parking Dimensions provides minimum dimensions of parking spaces and maneuvering aisles.  Standard spaces: 9’ x 18’ Compact spaces: 8’ x 16’	No changes recommended.
Number of spaces	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.8. Parking in Industrial Districts.	Requires each parking area contains no more than 240 parking spaces. There shall be no more than 30 parking spaces in any uninterrupted row.	Consider specifying a maximum number of spaces for parking areas in all districts that do not currently have a maximum.
	<u>Zoning</u> Section 7.0: Special Residential Regulations, 7.2. Planned Development, 7.2.5.	Requires 2 parking spaces per dwelling unit.	Consider allowing reduced parking for homes and businesses near major transit stops.



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
	Design Standards, 2. Parking Requirements.	For common lots, the required number of spaces can be reduced if it can be shown that a lower total will serve all uses adequately.	
	<u>Zoning</u> Section 7.0: Special Residential Regulations, 7.3. New Multi-Family Dwelling Construction- Attached Cluster, 7.3.6. Design Standards.	Requires at least 2 parking spaces per dwelling unit with no more than 12 spaces per parking area.	
	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.4. Table of Off-Street Parking Requirements, Appendix A: Table 3.	Table of Off-Street Parking Requirements provides minimum required number of parking spaces for various uses.	
Materials	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.5. Design Standards, 2. Parking Layout.	Requires all parking areas be paved for all uses other than one-family or two-family dwelling.	Consider allowing pervious materials such as porous pavers, paving stones, reinforced grass, and pervious pavement for parking stalls and spillover parking areas.
	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.6. Parking in Apartment Districts, Item 1.	Requires parking spaces be located either in an off-street paved area, in a garage, or a carport.	
	<u>Zoning</u> Section 7.0: Special Residential Regulations, 7.3.		



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
	New Multi-Family Dwelling Construction- Attached Cluster, 7.3.6. Design Standards, Item 6.		
Shared parking	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.7. Parking in General Business Districts, 3. Multiple Uses Sharing a Common Parking Lot.	Requires parking spaces for two or more uses on a common lot be the sum of the spaces required for each use individually, unless it can be shown that a lower total will serve all uses adequately.	No changes recommended. Reduction of parking requirements for shared parking supports LID practices.
	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.12. Special Permit for Change in Parking Space Requirements, 1. Shared Private Parking Facilities.	Current provisions allow for shared private parking facilities if applicant shows that the peak parking demand and principal operating hours for each use are suitable for a common parking facility.	
	<u>Zoning</u> Section 8.0: Special District Regulations, 8.7. Historic Mill District (HMD), 8.7.10. Off-Street Parking and Loading Areas, 3. Shared Parking Facilities.	Current provisions allow for up to 50% of parking spaces serving a building to be used jointly for other uses not normally open, used or operated during similar hours.	
Compact car spaces	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.7. Parking in General Business	Current provisions allow up to 30% of spaces in lots of more than 40 parking spaces be designed for compact cars.	No changes recommended. LID practices recommend up to 30% of the total number of parking spaces be smaller stalls for compact cars.



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
	Districts, 6. Compact Car Spaces.		
	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.8. Parking in Industrial Districts, Item 8.	Current provisions allow the size of a parking space to be reduced to a compact car space for those spaces serving all-day parkers.	
	<u>Zoning</u> Section 7.0: Special Residential Regulations, 7.4. Elderly Housing, 7.4.3. Assisted Living Residences-Dimensional Requirements and Design Standards, Item 11.	Current provisions allow up to 25% of the minimum number of required spaces be allocated for compact cars.	
Landscaping	<u>Zoning</u> Section 5.0: General Requirements, 5.1. Off-Street Parking and Loading, 5.1.8. Parking in Industrial Districts, Items 6-8.	Requires parking areas be enclosed by a landscaped buffer not less than 12 feet wide planted with shade trees and each parking area have interior landscaping areas, primarily planted with trees, equivalent in size to 5% of that parking area's total pavement area.	Consider establishing landscaping requirements for parking areas that include vegetated islands with bioretention functions.
	<u>Zoning</u> Section 7.0: Special Residential Regulations, 7.2. Planned Development, 7.2.5. Design Standards, 3. Landscaping, Screening and Lighting.	Requires at least 5% of parking lots with more than 50 spaces be landscaped, defining "landscaping" as planted trees, shrubs, and ground covers in a prepared planting area.	
	<u>Zoning</u> Section 8.0: Special District Regulations, 8.4. Mixed Use	Requires parking lots be enclosed by a landscaped area of at least 5 feet in width and at least 5% of parking lot interior be	



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
	District, 8.4.2. Design Standards, 5. Landscaping.	landscaped for parking lots exceeding 50 parking spaces.	
<b>Lot Layout</b>			
Lawn requirements	<u>N/A</u>	No current provisions for lawn extent limits.	Consider establishing limits on extent of lawn area on residential lots, either by area or by percentage of lots. Encourage property owners to plant native, drought-resistant species which require less water, pesticides, and fertilizers.
Landscaping and buffers	<u>Zoning</u> Section 5.0: General Requirements, 5.3. Landscaping, Buffering and Lighting.	General provisions for landscaping and buffering for various districts.	<p>Consider providing language explicitly allowing LID stormwater management practices (bioretention areas, filter strips, swales, rain gardens, constructed wetlands, etc.) in required landscaped and buffer areas for all districts.</p> <p>Consider expanding this section to more generally address landscaping design criteria, including (for example):</p> <ul style="list-style-type: none"> <li>• Provisions for additional landscape use of shrubs, native herbaceous plantings, instead of just grass;</li> <li>• Use of native materials for all plantings (possibly include an approved plant list with options to provide other species upon approval).</li> </ul>
	<u>Zoning</u> Section 8.0: Special District Regulations, 8.1. Watershed Protection Overlay District.	Requires vegetation on the lot be planted and located in such a way as to maximize groundwater recharge, absorb and filter runoff and reduce erosion.	Consider including this as a design standard for all districts.



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
	8.1.7. Design Standards, Item 3.		
Lot dimensions	<u>Zoning</u> Section 7.0: Special Residential Regulations, 7.1. Cluster Development, 7.1.2. Dimensional Requirements.	Current provisions allow reduced lot frontage or lot area only for lots fronting on a proposed “minor” street and through special permit.	Consider allowing cluster development as a “by right” form of development (no special permit required).  Consider minimizing setback distances in residential districts to increase flexibility with regard to house location.
	<u>Zoning</u> Section 4.0: Dimensional Requirements, 4.1. General, 4.1.2. Table of Dimensional Requirements, Appendix A: Table 2.	Table of Dimensional Requirements provides minimum lot dimensions for the various districts.	
Impervious lot coverage	<u>Zoning</u> Section 7.0: Special Residential Regulations, 7.2. Planned Development, 7.2.3. Dimensional Requirements, 2. Building Coverage.	Requires maximum building coverage in a Mixed-Use District not exceed 40% for new construction or expansion. Existing structures in a General Business District occupying more than 2/3 of the lot area shall not be expanded and new structures shall not exceed 2/3 of the lot area.	Consider limiting impervious lot coverage to 15% in rural, low-density areas. This recommendation is not appropriate for town centers, transit-oriented districts, and moderate density neighborhoods, where compact development should be encouraged.
	<u>Zoning</u> Section 8.0: Special District Regulations, 8.6. Groundwater Protection Overlay District (GWPOD), 8.6.5. Special Permit Uses.	A special permit is required for any use in the GWPOD that will render impervious more than 15% or 2,500 SF of any lot, whichever is greater.	
	<u>Zoning</u> Section 4.0: Dimensional Requirements, 4.1. General, 4.1.2. Table of Dimensional Requirements, Appendix A: Table 2.	Table of Dimensional Requirements provides maximum coverage, including accessory buildings, for lots in various districts (25-50%). No maximum coverage is provided for residential or general business districts.	



# ANDOVER REGULATORY ASSESSMENT

Topic	Reference	Existing Requirement	Recommendations
<b>Site Work</b>			
Tree removal	<u>Subdivision</u> §6. Subdivision design standards, A. General, Item 3.	Current provisions require natural features, such as mature vegetation, be protected and preserved when in the interest of the community.	No changes recommended, regulatory controls established over tree clearance and removal of mature trees/forest stands.
ROW clearing	<u>Subdivision</u> §7. Road construction standards for subdivision improvements, C. Grubbing, Item 1.	Requires all trees, brush, stumps, roots, boulders and all loam or other yielding materials be removed from the full length and width of the roadway (pavement and shoulder).	Consider requiring developers to limit clearing within the ROW to the minimum extent necessary to construct roadway, drainage, sidewalk, and utilities.
Soil restoration	<u>Zoning</u> Section 6. Special Regulations, 6.3. Earth Movement.	No current provisions addressing conservation of topsoil or restoration of natural condition of sub-soils impacted by construction activity.	Consider including provisions that address the following: <ul style="list-style-type: none"> <li>• Minimization of the removal of topsoil from the property;</li> <li>• Restoration of natural soil permeability, such as rototilling of soils, within vegetated/ landscaped areas where construction has compacted soils.</li> </ul>
Erosion and runoff controls	<u>Zoning</u> Section 8.0: Special District Regulations, 8.1. Watershed Protection Overlay District, 8.1.7. Design Standards.	Requires all construction activities within the WPOD be designed to minimize erosion and runoff by minimizing the construction period, slope stabilization, ditch maintenance, filtering, sedimentation basins and re-vegetation.	Consider including this as a design standard for all districts.

# Andover

Factors	Needs Improvement	Improved	Optimal	Zoning Bylaw (Site plan review and special districts included)	Subdivision Rules & Regulations	Stormwater Management Bylaw and Stormwater and Erosion Control Regulations	Wetland Protection Bylaw
<b>GOAL 1: PROTECT NATURAL RESOURCES AND OPEN SPACE</b>							
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 rototilling and other prep of soils compacted during construction	Revegetation plan required in watershed protection overlay district (8.1.7) WPOD Earth removal as defined in Sections 6.3.2, 6.3.3, and 6.3.4, where such removal will not endanger ground or surface water quality and where non-construction excavation or grading shall not come closer than four feet above maximum groundwater elevation. The angle of graded slopes shall be no greater than that which can be held by existing or planned vegetation (8.1.4, 7) WOPD Vegetation on the lot shall be planted and located in such a way as to maximize groundwater recharge, absorb and filter runoff and reduce erosion (8.1.7, 3). All construction and land disturbing activities within the GWPOD shall be designed or sites to minimize erosion and runoff, by such practices as minimizing the construction period, slope stabilization, ditch maintenance, filtering, sedimentation basins and revegetation. (8.6.7, 4)	soil erosion plan required which addresses stabilization and revegetation for plan Cs (3.E.5.e) Earth disturbed by construction activities associated with the subdivision roadway or easements, such as tree cutting, stump grubbing, cutting, filling and regrading shall be appropriately stabilized by methods determined by the Board through the Planning Department within 60 days of such disturbance unless otherwise approved by the Board. (3.B.5.i) Long-term (more than 60 days) stockpiles of earth materials shall be shaped and secured by butted haybales around the perimeter and shall be promptly stabilized by temporary seeding or netting (3.B.5.o)	analysis on best use potential for soils required (VI.B.i), topsoil cannot be removed from sites, should instead be stockpiled and given temporary vegetative cover if left for over 30 days (IX.H.11)	Except as permitted by the Conservation Commission or as provided in § 3 of this by-law, no person shall remove, fill, dredge, build upon, degrade or otherwise alter the following resource areas: any bank, freshwater wetland, marsh, wet meadow, bog, swamp, vernal pool, reservoir, lake, pond, creek, river or stream, or any land under said waters, or any land within 100 feet of any of the aforesaid resource areas, or any land subject to flooding or inundation by groundwater or surface water, or within 200 feet of any river (2) Alter defined as (among other things) Removal, excavation or dredging of soil, sand, gravel or aggregate materials of any kind.(16)
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	vegetation required to be planted in such a way that minimizes runoff in WPODs (8.1.7) WOPDs required to submit a planting and revegetation plan prior to construction (8.1.7, 4) WPOD and GWPOD Slopes which exceed an average of 15% over a distance of 10 feet or more shall remain undisturbed (8.1.7, 1) Preserve natural features, wetlands, scenic vistas and open spaces when possible HMD, SCROD(8.7.7, 4)	general qualitative statement not tied to other design standards (6) Earth materials associated with the construction of a subdivision may not be transported to or removed from the site without the applicant having first secured approval for such activities from the Board. (3.B.5.ee) Earth disturbed by construction activities associated with the subdivision roadway or easements, such as tree cutting, stump grubbing, cutting, filling and regrading, shall be appropriately stabilized by methods determined by the Board through the Planning Department within 60 days of such disturbance unless otherwise approved by the Board.(3.B.5.j). No minimization of grubbing encouraged in 7.C	Encourage minimization of clearing/grubbing (IX.H.1&14). Land disturbance activities exceeding two acres in size shall not be disturbed without a sequencing plan that requires stormwater controls to be installed and the soil stabilized, as disturbance beyond the two acres continues. Mass clearings and grading of the entire site should be avoided. (IX.H.9)	Except as permitted by the Conservation Commission or as provided in § 3 of this by-law, no person shall remove, fill, dredge, build upon, degrade or otherwise alter the following resource areas: any bank, freshwater wetland, marsh, wet meadow, bog, swamp, vernal pool, reservoir, lake, pond, creek, river or stream, or any land under said waters, or any land within 100 feet of any of the aforesaid resource areas, or any land subject to flooding or inundation by groundwater or surface water, or within 200 feet of any river (2) Alter defined as (among other things) Destruction of plant life, including the cutting of trees (16)
Require native vegetation and trees	Not addressed OR General qualitative statement	Mixture of required plantings of native and nonnative	Require at least 75% native plantings	Not addressed	not addressed beyond - all street trees planted within the right-of-way shall be approved by the Forestry Superintendent. (7.S.5)	100% Native species required (IX.H.24)	not addressed
<b>GOAL 2: PROMOTE EFFICIENT, COMPACT DEVELOPMENT PATTERNS AND INFILL</b>							
Lot size	Not addressed OR Required minimum lot sizes	OSRD/NRPZ preferred. Special permit with incentives to utilize	Flexible with OSRD/NRPZ by right, preferred option	Required minimum lot sizes (Appendix A, Table 2) exceptions exist but not related to OSRD. Cluster development allowed in some instances by special permit which requires 30% or more open space (7.1) For multi family dwellings each lot shall be not less than 10 acres nor more than 25 acres (7.3.4, 1).	(Not applicable)	Land disturbances of 43,560 square feet or more, including multiple separate activities which in aggregate disturb 43,560 square feet or more (a bit less than 1 acre), whether on one parcel or adjacent parcels held in common ownership, shall require a stormwater management permit (4.A) should include a small permit requirement for smaller sq ft projects	(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	cluster development allowed by special permit: The Planning Board shall approve a special permit for a cluster development only if it finds that the proposed disposition of lots and buildings under the particular circumstances involved will make more efficient the provision by the town of health, safety, protective and other services without causing substantial detriment to the character of the neighborhood. (7.1.5), multi-family development allowed by special permit: The Planning Board may grant a special permit for Planned Development-Multifamily Dwelling (PD-MD) or Planned Development-Mixed Use (PD-MU) for the following types of structures and uses (7.2.1) also mentioned in 7.3. - new multi-family dwelling construction	(Not applicable)	(Not applicable)	(Not applicable)
Setbacks	Not addressed OR Required minimum front, side, and rear setbacks	Minimize, allow flexibility	Clear standards that minimize and in some instances eliminate setbacks	Required minimum setbacks for multi family dwelling construction (7.3.4), In the General Business District, the front setback shall be the average front setback of existing buildings on the block. (4.1.4, 2) The minimum frontage of any individual lot shall be 100 feet measured at the street line. Only lots fronting on a proposed "minor" street may have reduced lot area, conform to the frontage and area requirements of the zoning district in which the development lies. In consideration of a special permit for a cluster development under this section, the Planning Board may approve a reduction in the minimum side yard depth to 20 feet (7.1.2) In a Mixed Use District only, the lot shall have a minimum frontage of 50 feet on an existing public way (7.2.3, 4)	(Not applicable)	(Not applicable)	(Not applicable)

Frontage	Not addressed OR Required minimum frontage for each lot/unit	Minimize especially on curved streets and cul-de-sacs	No minimums in some instances tied into other standards like OSRD design and shared driveways.	Required minimum frontage for each lot/unit (Appendix A, table 2) exceptions exist but not related to OSRD	(Not applicable)	(Not applicable)	(Not applicable)
Common driveways	Not addressed OR Not allowed, strict limitations	Allow for 2-3 residential units	Allow for up to 4 residential units, preferably constructed with permeable pavers or pavement	allowed in General Business District by special permit following provisions. Only allowed to serve 2 lots (5.1.12, 4) (5.1.5)	not addressed	(Not applicable)	(Not applicable)
<b>GOAL 3: SMART DESIGNS THAT REDUCE OVERALL IMPERVIOUSNESS</b>							
Impervious cover limits and infiltration rates	Not usually addressed in zoning and subdivision regs 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	The number of dwelling units (Independent Living, Congregate Care or Assisted Living Units or Nursing/Restorative beds) proposed may be increased by fifteen (15%) percent (i.e. for every 10 dwelling units, 2 additional dwelling units may be built) if the proposed SRCOD provides fifty (50%) Protected Open Space instead of thirty (30%) percent. (8.8.8)	not addressed	Impervious area not specifically limited, but fairly extensive requirements are in place via maintaining pre-construction recharge rates (IX.B) and pollutant removal (IX.D)	(Not applicable)
Street location	No standards addressed OR 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)	numeric and geometric standards (6.C)	(Not applicable)	(Not applicable)
Road width	No categories addressed OR 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.	24 feet for 2 way traffic, 14 feet for one way, shall not exceed 30 feet (for driveways) (5.1.5).	Minimums set for each category: 18 local, 26 minor, 28 major (6.C.3.a)	(Not applicable)	(Not applicable)
Road ROW width	ROW Width not addressed OR 50-75', fully cleared and graded	40-50', some flexibility in extent of clearing	20-50' depending on road type	Not addressed	40-50' with some flexibility, ROW is at least 40 feet in width (3.B.e.i)	not addressed, but all areas beyond ROW are required to be covered in topsoil and planted with native species (IX.H.19)	(Not applicable)
Access Options	Common drives not addressed. No common drives allowed. Dead end allowed with limit on length and # of units	Allow dead end with limit on length and # 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.	common driveways allowed in General Business District by special permit following provisions. Only allowed to serve 2 lots (5.1.12) (5.1.5)	not addressed	(Not applicable)	(Not applicable)
Dead Ends/Cul-de-sacs	No standards addressed OR 120 ft or more minimum turnaround	Minimize end radii – 35 ft	Allow hammerhead turnaround	(Not applicable)	120 ft or more minimum turnaround(6.C.5)	(Not applicable)	(Not applicable)
Cul-de-sacs	No standards addressed OR Full pavement standard	Encourage center landscaping with bioretention	Require center landscaping with bioretention	(Not applicable)	center islands allowed under some circumstances, but landscaping not allowed unless to preserve existing natural features (6.C.5) Any landscaped island must have a maintenance plan and the local govt. is not responsible for maintaining it (6.C.5)	(Not applicable)	(Not applicable)
Curbing	No standards addressed OR 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)	Vertical granite curbing (Type VB) shall be installed along all sidewalks. In the Single Residence A Zone, granite curb inlets shall be installed at each catch basin and curved granite curbing shall be installed at each intersection. Bituminous concrete birms may be constructed where deemed necessary by DPW, in or when grading is more than 4% in single residence zone A (7.P)	not addressed	(Not applicable)
Roadside Swales	Not addressed OR 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	encouraging the maximum retention of natural topographic features, such as drainage swales, streams, slopes, ridge lines, rock outcroppings, vistas, natural plant formations and trees; to minimize the effects of grading to insure that the natural character of steep slopes is retained; to minimize water runoff and soil-erosion problems incurred in grading of steep slopes; and to encourage innovative architectural, landscaping, circulation and site design. (4.1.4, 5.a)	not directly addressed - Retaining walls, revetments, armored slopes and similar type structures are prohibited within the street right-of-way. Retaining walls and/or similar type structures located outside the right-of-way shall be designed to Massachusetts state standards. Retaining walls and/or similar type structures shall be prohibited as right-of-way support structures. (6.C.2.p)	allowed as an option and mentioned briefly, but not preferred (VI.B.1 & 2)	(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)	Not mentioned in depth - Utility easements for water shall be no less than 20 feet in width, and utility easements for sewer shall not be less than 30 feet in width. Where multiple utilities are to be contained within the same easement, an additional 10 feet in width shall be provided for each additional utility. (6.E.2)	(Not applicable)	(Not applicable)
Sidewalks	Material not addressed OR Concrete or bituminous required	Some flexibility in material and design	Prefer permeable pavement or permeable pavers	(Not applicable)	concrete or bituminous (7.O.2) For plan A, the traveled way is at least 18 feet in width, with at least eight inches of compacted gravel if serving not more than two residential dwellings, and/or paved with at least two inches of bituminous pavement if serving more than two residential dwellings. (3.B.e) Sidewalks shall be at least five feet in width and shall be constructed starting at the street line towards the pavement edge and shall consist of eight inches of compacted bank gravel (or equivalent) with a wearing surface of two inches of Type I bituminous concrete. The area between the sidewalk and the street pavement or curb shall be at least six inches of loam with appropriate seeding. (7.Q)	(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)	sidewalk construction may be waived at request (6.D.5), allow only 1 side in certain districts, siting for best pedestrian utility allowed especially in cluster subdivisions(6.D.3/4). Sidewalks must be constructed on atleast one side of the street (6.D.2)	(Not applicable)	(Not applicable)
Sidewalk drainage	Draining to road, closed drainage system required	Not addressed	Disconnect drainage from road system – e.g. adjacent green strips or within vegetated areas that can absorb sheet flow	(Not applicable)	Side underdrains shall be installed on both sides of the street(s), except in fill sections, and shall be connected in an approved manner to the surface drainage system. (5.B.5.r). Catch basins shall be constructed on both sides of the roadway at intervals of not more than 400 feet (7.J.4)	(Not applicable)	(Not applicable)
<b>GOAL 4: ADOPT GREEN INFRASTRUCTURE STORMWATER MANAGEMENT PROVISIONS</b>							
Rooftop runoff	Not addressed OR 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)	No roof drainage permitted to enter sanitary sewer system (7.G.8)	not addressed	(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)	LID addressed very briefly, stating that local stormwater management systems shall be designed to use LID, but not specifying how (6)		(Not applicable)
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)	encourage/require the use of LID as listed in the Massachusetts stormwater handbook (IX.A), but does not specify LID counting towards site landscaping/OS reqs	(Not applicable)
Allow easy siting of LID features (bioretention, swales, etc.)	Not addressed OR 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	In HMD and SCROD: Incorporate low-impact development (LID) design techniques or Stormwater Best Management Practices (such as, but not limited to, pervious paving, landscape swales, vegetative filters or rain gardens, and landscape infiltration facilities) to lessen the environmental impact of development along the Shawshen River. (8.7.8, 11)	not addressed	(Not applicable)	(Not applicable)
Permeable paving	Not addressed OR 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 addressed	not addressed	(Not applicable)
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, surficial bioretention and swales preferred. Closed/underground systems requiring specialized inspection and clean out discouraged.	(Not applicable)	not addressed	required but no mention of preferred practices (VI.C)	(Not applicable)
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	GWPOD construction required to be designed to minimize erosion/sedimentation, but no plan necessary (8.6.7) WOPD requires a sedimentation and control plan (8.1.7)	Detailed soil erosion and sedimentation control plan required in subdivision plan C (5.e) Soil erosion and sedimentation control plan. A soil erosion and sedimentation control plan shall be provided at the time of definitive plan submission. The plan shall be prepared and signed by a person or firm qualified by training and experience to have expert knowledge of erosion and sedimentation control methods, general minimum requirements	not mentioned by name (soil erosion and sedimentation control plan) in both the stormwater bylaw and rules/reg - The Planning Board shall refer to the criteria and information, including specifications and standards, of the latest edition of the Massachusetts Stormwater Management Policy or to the design criteria as described in the Plan of Andover's Subdivision Rules and Regulations[1] or to the Town of Andover Stormwater Management and Erosion Control Regulations, whichever is more stringent in the protection of the Town's environmental and infrastructure resources, for execution of the provisions of this bylaw. (5.C)	(Not applicable)
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)	structural and non structural stormwater BMPs implemented to reduce discharge consistent with approved TMDL. stormwater management system designed specifically for nitrogen reduction in nitrogen impairment situation (IX.D.2)	(Not applicable)
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 sqft. of impervious surface and/or remove 90% TSS post-construction & 50% TP generated on the site for new development, or >0.8in. per sqft 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)	Local street stormwater management systems Shall be designed so that the post-development discharge rates do not exceed predevelopment peak discharge rates. (6.F.10) Shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS) (different from that mentioned in stormwater rules and regs) The post-development drainage peak flow rate of runoff shall not exceed the predevelopment drainage peak flow rate of runoff. (6.F.11)	maintain pre-existing ground water levels and stream baseflows by calculating the volume of water required to be recharged using the mass stormwater handbook (IX.B) If the site is on unsuitable soils, non structural LID practices will be implemented (IX.B.2c) requires 90% TSS post construction, 80% redev, and 60% TP for new dev, 50% for redev. In compliance.	(Not applicable)

As-built surveys	Not addressed	Recommended	Required, with written instructions for process; electronic submittal allowed	(Not applicable)	Required, process detailed, no mention of electronic submission: Initial as-built plan. All utilities associated with the project shall be located by a registered land surveyor before each utility is backfilled and shall be shown on an initial as-built plan with the following certification: "I certify that the utilities as shown are as actually located in the field and have not been shown as a reproduction of contractor records."	not addressed	(Not applicable)
Intra-departmental communication and coordination	Not addressed	Informally or loosely occurring	Required for plan review and/or permit approvals	some combination of inspector of buildings, board of appeal, and planning board, but informal communication required between the three: administered by inspector of buildings: Buildings, structures or signs may not be erected, substantially altered, moved or changed in use and land may not be substantially altered or changed in principal use without certification by the Inspector of Buildings (9.1.2.) board of appeals acts as special permit granting authority. Unless otherwise specifically required under this by-law, the SPGA may require that an interdepartmental review be conducted on an application for a special permit (9.4.9.) There is established a Board of Appeals of five members and there shall be also appointed four associate members to the Zoning Board of Appeals. The members of the Board of Appeals and the associates shall be appointed by the Selectmen as provided in G.L. c. 40A. The Zoning Board of Appeals shall be organized and governed by the provisions of G.L. c. 40A. (9.2.1.)	Planning board: The powers of the Board shall be exercised in accordance with the General Laws of Massachusetts to regulate the laying out and construction of ways in subdivisions to insure the safety, convenience and welfare of the present and future inhabitants of Andover. (1.B) no interdepartmental coordination addressed	The Planning Board, as the permit granting authority, shall administer, implement, and enforce this bylaw. Any powers granted to or duties imposed upon the Planning Board in this bylaw may be delegated to designated agents upon a majority vote of the Planning Board. Should the Planning Board designate an agent, such agent shall be approved by the Town Manager. (5) no interdepartmental coordination addressed	The Commission shall have authority to enforce this by-law, its regulations and permits issued thereunder by violation notices, administrative orders and civil and criminal court actions. Any person who violates provisions of this by-law may be ordered to restore the property to its original condition and take other action deemed necessary to remedy such violations. Upon request of the Commission, the Town Manager and Town Counsel, with the approval of the Select Board, may take legal action for enforcement under civil law. Upon request of the Commission, the Chief of Police may take legal action for enforcement under criminal law. (12) could serve for inter-departmental coordination if necessary
Enforcement	No	Yes	Yes with fines. Same entity should oversee permit approvals and enforcement	If the violation is not stopped within an appropriate time following notification, the Inspector of Buildings shall notify the Town Manager for appropriate action. Any person violating any of the provisions of this by-law shall be fined not more than \$300 for each offense. Each day that such violation continues shall constitute a separate offense (9.1.5.) different entities (board of appeals/planning board oversees permitting, enforcement is building inspector)	not addressed	The Planning Board or its designated agent shall enforce this bylaw, its regulations, orders, violation notices, and enforcement orders and may pursue all civil and criminal remedies for such violations. Criminal penalty. Any person who violates any provision of this bylaw, regulation, order or permit issued thereunder, shall be punished by a fine in an amount of \$300. Each day or part thereunder that such violation occurs or continues shall constitute a separate offense. (11, A and E)	Any person who violates any provision of this by-law or regulations issued thereunder shall be punished by a fine of \$200. Each day or portion thereof during which a violation continues, or unauthorized fill or other alteration remains in place, shall constitute a separate offense, and each provision of the by-law, regulations, permit or administrative order violated shall constitute a separate offense. Commission shall have authority to enforce this by-law, its regulations and permits issued thereunder by violation notices, administrative orders and civil and criminal court actions. (12)
<b>GOAL 5: ENCOURAGE EFFICIENT PARKING</b>							
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.	Minimum # needed to serve routine use (Appendix A, table 3) There shall be two parking spaces per dwelling unit. Visitor parking shall be determined by the Planning Board with reference to the number of dwelling units proposed. (7.2.5, 2.a) No parking area may have more than 12 spaces for multi-family dwellings (7.3.6, 6) HMD Up to 50% of the parking spaces serving a building may be used jointly for other uses not normally open, used or operated during similar hours. The applicant must demonstrate to the Planning Board that the peak demand and principal operating hours for each use are suitable for a common parking facility. (8.7.10, 3a)	(Not applicable)	(Not applicable)	(Not applicable)
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	parking stall size limited to 9x18 and 30% compact car stalls allowed. (Appendix A table 4 and 5.1.7, 6); Shared parking allowed but special permit required to reduce required # of spaces (5.1.7, 3 and 5.1.12.1) Shared parking for uses with different peak demand times allowed under special permit (5.1.12) No reduced parking near transit mentioned. Any proposals submitted under this section which, in the opinion of the Planning Board, provide direct and vital pedestrian access to other abutting commercial properties and serve to improve pedestrian accessibility in the General Business District may reduce the number of parking spaces required by 15% (5.1.12, 3)	(Not applicable)	(Not applicable)	(Not applicable)
LID in Parking Areas	LID not addressed OR Require waivers e.g. for planting islands to drain down rather than bulk up surrounded by curbs	Allow LID/bioretenion within parking areas.	Require landscaping within parking areas, as LID/bioretenion, at a minimum of 10% of the interior area landscaped and a minimum of 25 square feet for island planting areas.	Require landscaping within parking areas as minimum 5% interior if lot exceeds 50 spaces. Not required for bio-retention purposes but would serve those purposes (7.2.5, 3)	not addressed	not addressed	(Not applicable)

## Appendix D

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Inventory of Town-Owned Property

Inventory of Municipal Property  
Municipal Property BMP Retrofits Evaluation

## Inventory of Municipal Property

Inventory of Town-Owned Facilities

Site Name	Address	Map Label
<b>MUNICIPAL BUILDINGS</b>		
<b>DPW</b>		
Andover DPW	5 Campanelli Drive	D1
Bald Hill Compost Site	288 High Plain Rd	D3
<b>Police</b>		
Andover Police Dept.	32 North Main St	PD1
<b>Fire</b>		
Andover Fire Dept.	32 North Main St	FD1
West Andover Fire Station	200 Greenwood Rd	FD2
Andover Fire Station 2	163 Andover St	FD3
<b>Water</b>		
Water Treatment Plant	397 Lowell St	W2
<b>Town Hall</b>		
Andover Town Hall	36 Bartlet St	TH1
<b>COMMUNITY BUILDINGS</b>		
<b>Libraries</b>		
Memorial Hall Public Library	2 North Main St	L1
<b>Event Halls</b>		
Andover Town House	20 Main St	EH1
<b>Senior</b>		
Andover Senior Center	30 Whittier Ct	SC1
<b>SCHOOLS</b>		
Andover High School	70 Shawsheen Rd	S1
Bancroft School	15 Bancroft Rd	S2
Doherty Middle School	50 Bartlet St	S3
High Plain Elementary School	333 High Plain Rd	S4
Wood Hill Middle School	11 Cross St	S5
Sanborn Elementary School	90 Lovejoy Rd	S6
Shawsheen Preschool	18 Magnolia Ave	S7
South Elementary School	55 Woburn St	S8
West Elementary School	58 Beacon St	S9
West Middle School	70 Shawsheen Rd	S10
<b>OPEN SPACES</b>		
<b>Parks</b>		
Recreation Park	165-183 Abbott St	P1
Pomps Pond	147 Abbott St	P2
<b>Cemeteries</b>		
Spring Grove Cemetery	124 Abbott St	C1
<b>OTHER</b>		
Town Parking Lot	51 Park St	TP1

# Municipal Property BMP Retrofits Evaluation



# MUNICIPAL PROPERTY BMP RETROFITS

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**To:** Town of Andover  
**From:** Rebecca Balke, P.E., Comprehensive Environmental Inc.  
**Date:** June 30, 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 Andover 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, Andover 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.

Andover 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, Andover 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 Andover 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

Twenty-eight Town-owned facilities were identified within the MS4 regulated area. These parcels were advanced for additional desktop and field analysis as outlined further in the next section. CEI



# MUNICIPAL PROPERTY BMP RETROFITS

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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. CEI also reviewed the Merrimack Valley Stormwater Collaborative, MassDEP MS4 Municipal Assistance Grant Report prepared by the Merrimack Valley Planning Commission, dated June 30, 2021. Within this report, MVPC identified five sites for implementation of BMPs to reduce the volume of stormwater discharge, and recommended BMPs for two of these sites.

Noah Parent of CEI conducted field assessments of all 28 facilities in spring 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 28 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 will also be evaluated during redevelopment projects.

BMPs were identified for 12 sites and include the top sites identified by MVPC (**Table 2**). Actual BMP types and sizes are expected to be refined as part of future designs and in consideration of the cost benefit (e.g., cost per pound of removal).

## 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



# MUNICIPAL PROPERTY BMP RETROFITS

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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 all stormwater BMPs outlined in **Table 2** will remove a total of 15.33 pounds of phosphorus for a total engineering and construction cost of approximately \$1,353,500 at an average cost of \$88,300 per pound of phosphorus. Pre-conceptual designs for six sites have been prepared and are included as **Attachment B**.

## **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



# MUNICIPAL PROPERTY BMP RETROFITS

consideration of the size of the ROW, soil type, surrounding drainage infrastructure and location of other utilities.

## Recommendations and Next Steps

It is recommended that the Town move forward with design of BMPs at the top six sites outlined in **Table 4** below. Pre-conceptual designs for each of these sites have been prepared and are included as **Attachment B**.

**Table 4 – Top BMP Locations**

Location		Proposed BMP(s)		Estimate Costs	TP Reduction	
Facility Name	Address	Type	Estimated Size	Construction & Engineering	Lbs / Year	Dollars / Pound
Andover Water Treatment Plant	10 Geneva Road	Water Quality Swale	100' x 20' x 2'	\$44,200	0.50	\$88,400
		Infiltration Basin	70' x 30' x 3'	\$69,600	0.87	\$80,000
Andover Fire Station West	200 Greenwood Road	Bioretention Basin	45' x 35' x 3'	\$152,400	0.43	\$354,600
Andover Police and Fire	32 North Main Street	Rain Garden	40' x 25' x 3'	\$97,400	0.25	\$469,400
		Porous Pavement	2100 SF	\$19,900		
Bancroft Elementary School	15 Bancroft Road	Infiltration Island	230' x 12' x 2'	\$61,100	2.65	\$41,100
		Infiltration Island (2)	90' x 12' x 2' (2)	\$47,700		
		Bioretention Basin	70' x 40' x 3'	\$230,000	0.65	\$353,840
South Elementary School	55 Woburn Street	Infiltration Island	215' x 20' x 2'	\$95,000	1.42	\$66,900
			160' x 20' x 2'	\$70,800	3.54	\$20,000
Pomps Pond Beach	147-163 Abbot Street	Riprap Swale	270 LF	\$21,900	0.57	\$286,100
		Bioretention Island	75' x 15' x 2'	\$61,600		
		Infiltration Basin	80' x 30' x 3'	\$79,600		

Note: These are top sites based on impervious area and available space to implement a functional surface BMP.

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 x308 or [rbalke@ceiengineers.com](mailto:rbalke@ceiengineers.com). Thank you.



# MUNICIPAL PROPERTY BMP RETROFITS

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## **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	CEI Map ID	Parcel Area		Existing Conditions Description	Watershed	Direct or Near-Direct Discharge	BMPs Present?	Soil Type	Hydric Soil Group	Soil Area (acres)
			Total (acres)	Impervious (acres)							
Andover Water Treatment Plant	10 GENEVA RD	W2	7.5	2.8	Site consists of treatment plant buildings and associated parking areas. Existing drainage observed throughout the site.	Merrimack River	Yes (Haggetts Pond)	No	Hinckley loamy sand	A	4.28
									Sudbury fine sandy loam	B	3.21
									Water	N/A	0.00
Andover Fire Station West	200 GREENWOOD RD	FD2	6.1	0.3	A mostly wooded parcel bound by Chandler Road, Greenwood Road and Ledge Road. Fire station exists on the northeastern corner of the parcel. No drainage observed within the parcel. Existing drainage observed on Greenwood Road.	Merrimack River	No	No	Montauk fine sandy loam	C	4.05
									Woodbridge fine sandy loam	C/D	2.08
Andover Police and Fire	32 NORTH MAIN ST	PD1, FD1	1.4	1.2	Parcel includes the Andover police station and main fire station. The parcel is bound by Lewis Street, North Main Street and Pearson Street. Mapping identified potential underground storage for site drainage but no cleanout or access ports were observed. Site is mostly impervious, with a small grass area in the northeastern corner.	Merrimack River	No	No	Urban land	N/A	1.44
Bancroft Elementary School	15 BANCROFT RD	S2	20.9	4.6	Parcel is relatively flat with existing drainage flowing towards Bancroft Road. An existing BMP was observed on the southern portion of the parcel adjacent to the school access road.	Merrimack River and Ipswich River	No	Yes	Ridgebury fine sandy loam	D	0.23
									Udorthents	A	0.01
									Urban land	N/A	3.84
								Woodbridge fine sandy loam	C/D	16.78	
South Elementary School	55 WOBURN ST	S8	20.2	5	Site consists of the school, parking areas and sports fields. Wooded areas exist in the west and southwestern portions of the Site. Existing drainage exists around the building and in the parking areas east of the building.	Merrimack River	No	No	Windsor loamy sand	A	20.23
Pomps Pond - Beach	147-163 ABBOT ST	P2	10.3	0.8	A town beach with parking area at the end of Pomps Pond Road. Steep slope decreasing from east to west across the wooded portion of the parcel. The western portion of the parcel abuts Pomps Pond.	Merrimack River	No	No	Hinckley and Windsor soils	A	9.26
									Hinckley loamy sand	A	1.04
									Water	N/A	0.03
Municipal Parking Lot	51 PARK ST	TP1	1.6	1.4	Large municipal parking area off of Bartlet Street and Park Street. Existing drainage exists near the southern end of the parking lot. Multiple raised mulch beds observed throughout.	Merrimack River	No	No	Urban land	N/A	1.61
Old Town Hall	20 MAIN ST	EH1	0.6	0.6	Old town hall now home to the town house welcome center and post office. Large parking area to the east of the building.	Merrimack River	No	No	Urban land	N/A	0.57
West Middle School and Andover High School	70 SHAWSHEEN RD	S1, S10	89	24.1	Large parcel containing both the West Middle School and High School with associated parking areas. Multiple sports fields observed throughout the site. A Large wooded area with mapped wetlands exists in the southwestern portion of the site.	Merrimack River	Yes (Wetlands)	Yes	Canton fine sandy loam	B	0.05
									Freetown muck	B/D	20.76
									Hinckley and Windsor soils	A	5.21
									Hinckley loamy sand	A	7.69
									Udorthents	A	50.05
									Urban land	N/A	4.16
									Walpole fine sandy loam	A/D	0.97
									Wareham loamy sand	A/D	0.11
Andover Housing Authority	256 NORTH MAIN ST	H2	4.9	2.3	Community of apartment style buildings owned by the town surrounded by Frye Circle. Noticeable decrease in elevation from west to east across the site. Existing drainage observed throughout.	Merrimack River	No	No	Merrimack fine sandy loam	A	1.27
									Udorthents	A	3.62
Bald Hill	288-302 HIGH PLAIN RD	D3	76.2	0.1	Expansive wooded area with steep slopes bound by High Plain Road and I-495. Over 100 feet of elevation change over the parcel. Bald Hill Composite Site and the Andover Dog Park both exist on the parcel.	Merrimack River	Yes (Unnamed Stream)	No	Canton fine sandy loam	B	5.07
									Hinckley loamy sand	A	0.20
									Paxton fine sandy loam	C	27.49
									Swansea muck	B/D	7.00
									Udorthents	A	8.71
									Windsor loamy sand	A	12.58
									Woodbridge fine sandy loam	C/D	15.16
High Plain Elementary School	11 CROSS ST	S4, S5	39	10.1	Large parcel with school and associated parking areas and sports fields. Multiple BMPs observed throughout the site. Extensive existing drainage also observed.	Merrimack River	Yes (Unnamed Stream)	Yes	Canton fine sandy loam	B	36.92
									Woodbridge fine sandy loam	C/D	2.07
Sanborn School	90 LOVEJOY RD	S6	41.7	4	Large wooded parcel with the school building, parking areas and sports fields taking up roughly half of the site. Multiple BMPs observed around the school including porous pavement and concrete. Existing drainage infrastructure also observed throughout.	Merrimack River	No	Yes	Montauk fine sandy loam	C	3.33
									Ridgebury and Leicester fine sandy loams	D	4.99
									Scituate fine sandy loam	C	24.74
									Udorthents	A	6.97
									Whitman fine sandy loam	D	1.62
Shawsheen School	18 MAGNOLIA AV	S7	4.6	1.5	Site consists of the school, parking areas and small sports field. Noticeable decrease elevation from north to south across the parcel.	Merrimack River	No	No	Hinckley and Windsor soils	A	2.22
									Hinckley loamy sand	A	2.41
Pomps Pond - Fields	165-183 ABBOT ST	P1	21.9	1.9	Recreational areas off of Recreation Park Road. Areas include tennis courts, pickleball courts, baseball field and walking trails. The western portion of the parcel abuts Pomps Pond.	Merrimack River	No	No	Hinckley and Windsor soils	A	14.36
									Hinckley loamy sand	A	0.69
									Pipstone loamy sand	A	0.52
									Pits	N/A	2.64
									Water	N/A	0.01
Windsor loamy sand	A	3.68									

Description	Address	CEI Map ID	Parcel Area		Existing Conditions Description	Watershed	Direct or Near-Direct Discharge	BMPs Present?	Soil Type	Hydric Soil Group	Soil Area (acres)
			Total (acres)	Impervious (acres)							
Andover Housing Authority	0 MORTON ST	H1	2.1	0.9	Community of apartment style buildings owned by the town. Noticeable decrease in elevation from south to north. Site bound by Rogers Brook to the north. Existing drainage observed throughout.	Merrimack River	No	No	Sutton fine sandy loam	B/D	1.06
									Udorthents	A	0.44
									Urban land	N/A	0.57
Andover Housing Authority	12-18 MEMORIAL CI	H3	3.8	1.7	Community of apartment style buildings owned by the town. Noticeable decrease in elevation from south to north. Site bound by Rogers Brook to the north. Existing drainage observed throughout.	Merrimack River	No	No	Urban land	N/A	3.03
									Whitman fine sandy loam	D	0.02
									Sutton fine sandy loam	B/D	0.77
Andover Housing Authority	0 GRANDVIEW TR	H4	1.1	0.6	Community of apartment style buildings owned by the town. Noticeable decrease in elevation from south to north. Site bound by Rogers Brook to the north. Existing drainage observed throughout.	Merrimack River	No	No	Sutton fine sandy loam	B/D	0.56
									Urban land	N/A	0.54
Andover Housing Authority	0 CHESTNUT ST	H5	2.3	1.1	Community of apartment style buildings owned by the town. Noticeable decrease in elevation from south to north. Site bound by Rogers Brook to the north. Existing drainage observed throughout.	Merrimack River	No	No	Urban land	N/A	1.13
									Whitman fine sandy loam	D	1.13
									Urban land	N/A	0.02
Doherty Middle School	50 BARTLET ST	S3	16.6	7.1	School building is connected to other municipal offices and buildings. Multiple parking areas were observed within the parcel as well as multiple sports fields and the Cormier Youth Center. Multiple existing BMPs were observed throughout the parcel.	Merrimack River	Yes (Rogers Brook)	Yes	Charlton fine sandy loam	B	0.09
									Sutton fine sandy loam	B/D	0.51
									Udorthents	A	6.45
									Urban land	N/A	9.51
West Elementary School	60 BEACON ST	S9	11.8	6.7	Portions of the site are currently under construction for future renovations and replacement of the existing school.	Merrimack River	No	No	Hinckley loamy sand	A	0.46
									Sudbury fine sandy loam	B	0.20
									Sutton fine sandy loam	B/D	0.43
									Udorthents	A	10.71
									Wareham loamy sand	A/D	0.01
Andover Highway Maintenance	11 LEWIS ST	D2	2.0	1.8	Old DPW building and associated parking and storage areas. Miscellaneous storage throughout.	Merrimack River	No	No	Urban land	N/A	2.01
Ballardvale Fire Station	163 ANDOVER ST	FD3	0.2	0.1	New construction/renovation of fire station and surrounding area. Drainage improvements observed throughout site including porous pavement, catch basins and subsurface separators.	Merrimack River	No	Yes	Hinckley loamy sand	A	0.05
									Udorthents	A	0.12
Memorial Hall Library	2 NORTH MAIN ST	L1	1	0.8	Large library on the corner of North Main Street and Essex Street. Noticeable decrease in elevation from east to west across the site was observed. Existing drainage on both Essex and North Main Street was observed. Small grassed areas and parking surround the building.	Merrimack River	No	No	Urban land	N/A	0.95
TOPS School	30 WHITTIER CT	SC1	0.2	0.2	School building is connected to other municipal offices and buildings. Multiple parking areas were observed surrounding the parcel as well as multiple sports fields and the Cormier Youth Center.	Merrimack River	No	No	Urban land	N/A	0.25
Andover Town Offices	36 BARTLET ST	TH1, W1	0.3	0.2	Town office building is attached to multiple other town owned buildings including the Doherty Middle School and TOPS School. Multiple parking areas were observed surrounding the parcel as well as multiple sports fields and the Cormier Youth Center.	Merrimack River	No	No	Urban land	N/A	0.25
Spring Grove Cemetery	124 ABBOT ST	C1	46.6	7.5	Large cemetery between Spring Grove Road and Abbot Street with multiple outfalls and a piped stream crossing through the most northern portion of the site.	Merrimack River	Yes (Unnamed Stream)	No	Canton fine sandy loam	B	24.09
									Hinckley and Windsor soils	A	0.24
									Hinckley loamy sand	A	15.09
									Sutton fine sandy loam	B/D	5.27
									Whitman fine sandy loam	D	0.53
									Woodbridge fine sandy loam	C/D	1.41
Department of Public Works	5 CAMPANELLI DR	D1	16.2	0	New DPW building, parking and garage areas. Site also includes a large wetland area with stream to the west of the building. Drainage infrastructure observed throughout new parking area.	Merrimack River	Yes (Unnamed Stream)	Yes	Canton fine sandy loam	B	2.78
									Charlton-Rock outcrop-Hollis complex	A	0.35
									Deerfield loamy fine sand	A	3.27
									Paxton fine sandy loam	C	2.72
									Scarboro mucky fine sandy loam	A/D	3.68
									Udorthents	A	0.00
									Woodbridge fine sandy loam	C/D	3.43

1. All soils data obtained from GIS sources.

= Included in the MVPC Grant Report with recommendations  
 = Included in MVPC Grant Report

Table 2 - Proposed Improvements

Description	Address	CEI Map ID	Recommendations and Conclusions	Treatment Area		Pollutant Loading <sup>1</sup>			Proposed BMP(s)		Pollutant Reduction Estimates <sup>2</sup>			BMP Implementation Costs <sup>3</sup>				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 Construction Cost per SF, CF or LF	Estimated Construction Costs	Estimated Engineering Costs	Total BMP Cost (Design & Construction)	TP Reduction (\$\$/lb)	TN Reduction (\$\$/lb)	TSS Reduction (\$\$/lb)
Andover Water Treatment Plant	10 GENEVA RD	W2	Recommend separating any potential plant effluent from stormwater drainage. Install infiltration basin with sediment forebay in eastern grassed area to treat water from catch basins near Geneva Road and eastern plant access road. Install water quality swale in grassed area between plant entrance off Lowell Street and the plant parking area to treat and convey the 4 catch basins on entrance road.	1.37	0.38	0.51	3.86	562.45	Water Quality Swale	100' x 20' x 2'	0.50	3.87	562.45	\$8.18	\$32,700	\$11,500	\$44,200	\$88,400	\$11,400	\$80
				1.43	0.66	0.88	6.71	976.89	Infiltration Basin	70' x 30' x 3'	0.87	6.71	976.89	\$8.18	\$51,500	\$18,100	\$69,600	\$80,000	\$10,400	\$70
Andover Fire Station West	200 GREENWOOD RD	FD2	Recommend the installation of curbing and catch basins to convey stormwater runoff to a small bioretention basin in the small grassed area near the station entrance off of Greenwood Road. An overflow structure can be utilized and connected to the small stream south of the station.	1.1	0.51	0.68	5.19	754.87	Bioretention Basin	45' x 35' x 3'	0.43	2.08	754.87	\$20.27	\$95,800	\$33,600	\$129,400	\$354,600	\$73,300	\$200
									Catch Basin (3)	N/A				\$5,690	\$17,070	\$6,000	\$23,000			
Andover Town Police & Fire Station	32 NORTH MAIN ST	PD1, FD1	Recommend installing two shallow sump catch basins to capture water from the fire engine garage bay parking area and discharge it to an infiltration basin in the adjacent grassed area. Overflow from the basin can be tied back into the drainage system on North Main Street.	0.32	0.29	0.39	2.95	429.24	Rain Garden	40' x 25' x 3'	0.25	1.18	429.24	\$20.27	\$60,800	\$21,300	\$82,100	\$469,400	\$99,400	\$300
									Catch Basin (2)	N/A				\$5,690	\$11,380	\$4,000	\$15,300			
									Porous Pavement	2100 SF				\$6.98	\$14,658	\$5,200	\$19,900			
Bancroft Elementary School	15 BANCROFT RD	S2	Recommend sinking parking lot island to accept drainage from adjacent catch basins and potential sheet flow via curb cuts. Recommend large bioretention basin in grassed area in the northwestern corner of the site. Intercept drainage from existing pipe flowing towards Bancroft Road. Recommend routine maintenance of existing BMPs and drainage infrastructure on site.	3.98	1.99	2.67	20.24	2945.46	Infiltration Island	230' x 12' x 2'	2.65	20.34	2945.46	\$8.18	\$45,200	\$15,900	\$61,100	\$41,100	\$5,300	\$40
									Infiltration Island (2)	90' x 12' x 2' (2)				\$8.18	\$35,300	\$12,400	\$47,700			
									Bioretention Basin	70' x 40' x 3'				0.65	3.13	1139.70	\$20.27			
South Elementary School	55 WOBURN ST	S8	Recommend lowering parking lot island east of the school building to allow for infiltration of stormwater runoff. Select catch basins can be redirected to discharge into the infiltration islands. Curb cuts can also be installed to allow for sheet and gutter flow to enter the system.	1.31	1.07	1.43	10.88	1583.74	Infiltration Island	215' x 20' x 2'	1.42	10.88	1583.74	\$8.18	\$70,300	\$24,700	\$95,000	\$66,900	\$8,700	\$60
				4.52	2.8	3.75	28.48	4144.36		160' x 20' x 2'	3.54	27.95	4144.36	\$8.18	\$52,400	\$18,400	\$70,800	\$20,000	\$2,500	\$20
Pomps Pond - Beach	147-163 ABBOT ST	P2	Recommend installing a riprap conveyance swale along the northern side of the parking lot to capture runoff from steep wooded slope. Recommend repaving parking lot to promote positive drainage away from Pomps Pond and towards a bioretention island and the riprap conveyance swale. An infiltration basin should also be constructed south of the parking lot to accept overflow from the parking lot island and from the riprap swale.	1.29	0.44	0.59	4.47	651.26	Riprap Swale	270 LF	0.57	4.47	651.15	\$60.00	\$16,200	\$5,700	\$21,900	\$286,100	\$36,500	\$300
									Bioretention Island	75' x 15' x 2'				\$20.27	\$45,600	\$16,000	\$61,600			
									Infiltration Basin	80' x 30' x 3'				\$8.18	\$58,900	\$20,700	\$79,600			
Municipal Parking Lot <sup>4</sup>	51 PARK ST	TP1	MVPC study indicated redevelopment was planned for this site. Recommend proposed design plans include stormwater BMPs like bioretention basins or infiltration trenches to capture and treat runoff from parking lot.	1.51	1.42	1.90	14.44	2101.78	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Old Town Hall <sup>4</sup>	20 MAIN ST	EH1	Given the proximity to the municipal parking lot, it is unclear whether this site is part of the proposed redevelopment indicated by MVPC. Recommend following a similar design to what should be implemented into the new construction of the municipal parking lot (TP1).	0.4	0.4	0.54	4.07	592.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
West Middle School and Andover High School	70 SHAWSEEN RD	S1, S10	Recommend retrofitting multiple parking lot islands throughout the site into infiltration island. Select catch basins can be redirected to discharge into the infiltration islands. Curb cuts can also be installed to allow for sheet and gutter flow to enter the system. Recommend routine maintenance of existing BMPs and drainage infrastructure on site.	2.36	2.1	2.81	21.36	3108.27	Infiltration Island	60' x 20' x 2'	1.65	14.33	2185.31	\$8.18	\$19,600	\$6,900	\$26,500	\$16,100	\$1,800	\$10
										30' x 20' x 2'	0.55	4.78	728.44	\$8.18	\$9,800	\$3,500	\$13,300	\$24,200	\$2,800	\$20
Andover Housing Authority	256 NORTH MAIN ST	H2	Slope on site is not conducive for BMPs. Recommend the installation of porous pavement/pavers for future walkway and sidewalk improvements.	3.74	2.27	3.04	23.09	3359.90	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bald Hill	288-302 HIGH PLAIN RD	D3	A combination of swales and basins should be implemented at the Bald Hill Composting Facility to stop runoff from leaving the site and flowing down the side of High Plain Road.	2.13	0.52	0.70	5.29	769.67	Infiltration Basin	60' x 20' x 2'	0.68	5.18	769.66	\$8.18	\$19,600	\$6,900	\$26,500	\$39,000	\$5,100	\$30
High Plain Elementary School	11 CROSS ST	S4, S5	Recommend installing an infiltration trench along the toe of the slope, south of the school access road. Subdrain piping can connect to an existing manhole in the access road. Recommend routine maintenance of existing BMPs and drainage infrastructure on site.	1.11	0.01	0.01	0.10	14.80	Infiltration Trench	200' x 2' x 1'	0.1	0.1	14.8	\$16.38	\$6,600	\$2,400	\$9,000	\$90,000	\$90,000	\$610

Description	Address	CEI Map ID	Recommendations and Conclusions	Treatment Area		Pollutant Loading <sup>1</sup>			Proposed BMP(s)		Pollutant Reduction Estimates <sup>2</sup>			BMP Implementation Costs <sup>3</sup>			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 Construction Cost per SF, CF or LF	Estimated Construction Costs	Estimated Engineering Costs	Total BMP Cost (Design & Construction)	TP Reduction (\$\$/lb)	TN Reduction (\$\$/lb)	TSS Reduction (\$\$/lb)	
Sanborn School	90 LOVEJOY RD	S6	Recommend the installation of a bioretention pond in the grassy area southwest of the school. Existing drainage can be intercepted and discharged into pond. Recommend routine maintenance of existing BMPs and drainage infrastructure on site.	5.12	2.05	2.75	20.85	3034.27	Bioretention Basin	60' x 40' x 3'	1.43	6.64	2999	\$20.27	\$145,900	\$51,100	\$197,000	\$137,800	\$29,700	\$70	
Shawsheen School	18 MAGNOLIA AV	S7	Recommend the installation of a water quality swale along the northern side of Anns Lane to intercept water running down grassed slope and gutter flow running down school access road. The swale can be connected to the existing catch basin at the corner of Anns Lane and Sherbourne Street.	0.78	0.27	0.36	2.75	399.64	Water Quality Swale	200' x 6' x 1'	0.01	0.42	332.36	\$8.18	\$9,800	\$3,500	\$13,300	\$1,330,000	\$31,700	\$40	
Pomps Pond - Fields	165-183 ABBOT ST	P1	Recommend installing a water quality swale or infiltration trench along the northern and western sides of the tennis court. This will capture water running off of the tennis courts and prevent it from flowing down the steep slope to Pomps Pond.	1.8	0.63	0.84	6.41	932.48	Water Quality Swale	250' x 6' x 1'	0.03	0.98	443.22	\$8.18	\$12,300	\$4,400	\$16,700	\$556,700	\$17,000	\$40	
Andover Housing Authority	0 MORTON ST	H1	No room for BMP retrofits within parcel boundaries.	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	
Andover Housing Authority	12-18 MEMORIAL CI	H3	No room for BMP retrofits within parcel boundaries.	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	
Andover Housing Authority	0 GRANDVIEW TR	H4	No room for BMP retrofits within parcel boundaries.	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	
Andover Housing Authority	0 CHESTNUT ST	H5	No room for BMP retrofits within parcel boundaries.	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	
Doherty Middle School	50 BARTLET ST	S3	Recommend routine maintenance of existing BMPs and drainage infrastructure on site.	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	
West Elementary School	60 BEACON ST	S9	Recommend including stormwater BMPs in design plans for school renovations and new school building.	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	
Andover Highway Maintenance	11 LEWIS ST	D2	No room for BMP retrofits.	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	
Ballardvale Fire Station	163 ANDOVER ST	FD3	Recommend routine maintenance of existing BMPs and drainage infrastructure on site.	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	
Memorial Hall Library	2 NORTH MAIN ST	L1	Very limited room for BMPs. Recommend the installation of porous pavement in the parking areas west of the building. Possibility for rooftop gardens if roof is flat and can structurally accommodate them. Overflow piping can be tied into existing roof leader system.	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	
TOPS School	30 WHITTIER CT	SC1	No room for BMP retrofits within parcel boundaries.	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	
Andover Town Offices	36 BARTLET ST	TH1, W1	No room for BMP retrofits within parcel boundaries.	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	
Spring Grove Cemetery	124 ABBOT ST	C1	No Room for BMP retrofits.	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	
Department of Public Works	5 CAMPANELLI DR	D1	Recommend routine maintenance of existing BMPs and drainage infrastructure on site.	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	
											<b>Total</b>	<b>15.33</b>	<b>113.04</b>	<b>20660.65</b>		<b>\$1,001,708</b>	<b>\$351,900</b>	<b>\$1,353,500</b>	<b>\$88,300</b>	<b>\$12,000</b>	<b>\$66</b>

  = Included in the MVPC Grant Report with recommendations

  = Included in MVPC Grant Report

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.

4. The MVPC study indicated redevelopment was planned for the municipal parking lot. Given the proximity to the old town hall parking areas, it was assumed the town hall parking may also be a part of the proposed redevelopment. Due to the possibility of design plans already existing or in progress, these sites were not advanced to estimate potential BMP implementation costs and removals.

**Table 3 - BMP Costing Information**

<b>Stormwater BMP Type</b>	<b>Unit</b>	<b>OptiTool BMP Estimates, 2016<sup>1,2</sup></b>	<b>OptiTool BMP Estimates, 2022<sup>3</sup></b>	<b>Adjusted BMP Estimate, 2022<sup>4</sup></b>	<b>Adjusted Construction Estimate<sup>4</sup></b>	<b>Adjusted Engineering/Contingency Estimate<sup>5</sup></b>
<b>Bioretention / Rain Garden</b>	per CF	\$15.46	\$18.24	\$27.36	\$20.27	\$7.09
<b>Constructed Wetlands</b>	per CF	\$6.80	\$8.02	\$12.04	\$8.92	\$3.12
<b>Dry Detention Basin</b>	per CF	\$6.80	\$8.02	\$12.04	\$8.92	\$3.12
<b>Gravel Wetland</b>	per CF	\$8.78	\$10.36	\$15.54	\$11.51	\$4.03
<b>Infiltration Basin</b>	per CF	\$6.24	\$7.36	\$11.04	\$8.18	\$2.86
<b>Infiltration Trench</b>	per CF	\$12.49	\$14.74	\$22.11	\$16.38	\$5.73
<b>Porous Pavement</b>	per CF	\$5.32	\$6.28	\$9.42	\$6.98	\$2.44
<b>Sand Filter</b>	per CF	\$17.94	\$21.17	\$31.75	\$23.52	\$8.23
<b>Wet Detention Basin</b>	per CF	\$6.80	\$8.02	\$12.04	\$8.92	\$3.12
<b>Subsurface Infiltration/Detention System (aka Infiltration Chamber)</b>	per CF	\$67.85	\$80.06	\$160.13	\$118.61	\$41.51

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.





# BMP Retrofit Site Inspection Map Andover, MA

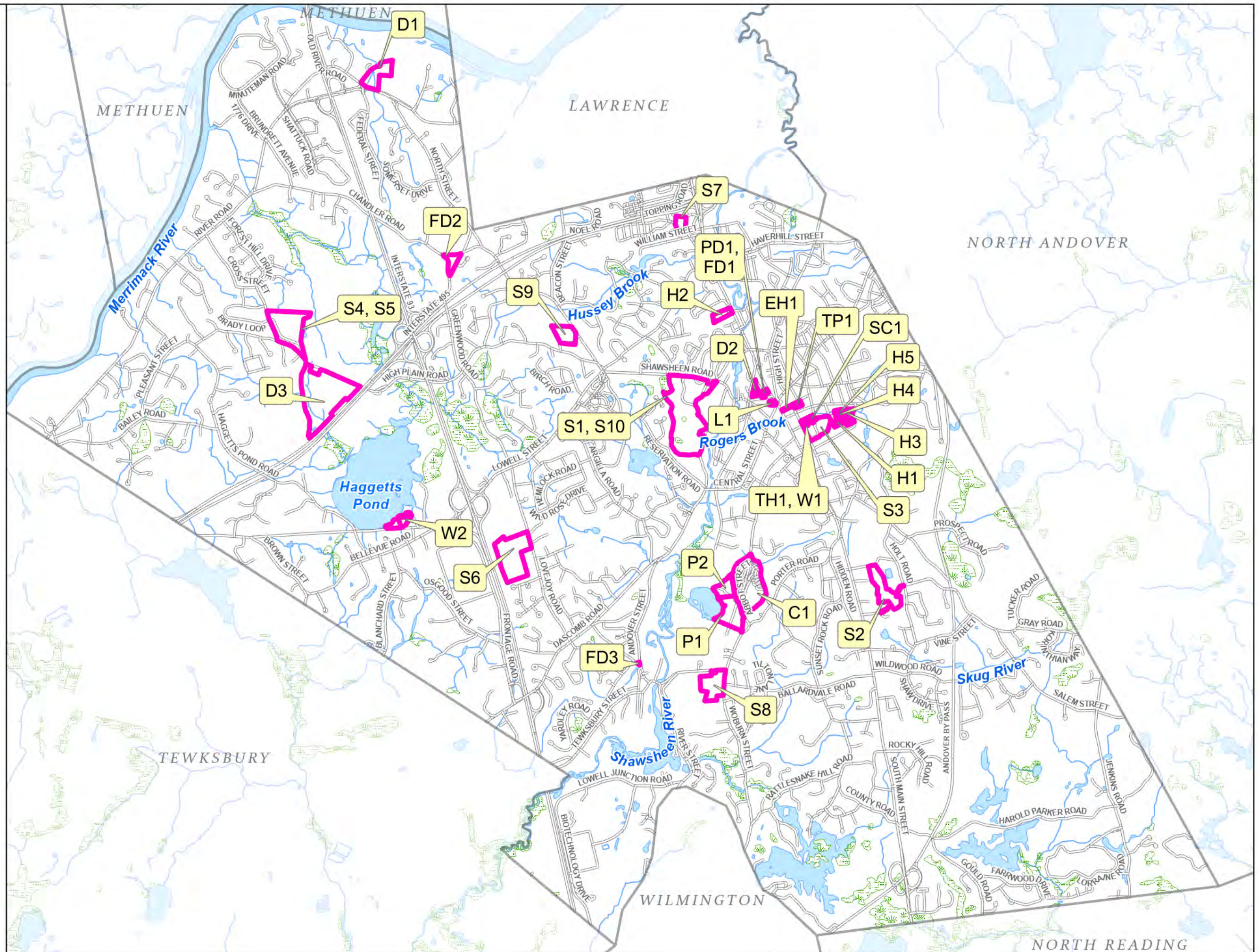


Comprehensive  
Environmental  
Incorporated



## Legend

-  Municipal Property
-  Lake, Pond, Reservoir
-  Wetland, Marsh, Swamp
-  Stream, Brook



**Attachment A:**

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

## MEMORANDUM

**DATE:** February 20, 2016  
**TO:** Opti-Tool TAC  
**FROM:** Karen Mateleska, EPA Region- I  
**SUBJECT:** **Methodology for developing cost estimates for Opti-Tool**

### Introduction

EPA – Region I offered to provide TetraTech with BMP cost information for the New England Stormwater Management Optimization Tool (Opti-Tool). The goal was to include the latest available information that would accurately reflect capital costs for select BMPs installed in the New England region. This document describes the approach used to determine these values.

The unit cost estimates originally developed as part of a 2010 study were used as the basis/starting-point for the cost estimates for the Opti-Tool. This study, entitled *Stormwater Management Plan for Spruce Pond Brook Subwatershed*, was produced by the Charles River Watershed Association (CRWA). The full report can be viewed at: [http://www.crwa.org/hs-fs/hub/311892/file-636820515-pdf/Our\\_Work/Blue\\_Cities\\_Initiative/Scientific\\_and\\_Technical/CRWA\\_Franklin\\_Plan.pdf](http://www.crwa.org/hs-fs/hub/311892/file-636820515-pdf/Our_Work/Blue_Cities_Initiative/Scientific_and_Technical/CRWA_Franklin_Plan.pdf). This subwatershed in the Town of Franklin (in eastern Massachusetts) was selected, in part, because it represented one of the many communities in the watershed that would be required to reduce nutrient (phosphorus) loads in stormwater runoff as part of EPA’s Phase II MS4 General Stormwater Permit and a TMDL for Nutrients in the Upper/Middle Charles River. The cost estimates developed in the study can predominantly be attributed to CRWA and both Rich Claytor and Nigel Pickering of Horsley Witten Group (CRWA *et al.* 2010). The development of these costs was based on a literature review of BMP cost information and Claytor’s extensive experience working in this field with Massachusetts communities. These values were originally reported in Appendix B of the aforementioned CRWA document. Those cost estimates have also been used in additional stormwater studies supported by EPA – Region I, including the *Sustainable Stormwater Funding Evaluation for the Upper Charles River Communities of Bellingham, Franklin, and Milford, MA* (2011). (That report can be viewed at: <http://www.epa.gov/region1/npdes/charlesriver/pdfs/20110930-SWUtilityReport.pdf>)

Before simply relying on the CRWA cost estimates, additional research was conducted of publicly available (online) resources to determine if more recent BMP cost information for the New England region was available. These resources included:

- EPA’s LID webpage: <http://water.epa.gov/polwaste/green/>
- EPA’s 2013 Article: *Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs*: [http://water.epa.gov/polwaste/green/upload/lid-gi-programs\\_report\\_8-6-13\\_combined.pdf](http://water.epa.gov/polwaste/green/upload/lid-gi-programs_report_8-6-13_combined.pdf)

- New England Environmental Finance Center: <http://efc.muskie.usm.maine.edu/>
- UNC Environmental Finance Center's *Catalog of Finance Publications on Green Infrastructure Approaches to Stormwater Management* (This spreadsheet provides a catalog of 46 publications related on green infrastructure for stormwater management that have finance relevance; Several of the sources from the catalog were reviewed for this document) : <http://www.efc.sog.unc.edu/reslib/item/catalog-green-infrastructure-and-stormwater-finance-publications>
- Houle, *et al.* *Comparison of Maintenance Cost, Labor Demands, and System Performance for LID and Conventional Stormwater Management*: [http://www.unh.edu/unhsc/sites/unh.edu.unhsc/files/Houle\\_JEE\\_July-2013.pdf](http://www.unh.edu/unhsc/sites/unh.edu.unhsc/files/Houle_JEE_July-2013.pdf)
- University of New Hampshire Stormwater Center's *Forging the Link: Linking the Economic Benefits of LID and Community Decisions*: <http://www.unh.edu/unhsc/forging-link-topics>
- Center for Neighborhood Technology's *Green Values Stormwater Tool Box*: <http://greenvalues.cnt.org/> which included the Green Values Calculator: <http://greenvalues.cnt.org/national/calculator.php>
- Water Environment Research Foundation (WERF): User's Guide to the BMP and LID Whole Life Cost Models, Version 2.0: [www.werf.org/bmpcost](http://www.werf.org/bmpcost)
- Low Impact Development Center: <http://www.lowimpactdevelopment.org/>
- ECONorthwest's *The Economics of Low-Impact Development: A Literature Review*: <http://www.econw.com/our-work/publications/the-economics-of-low-impact-development-a-literature-review/>
- Drexel University's Low Impact Development Rapid Assessment (LIDRA Model) <http://www.lidratool.org/home/publications.aspx>

A review of these resources did highlight the multitude of variables that can impact the cost of installing LID BMPs and the variety of cost analysis methods that can be used when assessing the cost effectiveness of various LID storm water controls. For example, many of the resources emphasized that costs tend to be site specific. Costs often differ significantly among different geographical locations, depending upon labor and material expenses and the constraints of a particular site. Unfortunately, most of the aforementioned resources highlighted projects outside of the New England region (with the exception of the articles by Houle of the UNHSC and New England Environmental Finance Center.)

EPA's recent (2013) report entitled *Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs* listed the 7 different types of economic analyses that were represented by the 13 case studies highlighted in the report. These ranged from the simplest form of economic analysis (i.e., the capital cost assessment) to more robust forms, including the life cycle cost assessment. Whole life-cycle costs would provide a more accurate estimate of the cost of installing, operating, maintaining, and replacing a project (i.e., BMP) throughout its expected lifetime. However this type of analysis requires solid estimates for capital, land purchase, O&M, and other related costs.

Ideally, the goal was to include a more advanced economic analysis (i.e. –life cycle costs) in the Opti-Tool while still maintaining some level of simplicity for the end user. However, such a robust economic analysis does not currently appear possible because the literary search for more recent BMP cost estimates, reflective of New England states, was largely unsuccessful. However, the search was not

entirely fruitless. Jamie Houle of the UNHSC did provide extremely valuable information on capital and maintenance costs for various BMPs that have been tested at the UNHSC. Cost estimates for a particular BMP available from *both* the CRWA study and UNHSC were discussed among Mark Voorhees of EPA, Jamie Houle of UNHSC, and Karen Mateleska of EPA, and a best professional judgment decision was made.

The recommendation at this time is to use a combination of the CRWA cost estimates **and** UNHSC costs estimates as the basis for the Opti-Tool BMP cost estimates, and to use a modified capital cost assessment (which includes a fixed percentage for Design and Contingency Costs) as well as a separate field for maintenance hours (from the UNHSC). The details supporting this approach are described below.

### **Overview of Scope and Approach**

According to a draft memo, dated 6/20/14 from Tetra Tech to EPA Region I, the current SUSTAIN BMP Cost function has seven major individual components, using a formula that would likely be useful in a more detailed design mode. For purposes of simplicity, EPA Region I is proposing the following cost function formula for the tool's "planning" mode:

<b>General Cost Function Formula =</b> Storage Volume of BMP* (ft <sup>3</sup> ) X Cost Estimate for BMP (\$/ft <sup>3</sup> ) X Adjustment Factor
---

\* Storage Volume of BMP is more accurately defined as (Design) Physical Storage Capacity of BMP; See Section A below for more details

Initially, the intention was to include the preliminary Operations and Maintenance (O&M) costs in the general formula (page 3) by simply multiplying the formula results by our Preliminary O & M costs. However, such an approach would only include **one year's worth** of operations and maintenance, which could have been misleading because it would not have reflected the true life cycle cost of the BMP (i.e., assume life cycle of 20 years). However, simply including the 20 year life cycle cost (O&M cost \*20) in the above formula would have greatly increased the cost value and perhaps have created misconceptions about BMP use and affordability.

Therefore, the subcommittee decided to include the anticipated operation and maintenance **hours** required for each BMP per year instead. This parameter was included as a completely separate field in the Opti-Tool. The rationale was that Opti-Tool users need to understand that operation and maintenance impact the overall cost-effectiveness of BMPs and should be considered when selecting a BMP. Including O&M hours (instead of costs) as a separate field, would still highlight this important consideration for stormwater managers.

## A. Storage Volume and Proposed Cost Estimate Values

As highlighted above, the general cost function formula used in the Opti-Tool consists of 3 factors: the BMP storage volume, the proposed BMP storage volume cost estimate, and the adjustment factor. The first two factors will be covered together in this memo because they are so closely linked. Table 1 below summarizes the proposed BMP cost estimates for the Opti-Tool.

**Table 1: Proposed BMP Cost Estimates for Opti-Tool**

BMP (From Opti-Tool)	Cost (\$/ft <sup>3</sup> ) <sup>1</sup>	Cost (\$/ft <sup>3</sup> ) – 2016 dollars <sup>6</sup>
Bioretention (Includes rain garden)	13.37 <sup>2,4</sup>	15.46
Dry Pond or detention basin	5.88 <sup>2,4</sup>	6.80
Enhanced Bioretention (aka-Bio-filtration Practice)	13.5 <sup>2,3</sup>	15.61
Infiltration Basin (or other Surface Infiltration Practice)	5.4 <sup>2,3</sup>	6.24
Infiltration Trench	10.8 <sup>2,3</sup>	12.49
Porous Pavement - Porous Asphalt Pavement	4.60 <sup>2,4</sup>	5.32
Porous Pavement - Pervious Concrete	15.63 <sup>2,4</sup>	18.07
Sand Filter	15.51 <sup>2,4</sup>	17.94
Gravel Wetland System (aka-subsurface gravel wetland)	7.59 <sup>2,4</sup>	8.78
Wet Pond or wet detention basin	5.88 <sup>2,4</sup>	6.80
Subsurface Infiltration/Detention System (aka-Infiltration Chamber)	54.54 <sup>5</sup>	67.85

<sup>1</sup> Footnote: Includes 35% add on for design engineering and contingencies

<sup>2</sup> Costs in 2010 dollars

<sup>3</sup> From CRWA Cost Estimates

<sup>4</sup> From UNHSC Cost Estimates; Most of original costs were from 2004 and converted to 2010 dollars using U.S. Department of Labor (USDOL). (2012). Bureau of Labor Statistics consumer price index inflation calculator. [http://www.bls.gov/data/inflation\\_calculator.htm](http://www.bls.gov/data/inflation_calculator.htm)

<sup>5</sup> From Cost Estimate of MA TT Rizzo Project (2008 Dollars)

<sup>6</sup> 2010 costs were converted to 2016 values to adjust for inflation. The ENR Cost Index Method was used for this conversion.

Table 1 includes all of the BMPs that are included in the Opti-Tool. The unit costs represent the dollar amount (\$) per cubic foot of storage volume (ft<sup>3</sup>), where the storage volume reflects the (design) physical static storage capacity that the relevant BMP can hold. This volume includes the volume of ponding water *and* the volume of water retained in the porous media or subbase materials if applicable. (This storage volume does *not* represent the *treated* volume of stormwater, which may be significantly higher than the physical storage volume of a BMP particularly for systems that are sized dynamically or

by a water quality flow rate as opposed to a water quality volume.) This unit cost per storage volume captured by a BMP differs from other (perhaps more traditional) methods that can be used. By choosing to use the unit cost per storage volume instead of volume of water treated, we are trying to eliminate confusion over what the actual dimensions of the BMP will be for the costs being estimated. Additionally, this use of the unit cost per storage volume is consistent with the approach used in developing the BMP performance curves (used in the Opti-Tool) where the x-axis is the actual **physical storage capacity** to hold water. Lastly, expressing the unit costs in this manner will benefit users who are simply interested in using the unit costs (outside of the Opti-Tool) by eliminating the step of modeling hydrology and routing the water through the BMP, which can yield widely varying results depending on modeling approach and supporting assumptions. Attachment A describes the method used in calculating the design storage volume for each of the selected BMPs.

Also, each unit cost per storage value represents the capital cost of construction/installation of the BMP and includes a 35% design/engineering/contingency (D & E) cost. This 35% fixed percentage of the total construction cost follows a general “rule of thumb,” often used by consulting firms. Based upon a conversation between Mark Voorhees and Jamie Houle (two members of the Opti-Tool cost subcommittee), a decision was made to include this D&E cost. The values in Table 1 do *not* include the cost of purchasing any land, nor does it include any O&M costs (which is discussed in more detail in a subsequent section). Therefore, each unit cost in Table 1 that was based on the CRWA’s 2010 values was calculated by multiplying the relevant BMP cost by 1.35.

Since the CRWA study did not include cost estimates for porous pavement or sand filters, which are BMPs included in the Opti-Tool, relevant data was obtained from Jamie Houle of the University of New Hampshire Stormwater Center (UNHSC). He also provided additional cost estimates (as denoted by Footnote 4 in Table 1) for some of the other BMPs included in the tool. UNHSC can provide valuable data because they have been directly involved with the engineering, design and construction of numerous LID controls, as well as evaluating multiple stormwater treatment systems over multiple years at their primary field research facility in Durham, N.H. Since they could provide cost information for both porous asphalt pavement and pervious concrete, separately, the general category of porous pavement was divided into the aforementioned two sub-categories.

It should be noted that the costs used for the Opti-tool *assume linearity*, which will both allow for *and* incentivize the scaling to smaller-sized systems. For example, EPA has estimated that *smaller* capacity designs for BMPs, rather than large-sized BMPs, can increase both the technical and economic feasibility of installing controls, particularly for retrofits. The assumption of linearity was made for the following reasons: 1) Limited data currently exists on the cost of small capacity systems. Until a larger pool of cost data becomes available which will allow for the development of a non-linear cost curve, the current method is the best available alternative; 2) As the installation of smaller systems becomes more widespread, it is likely that economies of scale will develop and cost savings will occur. For example, if one entity is contracted to install multiple small systems at once, materials can be bought in bulk and the installation process can become more efficient and less expensive; 3) An undersized system built to treat a large area can be a very cost effective approach. As an example, there should not be a significant cost difference between a 1-inch system treating 1 acre and a 1/10-inch-system that treats 10 acres, since the absolute capacity of the system is the same in both cases. This topic of linearity will be revisited in the future when more data is available.

Since UNHSC typically calculates the capital costs per cubic foot (ft<sup>3</sup>) *treated*, using WQv, Jamie Houle converted the costs to represent the capital costs per BMP storage volume (ft<sup>3</sup>). This was necessary so the capital cost data would be consistent with the method used in the Opti-Tool. Also, all of the costs were converted to 2010, and ultimately 2015, dollars. As with the CRWA costs, the UNHSC capital costs were already adjusted to include the 35% design/engineering/contingency (D & E) cost. Details of all of these calculations, and any other assumptions made, are presented in Attachment B.

When developing cost estimates, another topic for consideration was whether or not to address the issue of inflation. CRWA's BMP cost estimates were based on capital costs from 2010. As previously stated, UNHSW's cost estimates have also already been converted to constant 2010 dollars using consumer price index inflation rates [U.S. Department of Labor (USDOL) 2014].<sup>1</sup> Therefore, there was the option of converting all of these 2010 costs to 2016 costs, using the U.S. Department of Labor's consumer price index inflation calculator. However, another suggestion was made to use the ENR Cost Index method to adjust for inflation instead because it more closely tracks construction work. At least one New England state (i.e., Vermont) also uses the ENR Cost Index method, so this could provide some consistency, as well. Therefore, the decision was made to ultimately convert all of the costs to 2016 values using the ENR Cost Index method. These values are reflected in Table 1.

To use the index, one calculates the quotient of the current index number (based on the month and year of *current* date) divided by the index number from a given date (e.g., June of 2010). Since the month was not known for the 2010 costs, the month of June was used as an estimate. This assumption was used because it falls mid-way between the construction season and would likely provide a reasonable estimate. Once the quotient was calculated, it was multiplied by the construction cost (found in the middle column in Table 1, above) to provide the 2016 construction cost value

## **B. Cost Adjustment Factor**

Since the cost of installing a BMP will vary depending on the specific site location, the TAC subcommittee believed it was important for the Opti-Tool to include a scalable cost adjustment factor. The proposed cost estimates for the Opti-Tool (in Table 1) are all based on a Cost Adjustment Factor of 1. However, each Opti-Tool user has the option to choose and enter into the tool a cost adjustment factor that is appropriate for their site. This will adjust the storage volume cost function in the Opti-Tool.

For example, the CRWA report included the cost factors summarized in Table 2.

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<sup>1</sup> Reference: U.S. Department of Labor (USDOL). (2014). Bureau of Labor Statistics consumer price index inflation calculator." ([http://www.bls.gov/data/inflation\\_calculator.htm](http://www.bls.gov/data/inflation_calculator.htm))(Sep. 12, 2014)

**Table 2: Example of Cost Adjustment Factors**

<b>BMP Type</b>	<b>**EXAMPLE** Cost Adjustment Factor</b>
New BMP in undeveloped area	1
New BMP in partially developed area	1.5
New BMP in developed area	2
Difficult installation in highly urban settings	3

(Source: Table 4 of Appendix B of CRWA's Spruce Pond Brook Subwatershed Project for Town of Franklin)

The assumption made was that it would cost more to install a new BMP in a developed area (with more site constraints) than it would cost to install the same BMP in a previously undeveloped area. So in the above example, the cost adjustment factor would be 2 for installing a BMP in a previously developed area versus a cost adjustment factor of 1 for installing a BMP in an undeveloped area.

It should be noted that Table 2 (above) provides just *one example* of adjustment factors. The factor should be flexible enough so that another location (or Opti-Tool user) can adjust it, as needed. For example, the Charles River Watershed (in eastern Massachusetts) used an adjustment factor of 2 for installing a BMP in a developed area, while the State of Vermont uses an adjustment factor of 1.4 to estimate the cost of installing a BMP for existing development.

### **C. Maintenance (O&M) Costs**

Originally, one goal was to include Operation and Maintenance (O&M) costs as part of the cost estimates for the Opti-Tool. These O&M costs would help to provide a more realistic reflection of the long-term expenses of structural storm water controls, which is obviously critical in the practical, real-world implementation of BMPs. However, it is difficult to obtain accurate maintenance costs and they will be highly variable depending on the size, location and equipment needed to perform long-term O&M.

This point was highlighted by a key finding in EPA's recent (2013) publication, *Case Studies Analyzing the Economic Benefits of Low Impact Development and Green Infrastructure Programs*. The report indicated that only a small percentage of the entities that implement LID and GI approach for stormwater management conduct economic analyses due to the "uncertainties surrounding costs, operation and maintenance (O&M) requirements, budgetary constraints, and difficulties associated with quantifying the benefits provided by LID/GI" and the need "to obtain better estimates of the O&M costs associated with different types of LID/GI projects" was a key finding of the report.

As previously mentioned, one article entitled, *Comparison of Maintenance Cost, Labor Demands, and System Performance for LID and Conventional Stormwater Management* (Houle et al. 2013), did contain relevant information for BMP costs in the New England region. During initial discussions between EPA Region I (Mark Voorhees) and UNHSC (Jamie Houle), there was concern that not enough data existed on O&M costs to propose accurate values for each of the BMPs included in the Opti-Tool. There was also

the concern that the O&M costs were not scaleable. For example, initial O&M costs for each BMP were based on the cost of operation and maintenance per year per acre of IC treated. Scaled differences such as the annual O&M costs for treating 0.5 acres of IC or 2 acres of IC have **not** been evaluated and may or may **not** result in a simple linear relationship. Yet the Opti-Tool costs subcommittee also realized the importance of including some maintenance parameter in order to *initiate* the conversation on the importance of accounting for O&M to maintain the functionality of the BMPs. Therefore Table 3, below, presents these annual maintenance costs (in \$) for select BMPs, as well as the annual maintenance hours. Although the O&M costs have been presented in this memo, only the O&M **hours** will be included (as a separate field) in the Opti-Tool.

**Table 3: Maintenance Costs (\$) and Hours per year for select BMPs – From UNHSC**

<b>BMP</b>	<b>Maintenance Cost (\$) per year</b>	<b>Annual Maintenance Hours</b>
Bioretention	\$1,890.00	20.7
Chamber System	Not Assessed	Not Assessed
Detention Pond	\$2,380.00	24.0
Gravel Wetland	\$2,138.33	21.7
Porous Asphalt	\$1,080.00	6.0
Pervious Concrete	\$1,080.00	6.0
Retention Pond	\$3,060.00	28.0
Sand Filter	\$2,807.50	28.5

\*Note: initial costs based on cost of maintenance per year per acre of IC treated

Annual maintenance strategies were evaluated by directly quantifying hours spent categorizing maintenance activities, and assessing difficulty of those activities. To better illustrate costs and anticipate maintenance burdens, activities were characterized into distinct categories and a standard cost structure was applied. This unit conversion can easily be adapted according to local conditions, current economic climate, and regional cost variations which is why we decided to go with maintenance **hours** as those were directly measured and should remain constant. These maintenance activity categories allow more accurate cost predictions and provide insight into the appropriate assignment of maintenance responsibilities.

Annual maintenance costs were normalized to 2012 dollars and calculated for all SCMs by both dollars and personnel hours per acre of IC treated per system per year. It is important to note that inflation was not considered in life cycle maintenance cost projections.

**Attachment B:**  
Pre-Conceptual Designs for Top Five Locations

# TOWN OF ANDOVER

# MUNICIPAL PROPERTY BMP RETROFIT OPPORTUNITIES

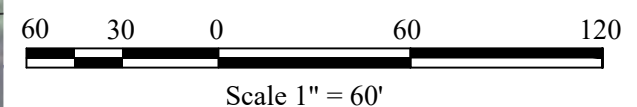
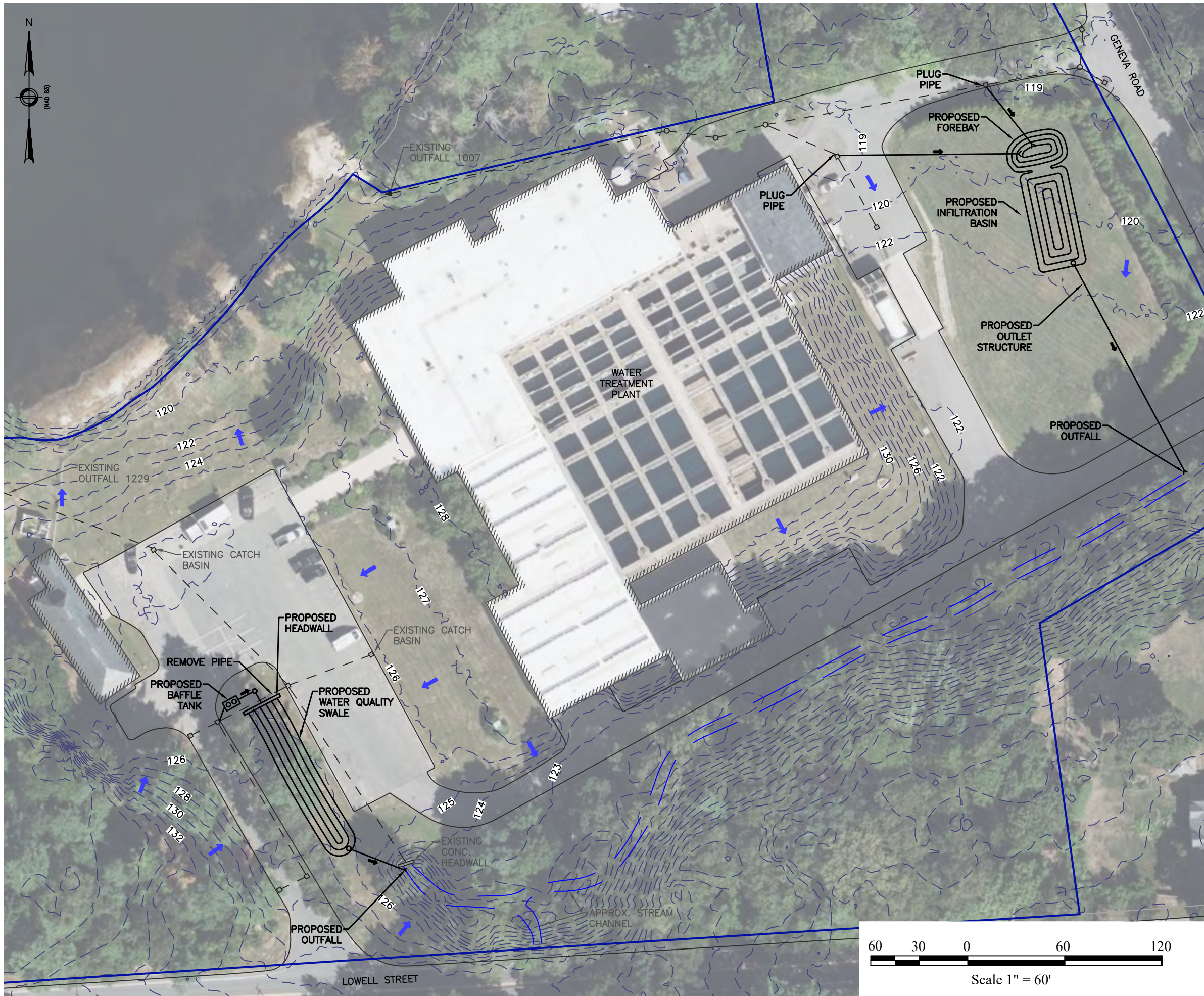
JUNE 2022



LOCUS NOT TO SCALE

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C-2	FD2 - WEST ANDOVER FIRE STATION
C-3	PD1-FD1 - ANDOVER TOWN FIRE & POLICE STATION
C-4	S2 - BANCROFT ELEMENTARY SCHOOL
C-5	S8 - SOUTH ELEMENTARY SCHOOL
C-6	P2 - POMPS POND BEACH





### GENERAL NOTES

#### LEGEND

- PROJECT PARCEL
- PROPERTY LINE
- EXISTING CONTOUR (1')
- EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAIN MANHOLE
- EXISTING BUILDING
- EDGE OF PAVEMENT
- FLOW DIRECTION ARROW

COMPREHENSIVE ENVIRONMENTAL  
INCORPORATED



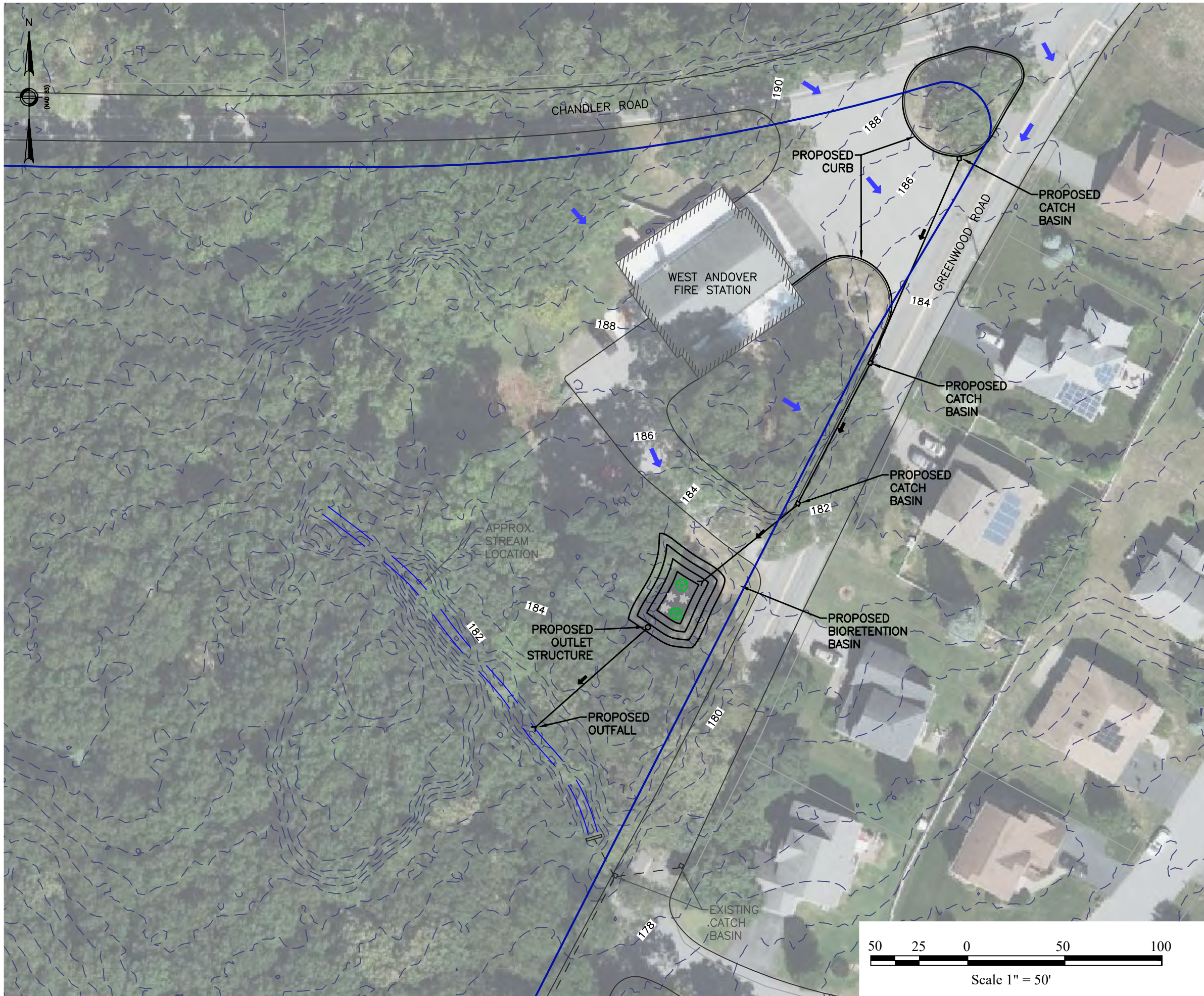
41 MAIN STREET  
BOLTON, MA 01740

### PROPOSED CONDITIONS WATER TREATMENT PLANT PLAN VIEW

TOWN OF ANDOVER, MA

Project No.: 179
Date: 6/2/2022
Drawn By: NP
Checked By: RB
Scale: AS SHOWN

Sheet  
  
C-1



**GENERAL NOTES**

LEGEND

- PROJECT PARCEL
- PROPERTY LINE
- - - - EXISTING CONTOUR (1')
- - - - EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAIN MANHOLE
- ////// EXISTING BUILDING
- EDGE OF PAVEMENT
- ➔ FLOW DIRECTION ARROW

COMPREHENSIVE ENVIRONMENTAL  
INCORPORATED



41 MAIN STREET  
BOLTON, MA 01740

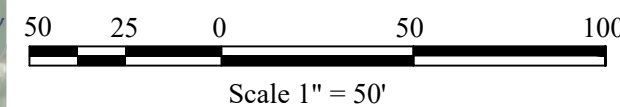
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WEST ANDOVER FIRE  
DEPARTMENT  
PLAN VIEW**

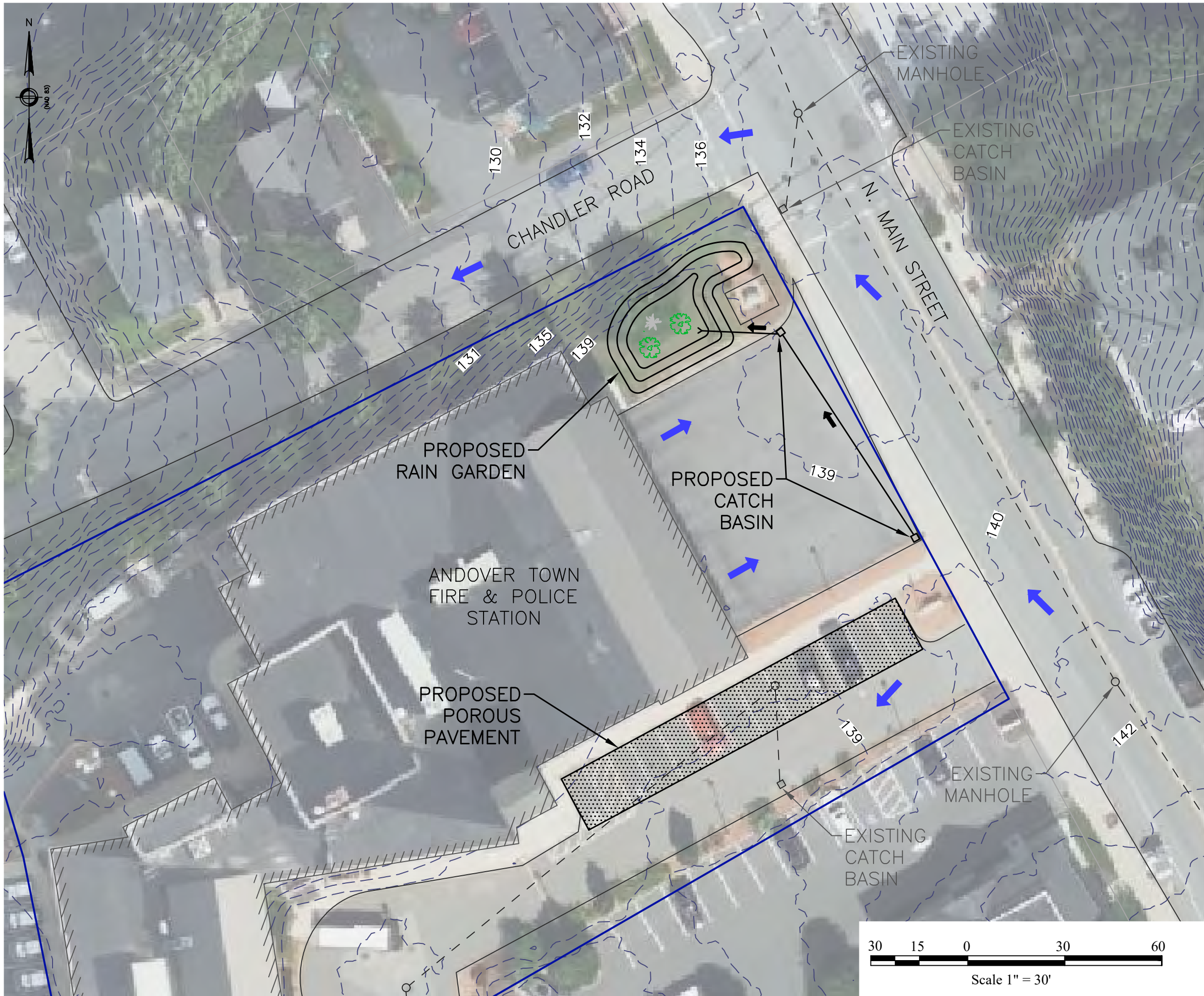
TOWN OF ANDOVER, MA

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C-2





**GENERAL NOTES**

**LEGEND**

- PROJECT PARCEL
- PROPERTY LINE
- EXISTING CONTOUR (1')
- EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAIN MANHOLE
- EXISTING BUILDING
- EDGE OF PAVEMENT
- FLOW DIRECTION ARROW

**COMPREHENSIVE ENVIRONMENTAL  
INCORPORATED**



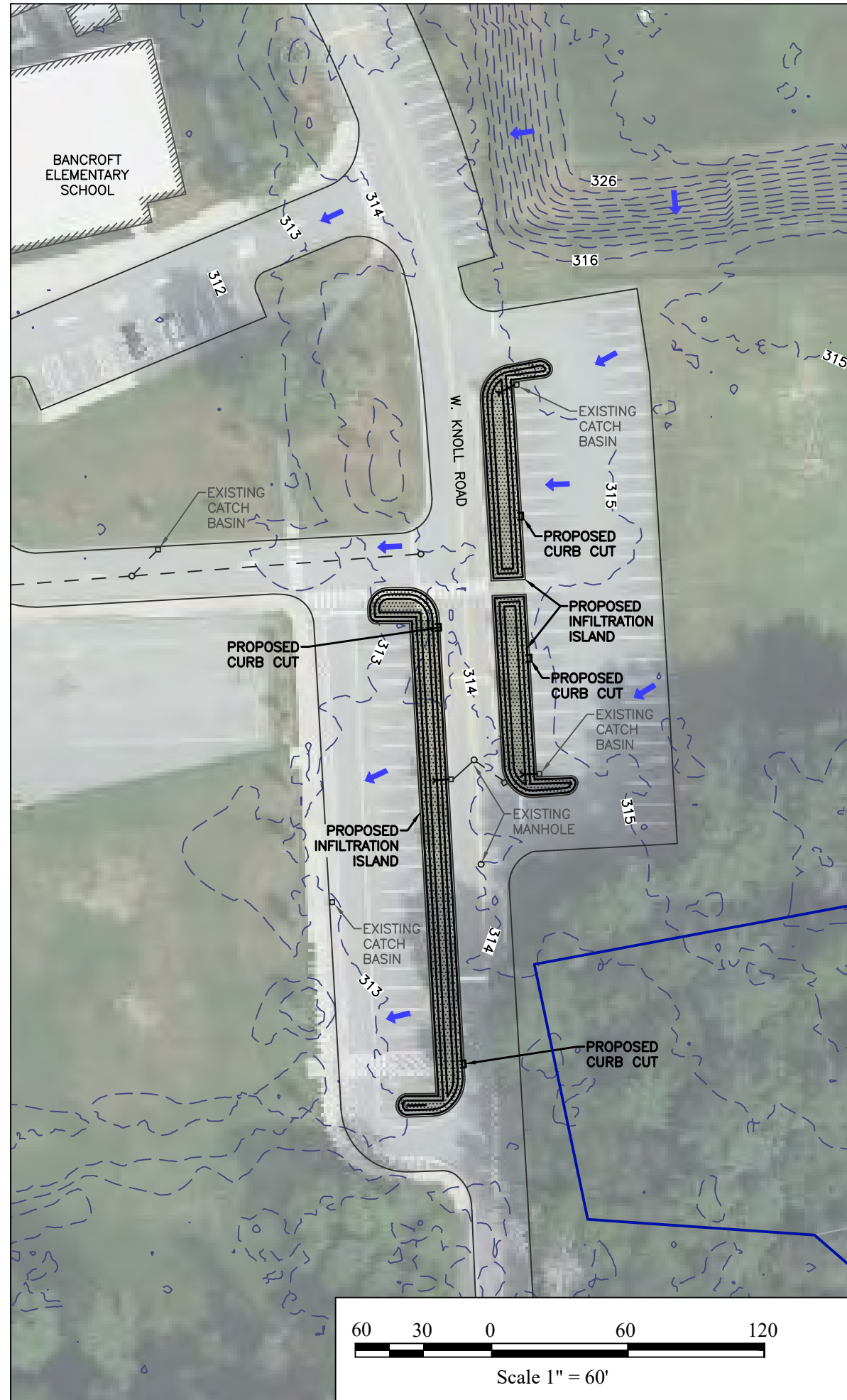
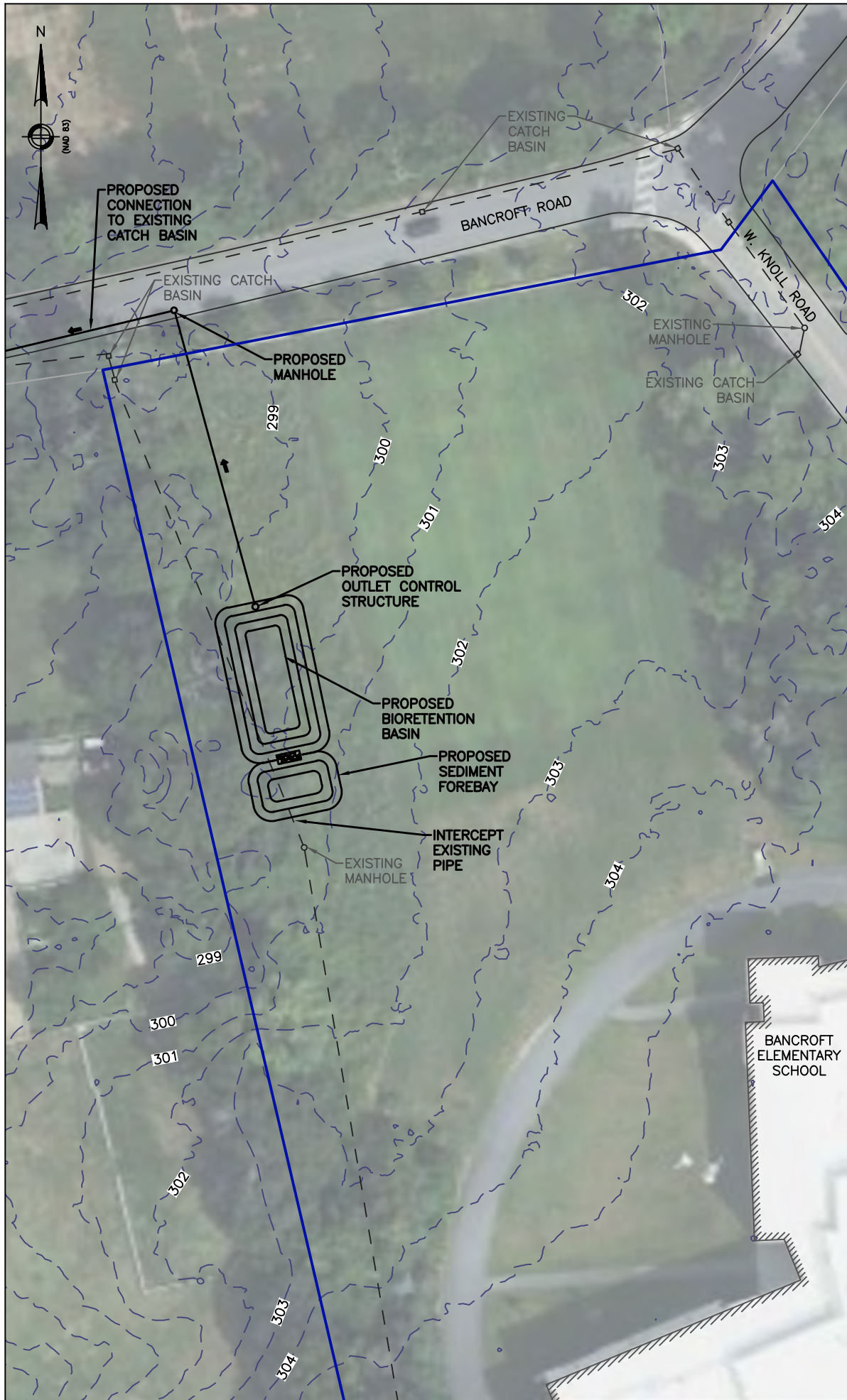
41 MAIN STREET  
BOLTON, MA 01740

**PROPOSED CONDITIONS  
ANDOVER TOWN FIRE & POLICE  
STATION  
PLAN VIEW**

TOWN OF ANDOVER, MA










Project No.: 179
Date: 6/2/2022
Drawn By: NP
Checked By: RB
Scale: AS SHOWN

Sheet  
**C-3**



**GENERAL NOTES**

**LEGEND**

-  PROJECT PARCEL
-  PROPERTY LINE
-  EXISTING CONTOUR (1')
-  EXISTING DRAIN PIPE
-  EXISTING CATCH BASIN
-  EXISTING DRAIN MANHOLE
-  EXISTING BUILDING
-  EDGE OF PAVEMENT
-  FLOW DIRECTION ARROW

COMPREHENSIVE ENVIRONMENTAL  
INCORPORATED



41 MAIN STREET  
BOLTON, MA 01740

**PROPOSED CONDITIONS  
BANCROFT ELEMENTARY  
SCHOOL  
PLAN VIEW**

TOWN OF ANDOVER, MA

Project No.: 179  
Date: 6/2/2022  
Drawn By: NP  
Checked By: RB  
Scale: AS SHOWN

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C-4



### GENERAL NOTES

#### LEGEND

- PROJECT PARCEL
- PROPERTY LINE
- EXISTING CONTOUR (1')
- EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAIN MANHOLE
- EXISTING BUILDING
- EDGE OF PAVEMENT
- FLOW DIRECTION ARROW

COMPREHENSIVE ENVIRONMENTAL  
INCORPORATED



41 MAIN STREET  
BOLTON, MA 01740

PROPOSED CONDITIONS  
SOUTH ELEMENTARY SCHOOL  
PLAN VIEW

TOWN OF ANDOVER, MA

Project No.: 179

Date: 6/2/2022

Drawn By: NP

Checked By: RB

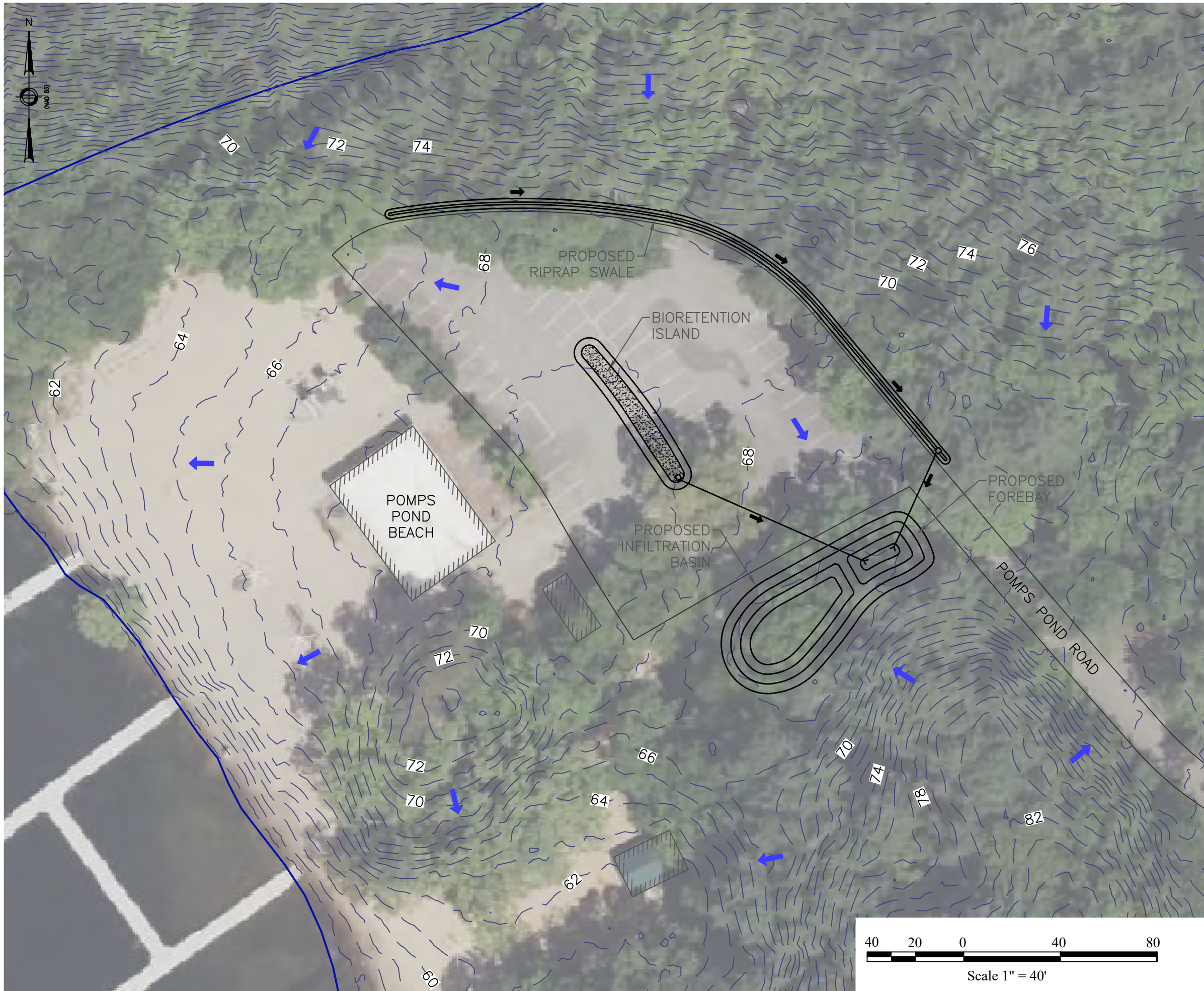
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C-5



Scale 1" = 60'



### GENERAL NOTES

#### LEGEND

- PROJECT PARCEL
- PROPERTY LINE
- EXISTING CONTOUR (1')
- EXISTING DRAIN PIPE
- EXISTING CATCH BASIN
- EXISTING DRAIN MANHOLE
- EXISTING BUILDING
- EDGE OF PAVEMENT
- FLOW DIRECTION ARROW

### COMPREHENSIVE ENVIRONMENTAL INCORPORATED



41 MAIN STREET  
BOLTON, MA 01740

### PROPOSED CONDITIONS POMPS POND BEACH PLAN VIEW

TOWN OF ANDOVER, MA

Project No.: 179

Date: 6/2/2022

Drawn By: NP

Checked By: RB

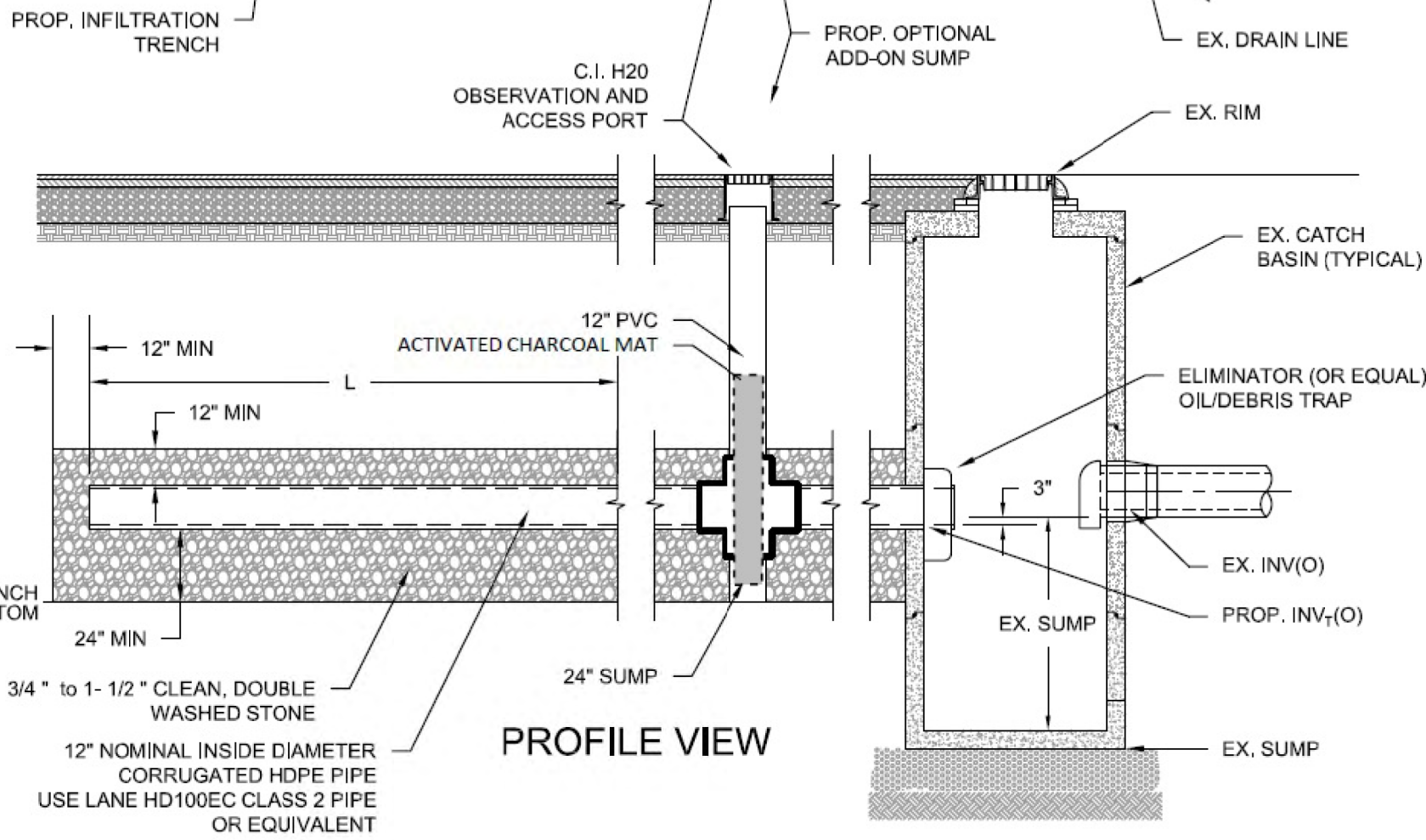
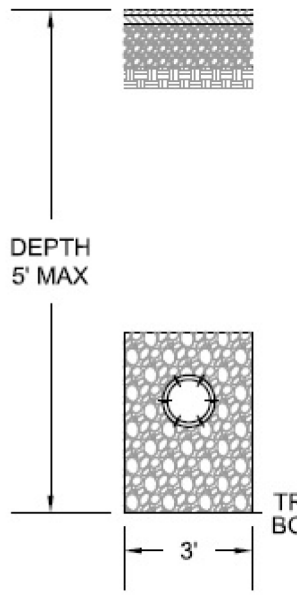
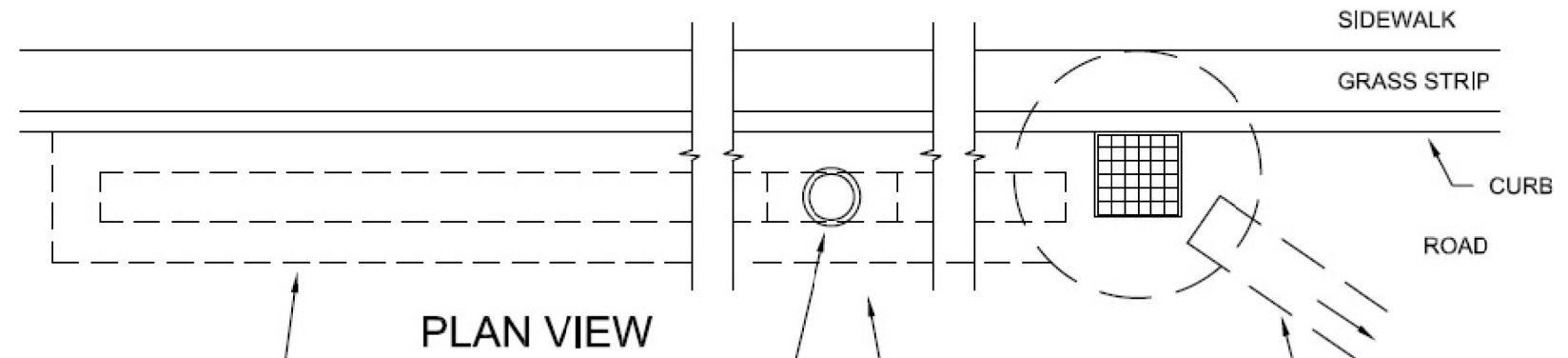
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C-6

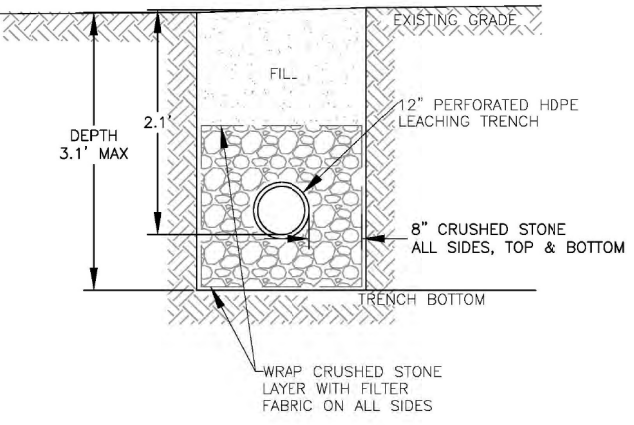
**Attachment C:**  
Example Roadway and Intersection BMP Improvements

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EX. RIM:
EX. INV(0):
PROP INV <sub>7</sub> (0):
TRENCH BOT:
EX. SUMP:

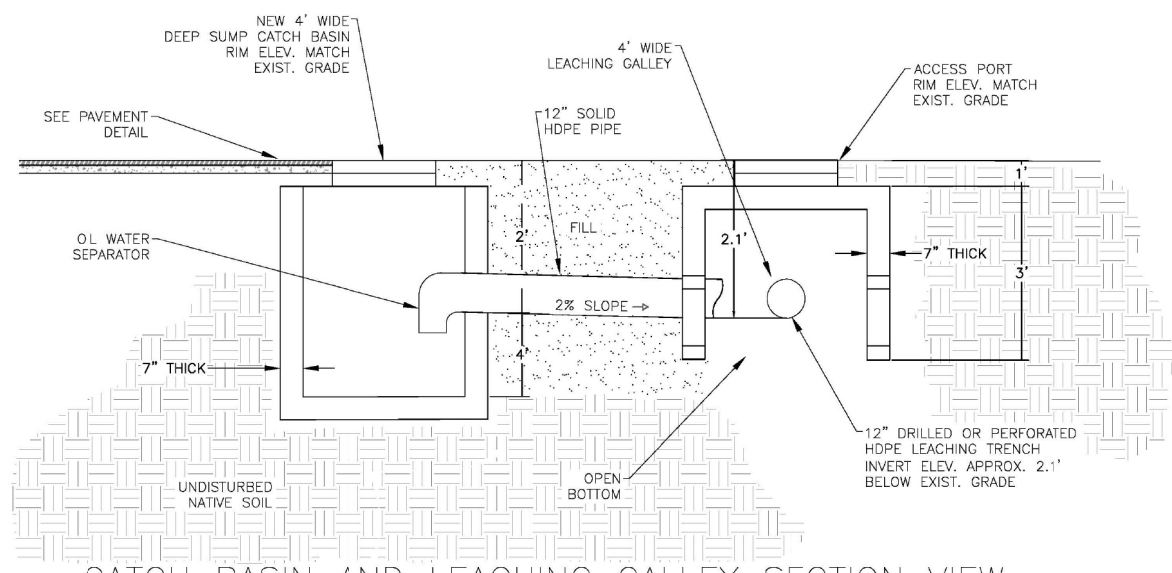


**CROSS SECTION**

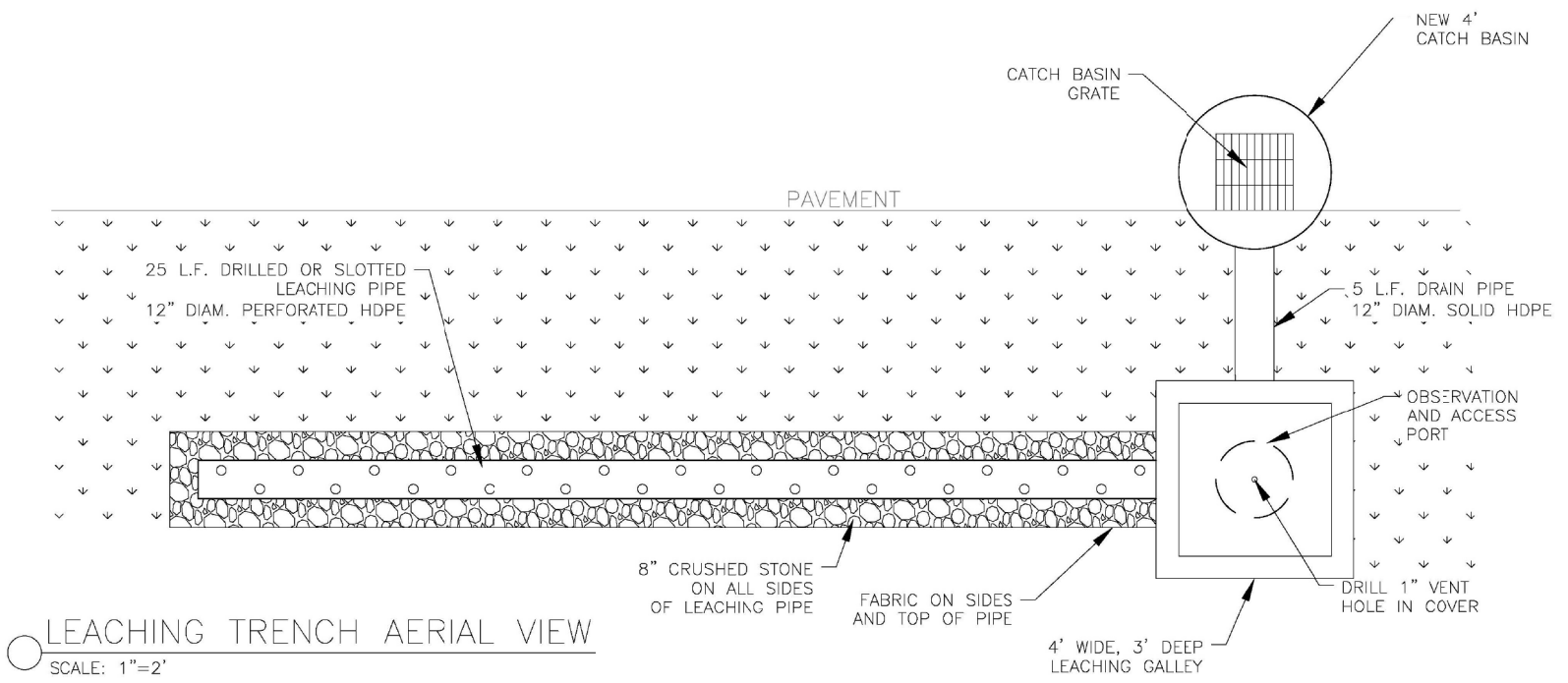
**PROFILE VIEW**



LEACHING TRENCH SECTION VIEW  
SCALE N.T.S.



CATCH BASIN AND LEACHING GALLEY SECTION VIEW  
SCALE: 1"=3'



LEACHING TRENCH AERIAL VIEW  
SCALE: 1"=2'

## Appendix E

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### Catch Basin Optimization Plan

# Plan for Optimizing Catch Basin Cleaning

Andover, MA

June 30, 2019

Prepared For:

**Town of Andover**  
36 Bartlet St  
Andover, MA 01810

Prepared by:

**Comprehensive Environmental Inc.**  
41 Main Street  
Bolton, MA 01740



# Table of Contents

## Plan for Optimizing Catch Basin Cleaning – Andover, MA

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2	Permit Requirements .....	1
3	Existing Catch Basin Management Program .....	2
4	Plans to Refine Catch Basin Cleaning Optimization .....	2
4.1	Optimization Methodology .....	2
4.2	Catch Basin Cleaning Standard Operation Procedure (SOP).....	2
4.3	Catch Basin Cleanings Storage and Disposal.....	2

## List of Appendices

Appendix A. Map of Drainage Infrastructure

Appendix B. Standard Operating Procedures for Catch Basin Cleaning and Inspection

# 1 Introduction

This Catch Basin Cleaning Optimization Plan has been prepared by Andover, MA to address the catch basin inspection, cleaning and maintenance requirements of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as the "2016 MS4 Permit."

The 2016 MS4 Permit requires the permittee to document its plan for optimizing catch basin cleaning, inspections, or its schedule for gathering information to develop the optimization plan. This plan documents the Town's existing catch basin cleaning program and its plans for gathering additional information to refine its program to meet the requirements of the permit.

## 2 Permit Requirements

This Catch Basin Cleaning Optimization Plan addresses Section 2.3.7.1.a.iii.2 of the 2016 MS4 Permit (Infrastructure Operations and Maintenance), which includes the following requirements:

- **Establish a schedule** with the goal that the frequency of routine cleaning will ensure that no catch basin at any time will be more than 50 percent full<sup>1</sup>;
- **Prioritize** inspection and maintenance for catch basins:
  - located near construction activities<sup>2</sup>. These should be cleaned more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings;
  - discharging to impaired waters where the pollutant of concern is E. coli or enterococcus; and
  - with sumps more than 50% full during consecutive inspections.
- **Establish proper documentation** of catch basin inspections to include:
  - the location and total number of catch basins;
  - the location and total number of catch basins cleaned or inspected; and
  - the total volume or mass of material removed from catch basins.
- **Develop an optimization plan** for catch basin cleaning, inspection plans, or a schedule for gathering information to develop the optimization plan in the first annual report and in the SWMP.

---

<sup>1</sup> A catch basin sump is more than 50 percent full if the contents within the sump exceed one half the distance between the bottom interior of the catch basin to the invert of the deepest outlet of the catch basin.

<sup>2</sup> Roadway construction; residential, commercial, or industrial development or redevelopment.

## 3 Existing Catch Basin Management Program

The Town has 8,600 catch basins to clean and maintain. Refer to the map in **Appendix A**. Given the large number of basins and expense of cleaning, catch basins are cleaned approximately every other year, with a select number of “priority” basins inspected and cleaned more frequently.

## 4 Plans to Refine Catch Basin Cleaning Optimization

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### 4.1 Optimization Methodology

Andover will continue to implement its existing catch basin cleaning schedule including more frequent cleaning of catch basins with known higher sediment loads. During this time, it will collect data on the sump depth and sediment depth in each catch basin. A spreadsheet will be used to track sediment depth at each location. The catch basin inspection form included with the standard operating procedure (SOP) in **Appendix B** will be used to document data collected during cleaning.

A minimum of two years of data will be collected and evaluated to determine the status of the catch basins and whether the sump was more than half full. The catch basins that are more than 50% full will be evaluated for potential factors that may have contributed to it being 50% full (i.e., smaller sump, nearby construction, surrounding land uses, location in town). The evaluation will be used to identify catch basins that require more frequent inspection and/or cleaning and to develop an optimization plan that prioritizes these structures accordingly.

---

### 4.2 Catch Basin Cleaning Standard Operation Procedure (SOP)

All catch basins will be inspected and cleaned following the standard operating procedures (SOP) provided in **Appendix B**.

---

### 4.3 Catch Basin Cleanings Storage and Disposal

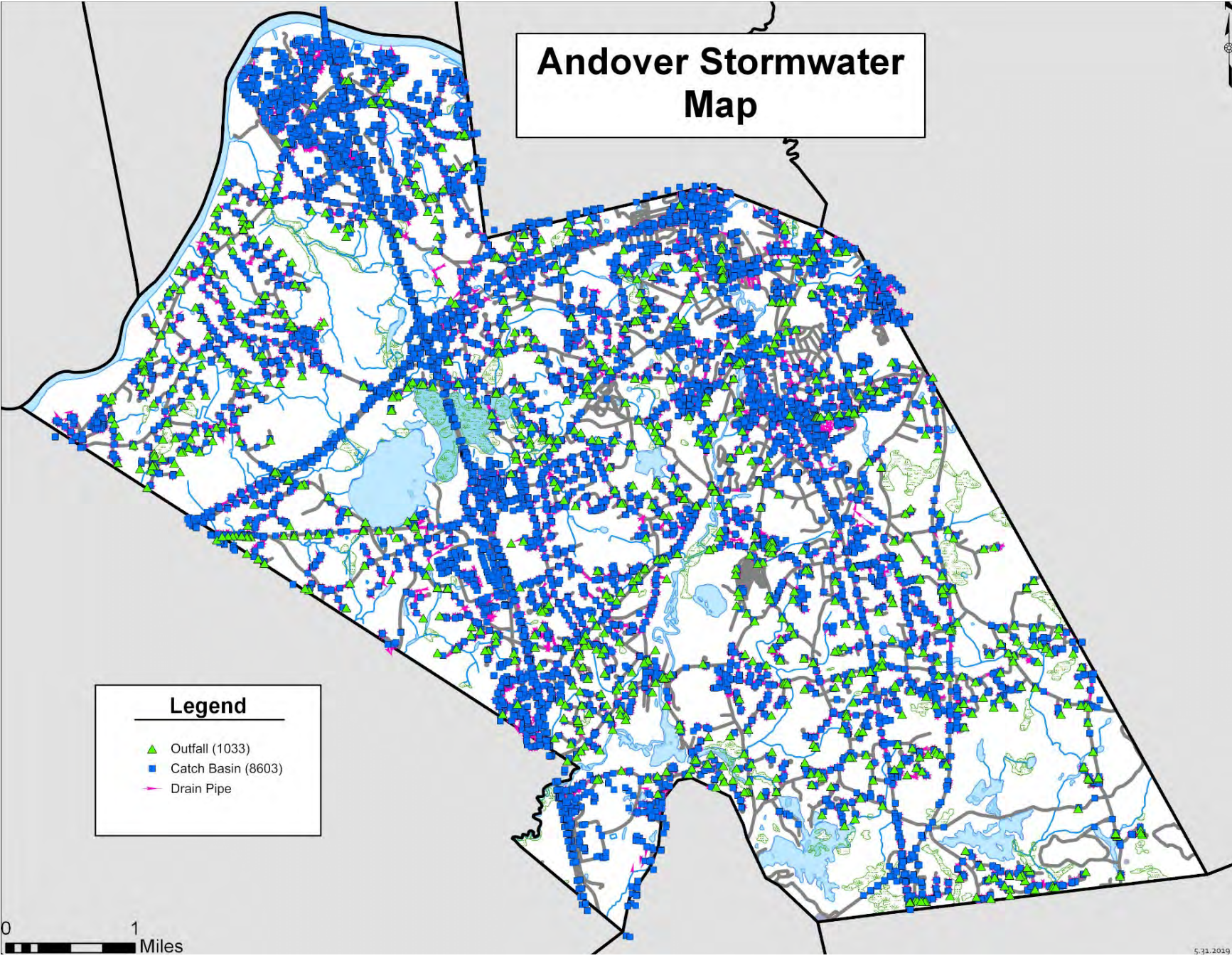
Andover will explore possible beneficial uses for its collected catch basin cleanings.

## Appendix A

---

### Map of Drainage Infrastructure

# Andover Stormwater Map



## Legend

- ▲ Outfall (1033)
- Catch Basin (8603)
- Drain Pipe

0 1 Miles

5-31-2019

## Appendix B

---

### Standard Operating Procedures for Catch Basin Cleaning and Inspection

## Permit Requirements

As required by the 2016 MS4 Permit, catch basin inspection and cleaning requirements include the following:

- **Inspect and clean catch basins** to ensure that no catch basin is not more than 50 percent full;
- **Prioritize inspection and maintenance** for catch basins:
  - located near construction activities;
  - discharging to impaired waters; and
  - with sumps more than 50% full during consecutive inspections.
- **Establish proper documentation** of catch basin inspections; and
- **Develop an optimization plan** for catch basin cleaning and inspection.

## Before Cleaning and/or Inspection

- **Notify residents and business** of catch basin cleaning schedule to restrict parking that could obstruct catch basin cleaning operations.
- **Gather** all required forms and maps.
  - Catch Basin Inspection Form; and
  - Maps of area to be cleaned/inspected

## Cleaning and 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 sump (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 if there are pollutants present.
  - Take photo of catch basin.
4. **Storage:** Bring cleanings to designated location for storage and disposal.
  5. If any illicit discharges are observed or suspected, notify supervisor.

### 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							
<input type="checkbox"/> Road/Curb <input type="checkbox"/> Alley <input type="checkbox"/> Ditch <input type="checkbox"/> Parking Lot <input type="checkbox"/> Driveway <input type="checkbox"/> Sidewalk Other: _____	<input type="checkbox"/> Asphalt <input type="checkbox"/> Gravel <input type="checkbox"/> Concrete <input type="checkbox"/> 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: _____						Check those Present:			
B. Depth from Rim to Bottom of Basin (after vac): _____						__ Sanitary Waste/Smell			
C. Sump Depth: _____						__ Excessive Sediment			
D. Depth of Sediment (B-A): _____						__ Oil Sheen			
E. More than 50% Full of Sediment? (D/C): _____						__ Floatables/Trash			
						__ Pet Waste:			
<b>CB Cleaned?</b> No Yes						Other: _____			
<b>Suspected illicit discharge?</b> No Yes						Potential Source: _____			

## Appendix F

---

### Street Sweeping Optimization Plan

**MUNICIPAL INFRASTRUCTURE STANDARD OPERATING  
PROCEDURE:  
Street Sweeping  
MI-1**

<b>SOP Name:</b>	Street Sweeping		
<b>SOP No:</b>	MI-1	<b>Division:</b>	Highway
<b>Responsible Official:</b>		<b>Adopted:</b>	June 30, 2020

**PURPOSE**

The Town of Andover believes that it is in the best interest of the residents for the Town to assume basic responsibility of sweeping on Town streets. Reasonable sweeping is necessary for vehicle and pedestrian safety, quality of life, street maintenance, surface water quality and environmental concerns. The Town will provide such service in a cost-effective manner, keeping in mind safety, budget, personnel and environmental concerns. The Town will use Town employees and equipment and private contractors (if applicable) to provide this service. Completion dates are dependent on weather conditions, personnel and equipment availability. The Deputy Director or his/her designee will be responsible for scheduling of personnel and equipment.

This SOP outlines procedures for the operation and maintenance of street sweepers, frequency of sweeping, disposal of debris, and recordkeeping to prevent pollution from entering the stormwater sewer systems and was prepared to meet the requirements of the 2016 Massachusetts Small MS4 General Permit (2016 MS4 Permit). Street sweeping is performed to remove sediments from streets and parking lots before it is washed into catch basins and waterways.

**SOP**

**Schedule**

*Standard Operations*

As required by the 2016 MS4 Permit, street sweeping requirements include the following:

- Sweep all streets with curbing in the MS4 regulated area a minimum of once per year in the spring (following winter activities);

- Include more frequent sweeping of targeted areas determined by the permittee based on pollutant load reduction potential, inspections, pollutant loads, catch basin cleaning or inspection results, land use, impaired or TMDL waters, or other relevant factors. Andover has waterbodies and tributaries with phosphorus impairments, requiring increased sweeping to twice a year;
- Report the number of miles cleaned and the volume or mass of material removed in annual reports; and
- Ensure proper storage of street sweepings prior to disposal or reuse such that they do not discharge to receiving waters.

### *Priority Areas*

The following areas are swept more frequently, as required by the MS4 TMDL and/or impaired waters provisions, or as determined necessary by the Town:

- **STORMWATER MANAGEMENT** - Priority will be given to areas draining into the higher priority water bodies as determined by the Town's Water Resources Management Plan. These areas will be swept on a priority basis throughout the year to comply with EPA National Pollutant Discharge Elimination System (NPDES) Phase II Storm Water Permit Program.
- **DOWNTOWN** -The core of the central downtown business district includes portions of; Main Street, Chestnut Street, Punchard Avenue, Bartlet Street, Park Street, Barnard Street, Elm Street, Central Street and municipal parking lots inclusive in this area and is swept one (1) to three (3) times per week. The peripheral downtown is defined by the urbanized areas bounded by School Street (west), Wheeler Street (south), Harding Street (north) and Whittier Street (east).
- **ARTERIAL STREETS** - The streets in the remainder of the town outside of the downtown district are swept once or twice a year. This takes several months and concludes approximately at the end of July, beginning of August. Second sweeps are conducted if severe weather events require it or the Deputy Director or his/her designee determines it is necessary.
- **SCHOOL PARKING LOTS** - School parking lots are swept during the spring break in April and in the late summer prior to the start of the school year. This operation takes five (5) full days to complete.
- **CITIZENS REQUEST** - Citizens request for sweeping will be evaluated and the Deputy Director will determine the necessity and priority.
- **CONSTRUCTION DEBRIS** - Erosion/siltation dirt & debris cleanup from construction projects is the responsibility of the developer, contractor or property owner. Except in cases of emergency the streets shall be cleaned and swept within twenty-four (24) hours of notification. If the streets are not swept within the specified time allowed or in the case of an emergency then the Town may

sweep the street and the responsible party will reimburse the Town for all associated costs.

- SIDEWALKS - The Town of Andover identifies sidewalks in the downtown and arterial streets requiring sweeping and sweeps once after the risk of snow has passed, and they are cleared of snow and ice or on an as-needed basis.

## Equipment

- The Town of Andover owns two (2) street sweepers and utilizes Town employees to conduct the sweeping.

## Procedures and Practices

### *General Procedures*

Sweeping is a slow process with average gutter line speeds for the first sweeping in spring that can be as slow as 2 to 3 miles per hour. The Town will sweep with its own equipment and manpower and private contractors (if applicable). Normally center lines are swept after gutter lines are cleaned. Equipment may include mechanical, vacuum or regenerative air sweepers.

The Town has classified Town streets based on the street function, traffic volume, impact on water quality and the environment, and the importance to the welfare of the Community. Accordingly, sweeping routes will be designed to provide the maximum possible benefit to higher volume and water quality sensitive areas.

Sweeping operations will be conducted when weather conditions permit. Factors that may delay sweeping operations include: temperatures below 32°, wind, rain, snow and frozen gutter lines.

Sweeping operations are performed in conjunction with and can be impacted by other maintenance operations. Sweeping operations will normally be conducted Monday - Friday, from 7:00 a.m. to 3:00 p.m. Extended work days and shift changes may be utilized for spring cleanup or emergency sweeping to provide maximum efficiency. The downtown core business district will normally be swept between the hours of 5 and 7 am.

### *Yard Waste*

It is the responsibility of residents to keep their neighborhood streets free of excessive yard waste and other debris. The Town does not provide street sweeping of leaves left in the gutter. Residents are not to sweep their leaves to the gutter in the expectation of the sweepers collecting them. Leaving yard waste and other debris in the street can clog

the storm water system during heavy rains and cause flooding problems and possibly damage homes in your neighborhood.

### *Complaints*

Complaints regarding sweeping shall be taken during normal working hours and handled in accordance with the Town's normal operating procedures. Complaints involving access to property or problems requiring immediate attention shall be handled on a priority basis. It should be understood that complaint responses are to ensure that the provisions of this S.O.P. have been fulfilled and that all residents of the Town have been treated fairly and uniformly. It is the Town's intention to log all complaints and upgrade this S.O.P. as necessary in consideration of the constraints of our resources. Any questions or complaints, please call the Highway Department at 978-623-8800.

### **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*

- Sweepings are stored at the DPW Yard in a designated location.
- Protect sweepings from wind and rain to the extent necessary to prevent dust, erosion, and off-site migration.
- Do not store sweepings within the 100-foot buffer zone of a wetland or within wetland resource areas including bordering vegetative wetlands and riverfront areas.
- Do not store sweepings within 500 feet of a ground or surface drinking water supply.
- Use sweepings within one year of collection.
- Remove solid waste such as paper, auto parts and other trash prior to use.

### *Disposal/Reuse*

- Dispose/reuse of sweepings in accordance with the Massachusetts Department of Environmental Protection *Reuse and Disposal of Street Sweepings Policy #BAW-18-001*. Options include:
  - Landfill – in accordance with landfill requirements;
  - Fill in public or private ways and parking lots
    - Cannot include sweepings from Urban Center Roads
    - Must be screened to remove debris and solid waste;
    - Must be kept above groundwater levels;
    - Cannot be used in designated “No Salt Areas”;
    - Cannot be used within 100-ft buffer zone of a wetland or within 500-ft of a drinking water supply;
    - In public ways, must be used under the paved road surface or, except in residential areas, as fill along the side of the road within the public way;
    - In private roadways or in residential areas, must be used under the paved road surface; and
    - In parking lots, can only be used under the paved parking surface.
  - Additive to restricted use compost
    - Cannot include sweepings from Urban Center Roads
    - Must be screened to remove debris and solid waste;
    - Can only be used along public ways and parking lot areas;
    - Cannot be used in residential areas;

- Must be kept above groundwater levels;
- Cannot be used in designated “No Salt Areas”;
- Cannot be used within 100-ft buffer zone of a wetland or within 500-ft of a drinking water supply;
- Anti-skid material
  - Cannot include sweepings from Urban Center Roads
  - Must be screened to remove debris and solid waste;
  - Cannot be used in designated “No Salt Areas”;
  - Cannot be used within 100-ft buffer zone of a wetland or within 500-ft of a drinking water supply;
- Reclamation soil facilities regulated under MassDEP Policy #COMM-15-01
- Use as a bulking agent for wastewater sludge or septage disposal with written approval from MassDEP Regional Office’s Bureau of Water Resources
- Other uses with an approved Beneficial Use Determination (BUD)

### **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

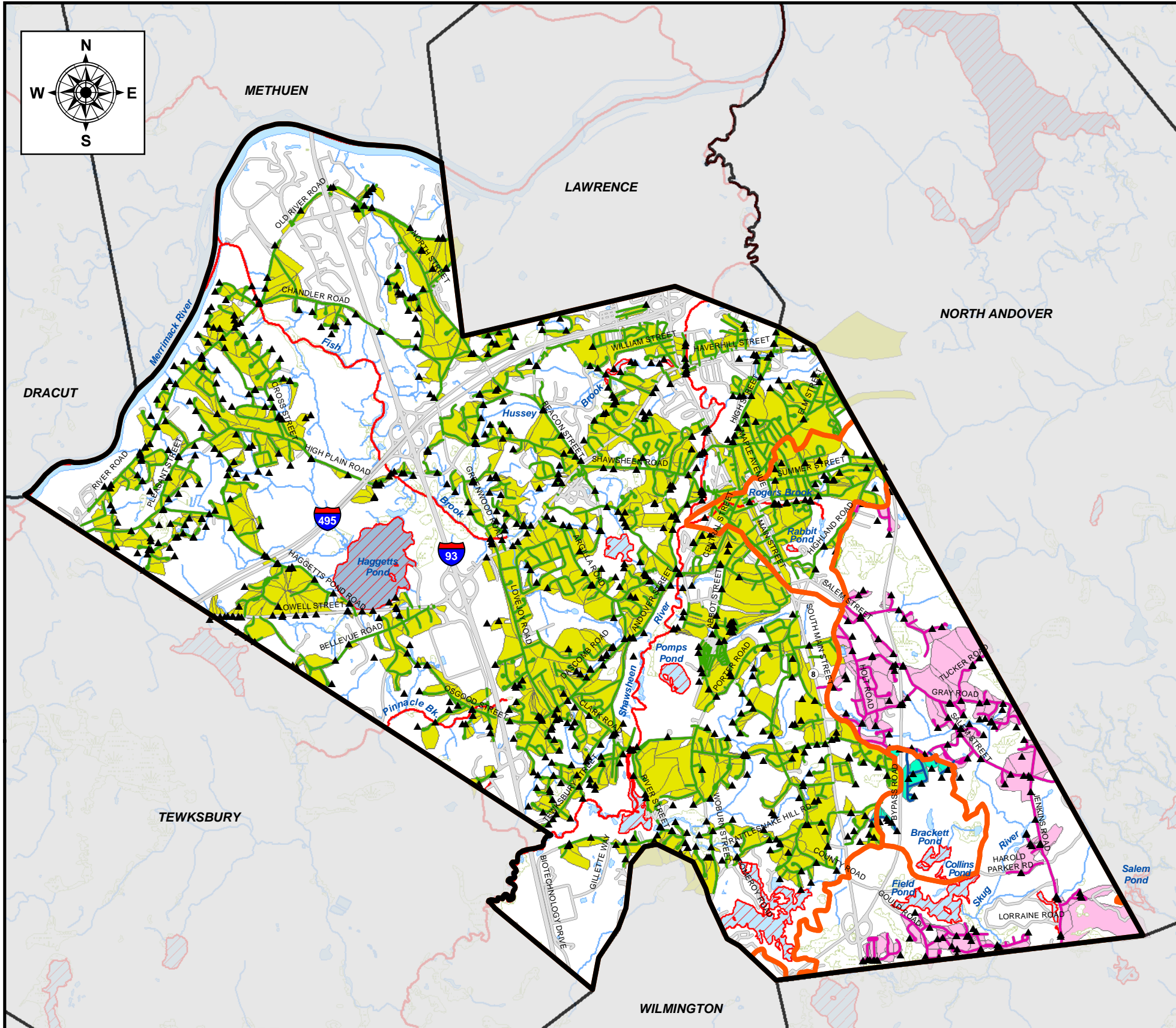
Weather Today: \_\_\_\_\_

Supervisor/Crew Leader: \_\_\_\_\_

Street Swept (Name)	Miles	Observed Potential Sources of Pollution	Volume or Mass of Material Removed	Comments
		<input type="checkbox"/> None <input type="checkbox"/> Material Storage <input type="checkbox"/> Construction Activity <input type="checkbox"/> Equipment Storage <input type="checkbox"/> Erosion <input type="checkbox"/> Other*		
		<input type="checkbox"/> None <input type="checkbox"/> Material Storage <input type="checkbox"/> Construction Activity <input type="checkbox"/> Equipment Storage <input type="checkbox"/> Erosion <input type="checkbox"/> Other*		
		<input type="checkbox"/> None <input type="checkbox"/> Material Storage <input type="checkbox"/> Construction Activity <input type="checkbox"/> Equipment Storage <input type="checkbox"/> Erosion <input type="checkbox"/> Other*		
		<input type="checkbox"/> None <input type="checkbox"/> Material Storage <input type="checkbox"/> Construction Activity <input type="checkbox"/> Equipment Storage <input type="checkbox"/> Erosion <input type="checkbox"/> Other*		
		<input type="checkbox"/> None <input type="checkbox"/> Material Storage <input type="checkbox"/> Construction Activity <input type="checkbox"/> Equipment Storage <input type="checkbox"/> Erosion <input type="checkbox"/> Other*		
		<input type="checkbox"/> None <input type="checkbox"/> Material Storage <input type="checkbox"/> Construction Activity <input type="checkbox"/> Equipment Storage <input type="checkbox"/> Erosion <input type="checkbox"/> Other*		
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		<input type="checkbox"/> None <input type="checkbox"/> Material Storage <input type="checkbox"/> Construction Activity <input type="checkbox"/> Equipment Storage <input type="checkbox"/> Erosion <input type="checkbox"/> Other*		
		<input type="checkbox"/> None <input type="checkbox"/> Material Storage <input type="checkbox"/> Construction Activity <input type="checkbox"/> Equipment Storage <input type="checkbox"/> Erosion <input type="checkbox"/> Other*		
		<input type="checkbox"/> None <input type="checkbox"/> Material Storage <input type="checkbox"/> Construction Activity <input type="checkbox"/> Equipment Storage <input type="checkbox"/> Erosion <input type="checkbox"/> Other*		
		<input type="checkbox"/> None <input type="checkbox"/> Material Storage <input type="checkbox"/> Construction Activity <input type="checkbox"/> Equipment Storage <input type="checkbox"/> Erosion <input type="checkbox"/> Other*		
		<input type="checkbox"/> None <input type="checkbox"/> Material Storage <input type="checkbox"/> Construction Activity <input type="checkbox"/> Equipment Storage <input type="checkbox"/> Erosion <input type="checkbox"/> Other*		
		<input type="checkbox"/> None <input type="checkbox"/> Material Storage <input type="checkbox"/> Construction Activity <input type="checkbox"/> Equipment Storage <input type="checkbox"/> Erosion <input type="checkbox"/> 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).



**Street Sweeping Twice a Year - Phosphorus**

*Merrimack River*

Streets located in MS4 catchment areas, which discharge within the Merrimack River subbasin, are required to be swept twice per year. The streets within the Rogers Brook and Rabbit Pond subbasin are included in this category since the subbasin is tributary to the Merrimack River.

Street sections located in MS4 outfall catchments = 320 lane miles  
 Additional street sections located in impaired water body subbasin = 110 lane miles

**Street Sweeping TBD - Turbidity**

*Brackett Pond, Collins Pond, Rogers Brook, Rabbit Pond and Salem Pond*

Street sections located in MS4 outfall catchments = 4.0 lane miles  
 Additional street sections located in impaired water body subbasin = 0 lane miles

**Street Sweeping Once per Year within a MS4 Catchment and Urbanized Area**

*Ipswich River (No Listed Impairment)*

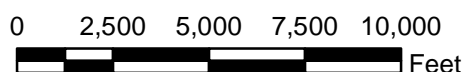
Street sections within a MS4 catchment and UA which are tributary to a subbasin that is not listed with an impairment.

Street sections located in MS4 outfall catchments = 40.0 lane miles.

**Legend**

- ▲ MS4 Outfall
- 303d Water Bodies**
- Impaired Lake, Pond
- Impaired River, Stream
- Hydrography**
- Lake, Pond, River
- Reservoir
- Wetlands
- Stream, Brook
- Subbasin Boundary
- MS4 Outfall Catchments**
- Sweep Twice per Year - Phosphorus
- Sweep Once per Year - No Listed Impairment
- Sweep TBD - Turbidity
- Streets within Outfall Catchments**
- Sweep Twice per Year (Phosphorus)
- Sweep Once per Year (No Listed Impairment)
- Sweep TBD (Turbidity)

Note: The Town of Andover is entirely within an Urbanized Area (UA) boundary



**Street Sweeping Map**

Sweeping per Phase II Requirements

Andover, Massachusetts

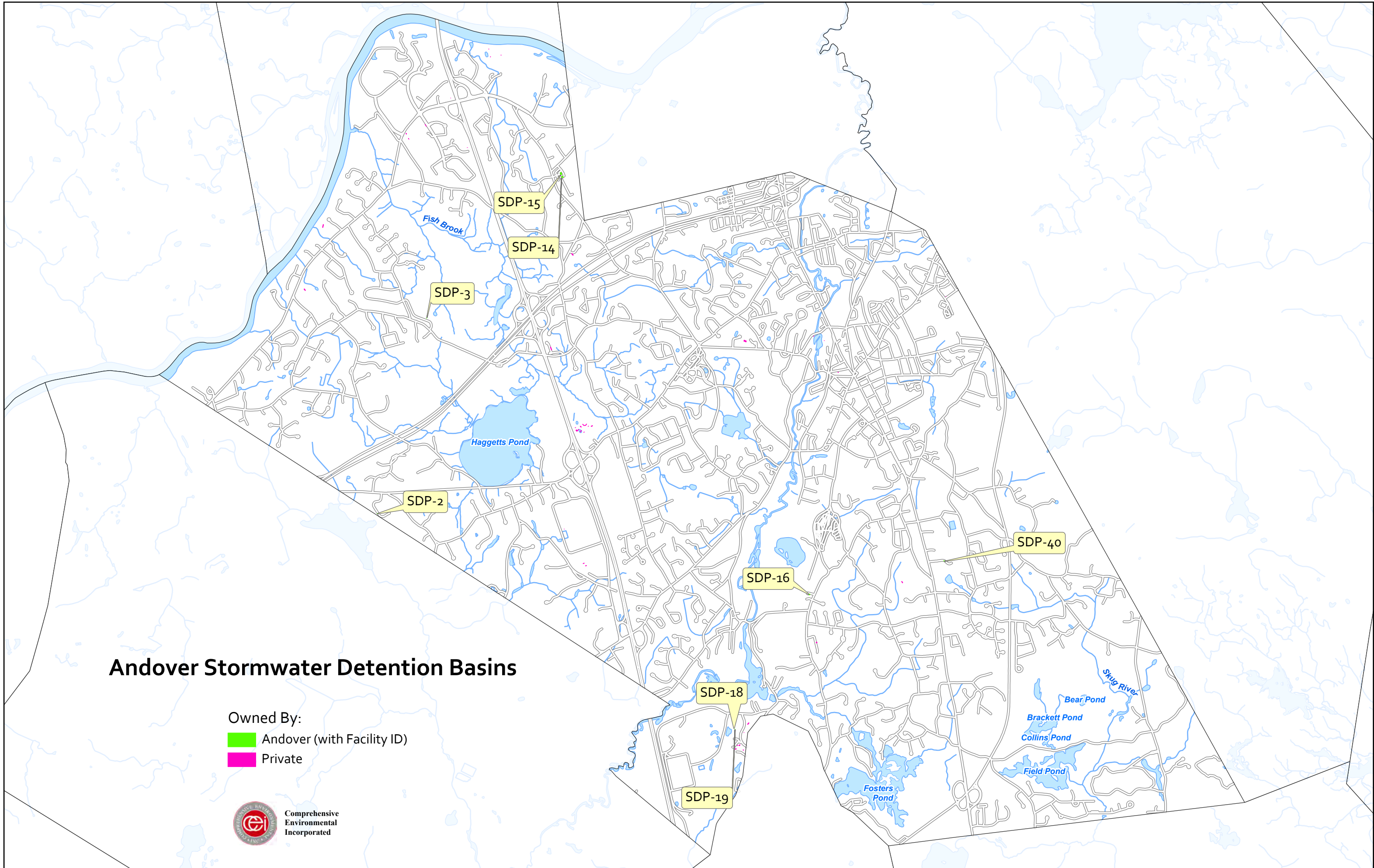


Comprehensive Environmental Inc.

## Appendix G

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List of Stormwater BMPs



# Andover Stormwater Detention Basins

Owned By:  
■ Andover (with Facility ID)  
■ Private



## Town-owned BMPs

Facility ID	BMP Type	Location Description
SDP-2		Jordyn Lane
SDP-3	Drywell	West Andover Schools
SDP-14		Northfield Commons
SDP-15		Northfield Commons
SDP-16		Winterberry Lane
SDP-18		
SDP-19		
SDP-40	Subsurface Detention Area	West Knoll Rd

**Town of Andover, Massachusetts**  
**Stormwater Management Program**  
**Implementation Activity**

**Date:** 6/9/21

**BMP ID #:** 6-8

**BMP Description:** Inspect and maintain stormwater BMPs

\_\_\_\_\_

**Location:** #29 Lincoln Circle East

**1. Briefly explain the activity performed:** DMH with weir was inspected and found to be in no need of  
maintenance.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**2. Is this BMP now completed or is it ongoing?** ongoing

**3. Describe any problems encountered which are preventing this BMP from being completed**

none

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**4. Explain actions taken or to be taken to address problems encountered:** None needed

\_\_\_\_\_

\_\_\_\_\_

**5. If this BMP has not been completed, when will it be completed?:**

This is an ongoing BMP

\_\_\_\_\_

**6. Describe any differences between what was implemented and the planned activities for this permit term and explain why:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**submitted by:** Scott Kandrut **Dept.:** Engineering

Attach any supporting documents, memos, pictures, reports or other records.

**Town of Andover, Massachusetts**  
**Stormwater Management Program**  
**Implementation Activity**

**Date:** 6/30/21

**BMP ID #:** 6-8

**BMP Description:** Inspect and maintain stormwater BMPs

**Location:** West Hollow (3) & River St (1)

**1. Briefly explain the activity performed:** 4 oil/water/sand separators were inspected. 3 were found to be in need of maintenance (GOS-3, GOS-2 & GOS-19)

**2. Is this BMP now completed or is it ongoing?** ongoing

**3. Describe any problems encountered which are preventing this BMP from being completed**

none

**4. Explain actions taken or to be taken to address problems encountered:** GOS-3, GOS-2 & GOS-19 were cleaned/vacuumed on 6/30/2021. GOS-1 was also vacuumed out.

**5. If this BMP has not been completed, when will it be completed?:**

This is an ongoing BMP

**6. Describe any differences between what was implemented and the planned activities for this permit term and explain why:**

**submitted by:** Scott Kandrut **Dept.:** Engineering

Attach any supporting documents, memos, pictures, reports or other records.

## Appendix H

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TMDL and Impaired Waters Progress

Phosphorus Source Identification Report Progress  
Chloride Requirements Progress

## Phosphorus Source Identification Report Progress



# PHOSPHORUS SOURCE IDENTIFICATION REPORT PROGRESS

1

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**For:** SWMP Update

**From:** Rebecca Balke, P.E., Comprehensive Environmental Inc.

**Date:** December 2022

**City:** Andover, MA

**Re:** Progress on Phosphorus Source Identification Report for Andover

---

Under the Environmental Protection Agency's (EPA's) 2016 National Pollutant Discharge and Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, Andover is required to develop a Phosphorus Source Identification Report to address the discharge of phosphorus from its MS4 to waters without approved Total Maximum Daily Loads (TMDLs) identified in Appendix H Part II of the Massachusetts MS4 Permit.

The Phosphorus Source Identification Report has been prepared as a separate standalone document and includes:

1. Calculation of total MS4 area draining to the water quality limited receiving water segments or their tributaries, incorporating updated mapping of the MS4 and catchment delineations produced pursuant to part 2.3.4.6;
2. All screening and monitoring results pursuant to part 2.3.4.7.b., targeting the receiving water segment(s);
3. Impervious area and DCIA for catchment areas;
4. Identification, delineation and prioritization of potential catchments with high phosphorus loading;
5. Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment, including the removal of impervious area for municipally owned developed properties.

## Chloride Requirements Progress



# CHLORIDE REQUIREMENTS PROGRESS

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**For:** SWMP Update

**From:** Rebecca Balke, P.E., Comprehensive Environmental Inc.

**Date:** December 2022

**City:** Andover, MA

**Re:** Progress on Chloride Requirements for Andover

Under the Environmental Protection Agency’s (EPA’s) 2016 National Pollutant Discharge and Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, Andover is required to develop a Salt Reduction Plan to address the discharge of chloride from its MS4 to waterbodies without approved Total Maximum Daily Loads (TMDLs) identified in Appendix H Part IV of the Massachusetts MS4 Permit. The Salt Reduction Plan was to be completed by the end of Year 3 and is to be fully implemented 5 years after the effective date of the permit.

The Town completed the Draft Salt Reduction Plan in June 2021 featuring BMPs to help reduce the amount of chloride discharging to the Town’s impaired waterbodies. In addition to the BMPs for municipally maintained surfaces, the Town is updating their Bylaws to regulate salt storage at commercial and industrial properties and has updated their Stormwater Management and Erosion Control Regulations to regulate salt usage at new development and redevelopment projects discharging to a chloride impaired water body.

The Town tracks the amount of salt applied to all municipally owned and maintained surfaces.

## Appendix I

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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:

EPA NPDES Permit Number:

**Primary MS4 Program Manager Contact Information**

Name:  Title:

Street Address Line 1:

Street Address Line 2:

City:  State:  Zip Code:

Email:  Phone Number:

Fax Number:

**Stormwater Management Program (SWMP) Information**

SWMP Location (web address):

Date SWMP was Last Updated:

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:  

<https://andoverma.gov/306/Stormwater-Management: Appendix B of IDDE Plan> Develop written IDDE plan including a procedure for screening and sampling outfalls  
 IDDE ordinance complete  
 Identify each outfall and interconnection discharging from MS4, classify into the relevant category, and priority rank each catchment for investigation
  - The priority ranking of outfalls/interconnections is attached to the email submission
  - The priority ranking of outfalls/interconnections can be found at the following website:  

<https://andoverma.gov/306/Stormwater-Management: Appendix C of IDDE Plan> 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)*

### **Chloride**

#### Annual Requirements

##### *Public Education and Outreach*

Include an annual message in November/ December to private road salt applicators and commercial

- industrial site owners on the proper storage and application rates of winter deicing material, along with the steps that can be taken to minimize salt use and protect local waterbodies

### **Phosphorus** (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

#### Annual Requirements

##### *Public Education and Outreach\**

- Distribute an annual message in the spring (April/May) that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release and phosphorus-free fertilizers
- Distribute an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- Distribute an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

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

##### *Good Housekeeping and Pollution Prevention for Permittee Owned Operations*

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

##### *Potential structural BMPs*

- Any structural BMPs listed in Attachment 3 to Appendix F already existing or installed in the regulated area by the permittee or its agents shall be tracked and the permittee shall estimate the phosphorus
- removal by the BMP consistent with Attachment 1 to Appendix H. Document the BMP type, total area treated by the BMP, the design storage volume of the BMP and the estimated phosphorus removed in mass per year by the BMP in each each annual report

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:

Catch Basin Cleaning Log - The Town keeps tracks of all catch basin inspections based on complaints generated on MaintStar and responses by personnel. The Town also tracks which basins are cleaned, but does not keep a log.

BMP Inspections - The Town inventoried town-owned BMPs and began inspections in Year 1. The Town will be performing annual inspections of all BMPs moving forward.

IDDE Training - An employee IDDE Training program will be developed during Year 2, with annual training to be performed starting in Year 2. Training will correspond with the start of outfall inspection activities.

Public Education - The Town is part of the Greenscapes Massachusetts North Shore Coalition, which handles the public education requirements under the MS4 Permit. In addition to the Greenscapes outreach listed, Andover displays stormwater information at the Water Treatment Plant and occasionally posts information on the DPW website and other social media outlets.

Potential Structural BMPs - Existing BMPs will be reviewed further for potential phosphorus removal amounts for inclusion in future annual reports where applicable.

The Town also logs complaints and resolutions pertaining to dumping, releases, etc. in its MaintStar System. When the Town receives a complaint, it performs an investigation to determine the necessary actions required.

### **Part III: Receiving Waters/Impaired Waters/TMDL**

Have you made any changes to your lists of receiving waters, outfalls, or impairments since the NOI was submitted?

Yes  No

If yes, describe below, including any relevant impairments or TMDLs:

## Part IV: Minimum Control Measures

Please fill out all of the metrics below. If applicable, include in the description who completed the task if completed by a third party.

### MCM1: Public Education

Number of educational messages completed during the reporting period:

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:

Responsible Department/Parties:

Measurable Goal(s):

Distributed by Salem Sound Coastwatch and Ipswich River Watershed Association at many community events. PDF available for download at [www.greenscapes.org/resources-brochures/](http://www.greenscapes.org/resources-brochures/)

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: 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:

Responsible Department/Parties:

Measurable Goal(s):

Attended by 35. Presentation PDF and "Tip Sheet" 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: "Soak Up the Rain" Presentation**

Message Description and Distribution Method:

Public presentation held at Nahant Life Saving Station, sponsored by Nahant SWIM, hosted by Greenscapes. Presentation conducted by Greenscapes representative, Barbara Warren, executive director of Salem Sound Coastwatch. Barbara shared natural ways to slow the flow of rainwater, including the planting of gardens designed to capture and absorb rainwater. In these times of unusually high rates of rainfall, small-scale stormwater management, such as a rain garden, is very important for all our communities to help reduce pollution and flooding of our basements, land, driveways and streets.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition

Measurable Goal(s):

Attended by 35

Message Date(s): March 6, 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:

Not described in NOI proposal.

### **BMP: Greenscapes 101 & Water Talk Presentation**

Message Description and Distribution Method:

Public presentation hosted by the Lynnfield Conservation Commission and Planning Department. Presenters included the Lynnfield Water District and Lynnfield Center Water District directors and Kristen Grubbs, Greenscapes representative and Environmental Planner for the Ipswich River Watershed Association. Topics included a general water conservation and stormwater overview, discussion of the watershed's issues and concerns, followed by solutions – including homeowner greenscaping practices and municipal solutions.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition

Measurable Goal(s):

Attended by 30

Message Date(s): May 15, 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:

Not described in NOI proposal.

**BMP: NEW Greenscapes Guide**

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, Municipal Contacts

Measurable Goal(s):

Available at [www.greenscapes.org/greenscapes-guide/](http://www.greenscapes.org/greenscapes-guide/)

Message Date(s): Published on Greenscapes website on June 30, 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:

Revised guide does not include messaging about sewer/septic maintenance. This information will be delivered in other Greenscapes materials and messaging.

**BMP: "Keeping Water Clean" Elementary 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: Greenscapes North Shore Coalition

Measurable Goal(s):

Conducted KWC at 27 different schools, reaching 2002 5th grade students and 300 adults across the North Shore. Four of the 27 schools are in Andover.

Message Date(s): 27 programs conducted Sept '18 - June '19.

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:

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### **BMP: Yard Waste Management Post**

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, Municipal Contacts

Measurable Goal(s):

Posted on partner social media platforms (Facebook & Twitter) and available at [www.greenscapes.org/resources-social-media/](http://www.greenscapes.org/resources-social-media/)

Message Date(s): Created 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:

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### **BMP: Keep Drains Clear Post**

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, Municipal Contacts

## Measurable Goal(s):

Posted on partner social media platforms (Facebook & Twitter) and available at [www.greenscapes.org/resources-social-media/](http://www.greenscapes.org/resources-social-media/)

Message Date(s): Created 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: Road Salt Alternatives Post**

## Message Description and Distribution Method:

Social media post describing many alternatives to traditional road salting practices. The use and benefits of coffee grounds, pickle brine, kitty litter, ashes, sugar beet juice and/or sand were discussed.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition, Municipal Contacts

## Measurable Goal(s):

Posted on partner social media platforms (Facebook & Twitter) and available at [www.greenscapes.org/resources-social-media/](http://www.greenscapes.org/resources-social-media/)

Message Date(s): Created December 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: What Not to Flush Post**

## Message Description and Distribution Method:

Social media post warning residents of the harm caused by flushing "unflushables" such as q-tips, feminine hygiene products, oil, grease, "flushable" wipes, and more in their wastewater systems. The post clearly states that those items belong in the trash!

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition, Municipal Contacts

Measurable Goal(s):

Posted on partner social media platforms (Facebook & Twitter) and available at [www.greenscapes.org/resources-social-media/](http://www.greenscapes.org/resources-social-media/)

Message Date(s): Created January 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: Scoop the Poop Post**

Message Description and Distribution Method:

Social media post educating residents on the harmful bacterial impacts that pet waste can have on our waterways and our health, if not properly disposed of. Andover also distributes the Greenscapes Pet Waste rack card at the Town Clerk's office where dog licenses are issued.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition, Municipal Contacts

Measurable Goal(s):

Posted on partner social media platforms (Facebook & Twitter) and available at [www.greenscapes.org/resources-social-media/](http://www.greenscapes.org/resources-social-media/)

Message Date(s): Created February 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: Rain Garden Post**

Message Description and Distribution Method:

Social media post describing the many important benefits rain gardens can have on our waterways by retaining and filtering stormwater as it travels through our watershed(s).

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition, Municipal Contacts

Measurable Goal(s):

Posted on partner social media platforms (Facebook & Twitter) and available at [www.greenscapes.org/resources-social-media/](http://www.greenscapes.org/resources-social-media/)

Message Date(s): Created March 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: Careful Lawn Care Post**

Message Description and Distribution Method:

Social media post describing many different sustainable and earth-friendly landscaping practices. Soil testing, mowing routines, watering routines, proper fertilization timing and suggested products are discussed.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition, ThinkBlue MA, Municipal Contacts

Measurable Goal(s):

Posted on partner social media platforms (Facebook & Twitter) and available at [www.greenscapes.org/resources-social-media/](http://www.greenscapes.org/resources-social-media/)

Message Date(s): Created 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: Water Smart Post**

Message Description and Distribution Method:

Social media post highlighting the importance of thoughtful watering practices such as watering deeply and only when the lawn/plants are "thirsty", which can conserve our supply of clean water, which is a limited resource.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition, Municipal Contacts

## Measurable Goal(s):

Posted on partner social media platforms (Facebook & Twitter) and available at [www.greenscapes.org/resources-social-media/](http://www.greenscapes.org/resources-social-media/)

Message Date(s): Created July 2019

Message Completed for: Appendix F Requirements  Appendix H Requirements

Was this message different than what was proposed in your NOI? Yes  No

If yes, describe why the change was made:

**BMP: Rain Barrel Sale**

## Message Description and Distribution Method:

Greenscapes North Shore Coalition hosted a rain barrel sale and created associated advertisements that promoted water conservation and described how using a rain barrel can greatly reduce a resident's household water use as well as mitigating roof run-off. The barrel sale was open to all residents on the North Shore.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition, Municipal Contacts

## Measurable Goal(s):

Press release sent to 20 local and regional newspapers, 300 "engagements" with post on Salem Sound Coastwatch Facebook, 520 "engagements" on IRWA Facebook, 20 rain barrels sold.

Message Date(s): Social media ad/press release created May 2019. Barrel sale held June 22, 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:

Not described in original NOI

**BMP: ThinkBlueMA Fowl Water Video**

## Message Description and Distribution Method:

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/> and spread as an advertisement on Facebook, Instagram, & YouTube

Targeted Audience: Residents

Responsible Department/Parties: ThinkBlue MA, Greenscapes North Shore Coalition, Municipal Contacts

## Measurable Goal(s):

Outreach "# of impressions" was evaluated in 9 out of 23 Greenscapes Communities. Results claimed that 121,520 impressions were made on Facebook or Youtube. 10,552 impressions from Andover. The video is available on the ThinkBlue website and the Greenscapes website at [www.greenscapes.org/resources-videos/](http://www.greenscapes.org/resources-videos/).

Message Date(s): Spread by ThinkBlue June 23 - June 30, 2019. Shared further July 2019.

Message Completed for: Appendix F Requirements  Appendix H Requirements

Was this message different than what was proposed in your NOI? Yes  No

If yes, describe why the change was made:

Not described in original NOI

**BMP: Miscellaneous Greenscapes Tabling Events**

## Message Description and Distribution Method:

Informational table with Greenscapes demonstrations and materials at local community and school events, including: Grow Spring Expo, Essex STEM Night, Middleton Earth Day, STEAM Night Beverly, Ipswich Garden Club Plant Sale, MassAudubon Nature Fest, Cape Ann Farmer's Market, Rowley Farmer's Market, Beverly Farmer's Market, North Reading Farmer's Market, Billerica Farmer's Market, Waldorf School at Moraine Farm, Wilmington Farmer's Market, Underwater in Salem Sound Lecture Series, Beverly Public Library Lecture Series

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes North Shore Coalition

## Measurable Goal(s):

Miscellaneous.

Message Date(s): Events held September '18 - May '19. Farmers markets held weekly in the spring/summer.

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:

Not described in original NOI

**BMP: Protecting Your Water Supply**

## Message Description and Distribution Method:

In the summer of 2018, a public health intern completed a dash-board survey of the Town's drinking watershed to identify potential threats to the drinking water supply. An educational brochure was developed and mailed to properties in the watershed. The brochure contains tips to prevent contamination (i.e., lawn maintenance, pet waste, trash disposal, vehicle maintenance, managing yard waste) and septic safety.

Targeted Audience: Residents

Responsible Department/Parties: Health Department

Measurable Goal(s):

Brochures mailed to all properties in the Haggetts Pond watershed.

Message Date(s): Summer 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:

The Town wanted public outreach that focused on protection of the water supply.

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:

SWMP Plan for Download - The Town has posted the SWMP Plan on Town website.

A revision to the Pesticide Use Policy for the Town of Andover was finalized and approved by the BOH in 2017. It was a collaborative effort of many departments and citizens.

Stormwater Call Directory - The Town has implemented a new service request application on the Town website or over the phone. It can be used for construction complaints 24 hours a day.

Classroom education is performed by Greenscapes as outlined under MCM1.

Watershed Organization Involvement - Conservation Director has partnered with the Shawsheen River Watershed Association (SRWA) and the Shawsheen Greenway/Andover Trails collective, and the Merrimack River Watershed Council. Conservation Director meets with Watershed groups and discusses stormwater concerns. Volunteers from the Shawsheen River Watershed Association and other groups check outfalls into the river and work to pinpoint areas not in compliance. These areas are investigated by the Conservation staff.

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:

Number of SSOs removed:

*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:

Total number of SSOs removed:

#### MS4 System Mapping

Describe the status of your MS4 map, including any progress made during the reporting period:

The Town has mapped all of its known stormwater outfalls, interconnection, open channels, receiving waters including impairments and most of the storm drain infrastructure (e.g., pipes, manholes, catch basins). Initial catchment delineations have also been mapped using available system data and topographic information. The Town will continue to update mapping as new information becomes available.

#### Screening of Outfalls/Interconnections

*If conducted, please submit any outfall monitoring results from this reporting period. Outfall monitoring results should include the date, outfall/interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results from all analyses.*

- The outfall screening data is attached to the email submission
- The outfall screening data can be found at the following website:

*Below, report on the number of outfalls/interconnections screened during this reporting period.*

Number of outfalls screened:

*Below, report on the percent of total outfalls/ interconnections screened to date.*

Percent of total outfalls screened:

#### Catchment Investigations

*If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.*

- The catchment investigation data is attached to the email submission
- The catchment investigation data can be found at the following website:

N/A - none completed to date

*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:*

N/A - not started yet

### **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: N/A

Estimated volume of sewage removed: N/A [UNITS]

*Below, report on the total number of illicit discharges identified and removed to date. At a minimum, report on the number of illicit discharges identified and removed since the effective date of the permit.*

Total number of illicit discharges identified: 0

Total number of illicit discharges removed: N/A

*Optional: Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:*

N/A

**Employee Training**

Describe the frequency and type of employee training conducted during the reporting period:

An employee IDDE Training program will be developed during Year 2, with annual training to be performed starting in Year 2 to correspond with the start of IDDE investigation work.

**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:

Number of inspections completed:

Number of enforcement actions taken:

**MCM5: Post-Construction Stormwater Management in New Development and Redevelopment****Ordinance Development**

Describe the status of the post-construction ordinance required to be complete in year 2 of the permit term:

The Town has a Stormwater Management and Erosion Control bylaw and regulations that address construction and post-construction requirements for developments and redevelopments greater than or equal to 1 acre. This will be updated to meet MS4 Permit requirements in Permit Year 2.

**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:

The Town's regulations require the submission of as-built plans detailing the actual stormwater management system as installed before the surety has been released. The regulations also require Responsible Parties to submit an annual report by September 1st to the Planning Board documenting the inspection and maintenance of the BMPs for which they are responsible.

**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:

No work completed in Year 1. To be completed in future years.

### **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:

No work completed in Year 1. To be completed in future years.

### **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:

No work completed in Year 1. To be completed in future years.

## **MCM6: Good Housekeeping**

### **Catch Basin Cleaning**

Describe the status of the catch basin cleaning optimization plan:

A plan for optimizing catch basin cleaning was completed and included as Appendix G to the SWMP. The Plan

*If complete, attach the catch basin cleaning optimization plan or the schedule to gather information to develop the optimization plan:*

- The catch basin cleaning optimization plan or schedule is attached to the email submission
- The catch basin cleaning optimization plan or schedule can be found at the following website:

<https://andoverma.gov/306/Stormwater-Management: Appendix G of SWMP>

*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:

Number of catch basins cleaned:

Total volume or mass of material removed from all catch basins:

*Below, report on the total number of catch basins in the MS4 system, if known.*

Total number of catch basins:

*If applicable:*

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

Not yet applicable. Pending the collection of sediment depth data.

**Street Sweeping**

Describe the status of the written procedures for sweeping streets and municipal-owned lots:

The Town developed a street sweeping map showing sweeping requirements throughout Town based on the location of impaired waters. A street sweeping SOP was also developed and will be included as part of a larger comprehensive Operation and Maintenance (O&M) Plan during Year 2 that covers other facilities and stormwater infrastructure.

*Report on street sweeping completed during the reporting period using one of the three metrics below.*

Number of miles cleaned:

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:

DPW personnel observe all regulated town-owned roadways for maintenance needs, including street sweeping, during routine operations. Personnel also observe suspect trouble areas, such as large-scale construction projects or projects with substantial land disturbance, for evidence of runoff-laden sediment onto roadways that may require more frequent sweeping in addition to that outlined under the Street Sweeping SOP. Should areas in need of additional sweeping be observed, the Town will document these areas and schedule additional sweeping as needed. Inspections of rural uncurbed roadways conducted to date have not yet observed any needs for additional sweeping within regulated urbanized area roadways.

**Winter Road Maintenance**

Describe the status of the written procedures for winter road maintenance including the storage of salt and sand:

The Town developed an SOP for winter road maintenance during Year 1. The SOP will be included as part of a larger comprehensive Operation and Maintenance (O&M) Plan during Year 2 that covers other facilities and stormwater infrastructure.

### **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:

An inventory of permittee-owned properties was performed under the 2003 MS4 Permit and included in the 2003 SWMP. This inventory will be reviewed and updated by the end of Year 2.

### **O&M Procedures for Parks and Open Spaces, Buildings and Facilities, and Vehicles and Equipment**

Describe the status of the operation and maintenance procedures, due in year 2 of the permit term, of permittee-owned properties (parks and open spaces, buildings and facilities, vehicles and equipment) and include maintenance activities associated with each:

No work completed in Year 1. To be completed in Year 2.

### **Stormwater Pollution Prevention Plan (SWPPP)**

Describe the status of any SWPPP, due in year 2 of the permit term, for permittee-owned or operated facilities including maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater:

No work completed in Year 1. To be completed in Year 2.

*Below, report on the number of site inspections for facilities that require a SWPPP completed during this reporting period.*

Number of site inspections completed:

Describe any corrective actions taken at a facility with a SWPPP:

### **O&M Procedures for Stormwater Treatment Structures**

Describe the status of the written procedure for stormwater treatment structure maintenance:

Andover has a SOP for inspecting and maintaining stormwater BMPs. The SOP will be updated as needed.

### **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:

N/A

#### **Additional Information**

*Optional:* Enter any additional information relevant to your stormwater management program implementation during the reporting period. Include any BMP modifications made by the MS4 if not already discussed above:

#### **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:

### 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: Andrew Flanagan Title: Town Manager  
Signature: [Handwritten Signature] Date: 9/30/19  
*[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:

EPA NPDES Permit Number:

**Primary MS4 Program Manager Contact Information**

Name:

Title:

Street Address Line 1:

Street Address Line 2:

City:

State:

Zip Code:

Email:

Phone Number:

**Stormwater Management Program (SWMP) Information**

SWMP Location (web address):

Date SWMP was Last Updated:

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:

IDDE training was not performed in Year 2 due to social distancing requirements associated with COVID-19. The Town is working with a Consultant to perform IDDE and SWPPP training in Permit Year 3.

**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:

**Chloride**Annual Requirements*Public Education and Outreach*

- Included an annual message in November/ December to private road salt applicators and commercial
- industrial site owners on the proper storage and application rates of winter deicing material, along with the steps that can be taken to minimize salt use and protect local waterbodies

*Optional:* If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

**Phosphorus (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)**Annual Requirements*Public Education and Outreach\**

- Distributed an annual message in the spring (April/May) encouraging the proper use and disposal of grass clippings and encouraging the proper use of slow-release and phosphorus-free fertilizers
- Distributed an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- Distributed an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

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

*Good Housekeeping and Pollution Prevention for Permittee Owned Operations*

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

*Potential structural BMPs*

- Any structural BMPs already existing or installed in the regulated area by the permittee or its agents was tracked and the phosphorus removal by the BMP was estimated consistent with Attachment 3 to Appendix F. The BMP type, total area treated by the BMP, the design storage volume of the BMP and the estimated phosphorus removed in mass per year by the BMP were documented.

- The BMP information is attached to the email submission
- The BMP information can be found at the following website:

*Optional:* If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

Potential structural BMPs - Town-owned BMPs have been inventoried. Phosphorus loads and removals from existing BMPs have not yet been calculated. These estimates will be performed in conjunction with the development of a Phosphorus Source Identification Permit Year 3.

*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 2016 Integrated List of Waters was finalized and includes the following new or removed impairments and/or TMDLs in Andover:

- Rogers Brook (MA83-04) covered under existing TMDL for E.Coli (previously only fecal coliform) and turbidity impaired was removed.
- Shawsheen River (MA83-18) covered under existing TMDL for E.Coli (previously only fecal coliform) and mercury in fish tissue impairment removed
- Shawsheen River (MA83-19) covered under existing TMDL for E.Coli (previously only fecal coliform) and DO impairment removed
- Unnamed Tributary to Meadow Brook, known as "Pinnacle Brook" (MA83-15) covered under existing TMDL for E.Coli (previously only fecal coliform)

## 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:**

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: Greenscapes 101 Webinar**

Message Description and Distribution Method:

Forwarded Greenscapes on-line workshop offerings to Community Services librarian to share with contacts at Garden Clubs and seed sharing groups. They were also shared on Town DPW social media outlets. Greenscapes staff delivered a virtual presentation on residential stormwater management, the importance of natural solutions in combatting stormwater/water resource management, and made suggestions for at-home projects that interested residents could explore. Projects included using native grass species, converting a lawn into a water-friendly garden, and more. The webinar was recorded and posted on the Greenscapes website.

Targeted Audience:

Responsible Department/Parties:

Measurable Goal(s):

35 "attended" webinar. Recordings shared with 75 municipal staff June 6, 2020 and posted on Greenscapes website.

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: Keeping Water Clean - School Program**

Message Description and Distribution Method:

Greenscapes presented their "Keeping Water Clean" Program on 12/9 and 12/10/19 at Bancroft Elementary School. 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:

Responsible Department/Parties: DPW, Greenscapes North Coalition

Measurable Goal(s):

A total of 102 students, 11 parents and 7 teachers participated.

Message Date(s): 12/9/19 and 12/10/19

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: Pet Waste Literature Cards**

Message Description and Distribution Method:

Pet waste literature cards are placed at the Memorial Hall Library reference area. They were also shared with local trails groups via the Community Service librarian. Pet waste literature is also printed on dog license paperwork when issued and made available at the Town Clerk's office for distribution to residents who visit the Town Office to purchase dog licenses. A 'Scoop the Poop' flyer was shared through social media on September 3, 2019 and links were provided to it in posts pertaining to socially responsible hiking during the Coronavirus threat on March 24, 2020. Retweeted Think Blue Massachusetts Scoop the Poop tweet on 02/13/20.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Distributed at library and directly to trail groups. 1,147 people reached with 9/3/19 post.

Message Date(s): Shared with trails groups 4/24/20. Posted on social media 09/03/19. Retweeted Think Blue tweet on 02/13/20. Continuously available at library.

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: Think Blue Massachusetts "Fowl Water"**

Message Description and Distribution Method:

On behalf of the members of the Greenscapes North Shore, Think Blue Massachusetts ran an educational

advertising campaign from May 16th to June 5th, 2020. The "Fowl Water" advertisement helps viewers visualize stormwater pollution from motor oil, pet waste, and trash become stormwater pollution. The Town also posted this video on social media.

Targeted Audience: Residents

Responsible Department/Parties: Think Blue Massachusetts

Measurable Goal(s):

106,308 social media impressions from Town residents through Facebook, Instagram and YouTube through the Think Blue program.

Message Date(s): May 16-June 5, 2020

Message Completed for: Appendix F Requirements  Appendix H Requirements

Was this message different than what was proposed in your NOI? Yes  No

If yes, describe why the change was made:

Not described in original NOI. Supplemental to expected resident outreach.

### **BMP: Annual Water Quality Report**

Message Description and Distribution Method:

The annual Water Quality Report made available in June includes the following messages:

- Stormwater management tips on car washings, vehicle repair, disposal of household hazardous wastes, septic system maintenance, yard waste management, pet waste, recycling and lawn care.
- Water conservation tips on plantings, lawn watering, use of rain barrels, and mulching.

Distributed to all water customers and posted on Town website.

Targeted Audience: Residents, Businesses, institutions and commercial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

Distributed to all water customers.

Message Date(s): June 2020.

Message Completed for: Appendix F Requirements  Appendix H Requirements

Was this message different than what was proposed in your NOI? Yes  No

If yes, describe why the change was made:

The annual water report is provided to all Town water customers allowing for wide distribution of various messages geared towards promoting good water quality, including septic system education.

### **BMP: How to Build a Raingarden and Cutting Down on Lawn**

Message Description and Distribution Method:

Andover posted the ThinkBlue "How to Build a Rain Garden in Your Yard" story on social media. Tweet on "Cutting Down on Lawn - Alternatives to Grass."

Targeted Audience: Resident

Responsible Department/Parties: DPW

Measurable Goal(s):

654 people reached on raingarden. Alternatives to grass tweet on August 13, 2019.

Message Date(s): January 15, 2020 video post. Twee on 08/13/2019

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: "What is a Storm Sewer?" Social Media**

Message Description and Distribution Method:

Posted the Think Blue video "Stormwater Minute: What is a Storm Sewer?" on social media on January 24, 2020. Retweeted Think Blue tweet "Only Rain Down the Drain" on November 27, 2019. Tweeted a message on August 28, 2019 and October 16, 2019 outlining Town activities to clear leaves and debris from catch basins due to expected heavy rain and asking residents to do the same. Retweeted a message to clear away catch basins near homes and fire hydrants during a large storm on December 31, 2019.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

646 people reached.

Message Date(s): Video posted 01/24/2020. "Only Rain Down the Drain" tweet on 11/27/2019. Clear catch basins tweet on 08/28/19, 10/16/19 and 12/31/2019.

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:

Supplemented education program to provide additional information on the difference between sanitary and storm sewers.

**BMP: Keep Town Sewer and Your Septic Clear**

Message Description and Distribution Method:

Tweeted "No Wipes Down the Pipes and Cease the Grease?" on July 13, 2019.

Targeted Audience: Resident, Business, institutions and commercial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

Tweet on July 13, 2019.

Message Date(s): July 13, 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: Recycling and Leaf Collection**

Message Description and Distribution Method:

Recycle Guide and Leaf Collection Flyer posted on website, available for pickup at Library, Water Treatment Plant, Town Offices and the Municipal Services Building, and mailed upon request. The Recycle Guide is also handed out with recycle bins for new residents. The Leaf Collection flyer is mailed with the Bald Hill Compost Permits. The Recycling and Trash Guide also contains tips to keep storm drains clean, including no dumping, proper disposal of yard wastes, fertilizer and pesticide use, car washing, and septic tank pumping.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Updated and distributed each fiscal year. Posted on social media.

Message Date(s): Posted each June/July.

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:

The Recycling Guide and Leaf Collection Flyer is provided to all Town water customers allowing for wide distribution of various messages geared towards promoting good water quality, including management of yard

waste, illicit discharges and septic system education.

### **BMP: Green Your Yard**

Message Description and Distribution Method:

"Green Your Yard--Questions to ask when looking for a "Green" Landscaper" fact sheet posted on Andover's website. Provides tips for a healthy eco-friendly yard.

Targeted Audience: Residents

Responsible Department/Parties: DPW and Greenscapes North Shore Coalition

Measurable Goal(s):

Post on Town website.

Message Date(s): Continuously available.

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 on Town website.

Stormwater Call Directory - The Town has implemented a service request application on the Town website or over the phone. It can be used for construction complaints 24 hours a day.

Classroom education is performed by Greenscapes as outlined under MCM1.

Watershed Organization Involvement - Conservation Director has partnered with the Shawsheen River Watershed Association (SRWA) and the Shawsheen Greenway/Andover Trails collective, and the Merrimack River Watershed Council. Conservation Director meets with Watershed groups and discusses stormwater concerns. Volunteers from the Shawsheen River Watershed Association and other groups check outfalls into the river and work to pinpoint areas not in compliance. These areas are investigated by the Conservation staff.

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:

Number of SSOs removed:

#### MS4 System Mapping

Below, check all that apply.

The following elements of the Phase I map have been completed:

- Outfalls and receiving waters
- Open channel conveyances
- Interconnections
- Municipally-owned stormwater treatment structures
- Waterbodies identified by name and indication of all use impairments
- Initial catchment delineations

Optional: Describe any additional progress you made on your map during this reporting period or provide additional status information regarding your map:

#### Screening of Outfalls/Interconnections

If conducted, please submit any outfall monitoring results from this reporting period. Outfall monitoring results should include the date, outfall/interconnection identifier, location, weather conditions at time of sampling, precipitation in previous 48 hours, field screening parameter results, and results from all analyses.

- The outfall screening data is attached to the email submission
- The outfall screening data can be found at the following website:

[Empty text box]

*Below, report on the number of outfalls/interconnections screened during this reporting period.*

Number of outfalls screened:

**Catchment Investigations**

*If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.*

- The catchment investigation data is attached to the email submission
- The catchment investigation data can be found at the following website:

[Empty text box]

*Below, report on the number of catchment investigations completed during this reporting period.*

Number of catchment investigations completed this reporting period:

*Below, report on the percent of catchments investigated to date.*

Percent of total catchments investigated:

*Optional: Provide any additional information for clarity regarding the catchment investigations below:*

No catchment investigations performed this period. The Town performed a review of records to identify system vulnerability factors (SVFs) and updated its IDDE Plan to include these findings.

**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:

[Empty text box]

*Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed during this reporting period.*

Number of illicit discharges identified:

Number of illicit discharges removed:

Estimated volume of sewage removed:  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:

Total number of illicit discharges removed:

*Optional:* Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:

No illicit discharges found or removed this period.

**Employee Training**

Describe the frequency and type of employee training conducted **during the reporting period:**

IDDE training was not performed in Year 2 due to social distancing requirements associated with COVID-19. The Town is working with a Consultant to perform IDDE and SWPPP training in Permit Year 3.

**MCM4: Construction Site Stormwater Runoff Control**

*Below, report on the construction site plan reviews, inspections, and enforcement actions completed during this reporting period.*

Number of site plan reviews completed:

Number of inspections completed:

Number of enforcement actions taken:

*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:

The Town's regulations require the submission of as-built plans detailing the actual stormwater management system as installed before the surety has been released. The regulations also require Responsible Parties to submit an annual report by September 1st to the Planning Board documenting the inspection and maintenance of the BMPs for which they are responsible.

### **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:

N/A, to be completed during future permit years.

### **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:

N/A, to be completed during future permit years.

### **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:

The Town completed an inventory of its permittee-owned properties. Facilities will be evaluated for potential BMP retrofit opportunities during future permit years.

## **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:

Number of catch basins cleaned:

Total volume or mass of material removed from all catch basins:

*Below, report on the total number of catch basins in the MS4 system.*

Total number of catch basins:

*If applicable:*

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

Not yet applicable, pending collection of sediment data during catch basin cleaning from year to year.

### **Street Sweeping**

*Report on street sweeping completed **during this reporting period** using one of the three metrics below.*

Number of miles cleaned:

Volume of material removed:  [Select Units]

Weight of material removed:  [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:

Describe any corrective actions taken at a facility with a SWPPP:

SWPPP inspections will begin in Permit Year 3.

[Empty rectangular box]

**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):

[Empty rectangular box]

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:

[Empty rectangular box]

**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:

[Empty rectangular box]

**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:

Public Education - A workshop entitled, "Keeping Water Clean and Plentiful" was scheduled for May 14, 2020. It was cancelled in late March due to COVID-19.

Training - IDDE training was not performed in Year 2 due to social distancing requirements associated with COVID-19. The Town is working with a Consultant to perform IDDE and SWPPP training in Permit Year 3.

As a result of the COVID-19 outbreak, regulatory updates have not been finalized (they are in draft form) and adopted as planned during Permit Year 2. The Town now anticipates incorporating final revisions and

adopting stormwater regulatory updates as part of the Year 3 requirements under EPA's pending updated permit schedule.

**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:  Title:

Signature:  Date:

*[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:

EPA NPDES Permit Number:

**Primary MS4 Program Manager Contact Information**

Name:  Title:

Street Address Line 1:

Street Address Line 2:

City:  State:  Zip Code:

Email:  Phone Number:

**Stormwater Management Program (SWMP) Information**

SWMP Location (web address):

Date SWMP was Last Updated:

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:

-Dry Weather Outfall Screening: The Town initially identified 1033 outfalls and 44 interconnections in its GIS mapping. After several site inspections, it was determined that many of these outfalls were actually culverts and a desktop exercise using the Town's roadway and culvert mapping layers was performed to re-designate the mislabeled outfalls as culverts as appropriate. This reduced the number of outfalls to 821. The Town has attempted to inspect all 865 known stormwater outfalls and interconnections within the urbanized area during dry weather. 87 of these could not be found or accessed. The upgradient catch basin or manhole was inspected for 54 of the 87 not found/accessed outfalls. The remaining 33 not found/accessed will be revisited when vegetation is down in Year 4 to again attempt to find the outfall. If it still cannot be located, proxy inspections of the closest upgradient structure will be performed.

-Updated Outfall Priority Ranking: A new prioritization table and map was created.

-Post-Construction Bylaw and Regulations: The Town updated its Stormwater Management and Erosion

Control Regulations to meet the requirements of the MS4 Permit. The amended regulations were approved on May 11, 2021.

### 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:

Street Sweeping frequency - Every road is swept at least twice per year. Main Street Business District is swept at least 3 times per week.

Stormwater BMPs - 4 oil/water/sand separators were inspected. 3 were found to be in need of maintenance and were cleaned and vacuumed on 6/30/2021. The other was vacuumed out. The Town is working on inspecting its remaining stormwater BMPs.

**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:

**Chloride**Annual Requirements*Public Education and Outreach*

- Included an annual message in November/ December to private road salt applicators and commercial industrial site owners on the proper storage and application rates of winter deicing material, along with the steps that can be taken to minimize salt use and protect local waterbodies

*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:

The Town is part of the Greenscapes North Shore Coalition, 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 the MS4 Stormwater and other water-related regulatory requirements. Greenscapes coalition distributed a graphic with natural alternatives to harsh road salt that was sent in a February newsletter and distributed a video 'More Isn't Always Better' relating to salt use in February 2021.

A Salt Reduction Plan was prepared in June 2021 and will be fully implemented by the end of Year 5. The Town of Andover is working to incorporate a bylaw under Part II: By-Laws, Article XII Miscellaneous Bylaws that outlines regulations governing salt storage at commercial and industrial properties. The updated Stormwater Management and Erosion Control Regulations amended 5/11/2021 require new development or redevelopment projects discharging to a chloride impaired waterbody to include measures in their O&M Plan to minimize salt usage or to use alternative deicing materials and practices.

The Town tracks salt use by date and truck load. The Town used 5,493.2 tons of solid sodium chloride this reporting period.

**Phosphorus** (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)Annual Requirements

*Public Education and Outreach\**

- Distributed an annual message in the spring (April/May) encouraging the proper use and disposal of grass clippings and encouraging the proper use of slow-release and phosphorus-free fertilizers
- Distributed an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- Distributed an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

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

*Good Housekeeping and Pollution Prevention for Permittee Owned Operations*

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

*Potential structural BMPs*

Any structural BMPs already existing or installed in the regulated area by the permittee or its agents was tracked and the phosphorus removal by the BMP was estimated consistent with Attachment 3 to Appendix F. The BMP type, total area treated by the BMP, the design storage volume of the BMP and the estimated phosphorus removed in mass per year by the BMP were documented.

- The BMP information is attached to the email submission
- The BMP information can be found at the following website:

*Optional:* If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

Street Sweeping - Every road is swept at least twice per year. Main Street Business District is swept at least 3 times per week.

Potential structural BMPs - Town-owned BMPs have been inventoried. Phosphorus loads and removals from existing BMPs have not yet been calculated. These estimates will be performed in conjunction with the development of a Phosphorus Source Identification Plan in Year 4.

*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 Final 2016 Integrated List of Waters wincluded the following new or removed impairments and/or TMDLs in Andover since the NOI was submitted:

- Rogers Brook (MA83-04) covered under existing TMDL for E.Coli (previously only fecal coliform) and turbidity impaired was removed.
- Shawsheen River (MA83-18) covered under existing TMDL for E.Coli (previously only fecal coliform) and mercury in fish tissue impairment removed
- Shawsheen River (MA83-19) covered under existing TMDL for E.Coli (previously only fecal coliform) and DO impairment removed
- Unnamed Tributary to Meadow Brook, known as "Pinnacle Brook" (MA83-15) covered under existing TMDL for E.Coli (previously only fecal coliform)

The Town also updated its list of outfalls and receiving waters as new outfalls were found during the dry weather screening. The inspection results are attached to this annual report and a list and updated prioritization are also kept with the Town's IDDE Plan.

## 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:**

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: Yard Waste**

Message Description and Distribution Method:

Recycling and Trash Guide posted on website, available for pickup at Library, Water Treatment Plant, Town Offices and the Municipal Services Building, and mailed upon request. The Recycle Guide is also handed out with recycle bins for new residents. The Recycling and Trash Guide also contains tips to keep storm drains clean, including no dumping, proper disposal of yard wastes, fertilizer and pesticide use, car washing, and septic tank pumping. A NC Clean Water Education Partnership post with infographics on handling yard waste was reposted on the Town's Facebook page on 7/22/2020. Messages on the Town's leaf collection program were posted on Facebook and Twitter on 10/5/2020, 10/14/2020, and 10/29/2020.

Targeted Audience:

Responsible Department/Parties:

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: Rain Barrels**

Message Description and Distribution Method:

Targeted Audience:

Responsible Department/Parties: DPW

Measurable Goal(s):

Posted on Facebook

Message Date(s): 8/5/2020, 8/8/2020

Message Completed for: Appendix F Requirements  Appendix H Requirements Was this message different than what was proposed in your NOI? Yes  No 

If yes, describe why the change was made:

To raise awareness of runoff and options for keeping it on site.

**BMP: Reduce Water Waste**

Message Description and Distribution Method:

Andover DPW released a message on sprinklers and turning them to spray landscapes instead of hardscapes on Twitter and Facebook on 8/10/2020.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Posted on Twitter and Facebook

Message Date(s): 8/10/2020

Message Completed for: Appendix F Requirements  Appendix H Requirements Was this message different than what was proposed in your NOI? Yes  No 

If yes, describe why the change was made:

To promote conservation of water and raise awareness of where it goes when it hits an impervious surface.

**BMP: Pet Waste Outreach**

Message Description and Distribution Method:

Pet waste literature is distributed with dog license paperwork when issued and made available at the Town Clerk's office for distribution to residents who visit the Town Office to purchase dog licenses. The literature is posted on the Town website. Scoop the poop signage with pet bylaw information is posted at public parks. A 'Scoop the poop' message was posted on the DPW's Facebook feed on 8/19/2020. DPW retweeted a BWSC tweet on the harms of dog waste on 10/16/2020. A reminder that new dog licenses are required was posted on Facebook and Twitter on 1/11/2021 with a link to the Town's by-law and Scoop the Poop flyer. The Scoop the

Poop flyer was again posted on Facebook on 3/4/2021, 3/23/2021, and 6/18/2021.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Continuously available on website; Posted on Social Media

Message Date(s): Continuously available, 8/19/2020, 10/16/2020, 1/11/2021, 3/4/2021, 3/23/2021, 6/18/2021

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: Stormwater Drain Outreach**

Message Description and Distribution Method:

A message on clearing catch basins of leaves and debris with contact information for DPW for potentially clogged storm drains was posted on Facebook and Twitter on 9/29/2020. A message on proper disposal of face masks and other PPE was posted on Facebook and Twitter on 12/10/2020. A message on adopting storm drains was posted on Facebook and Twitter on 12/18/2020. A "Help the Melt" message was tweeted on 12/24/2020.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Posted on Social Media

Message Date(s): Continuously available; 9/29/2020, 12/10/2020, 12/18/2020, 12/24/2020

Message Completed for: Appendix F Requirements  Appendix H Requirements

Was this message different than what was proposed in your NOI? Yes  No

If yes, describe why the change was made:

### **BMP: National Public Works Week**

Message Description and Distribution Method:

A message on National Public Works Week was posted on Facebook on 5/17/2021. The message outlines the

work Public Works performs to help maintain a community's strength by working together to provide an infrastructure of services in transportation, water, wastewater, stormwater management, public parks and grounds, forestry management, vehicle and equipment maintenance, and solid waste services.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Posted on Facebook

Message Date(s): 5/17/2021

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:

To raise awareness of public works duties for maintaining various infrastructure.

### **BMP: Greenscapes Coalition Videos for Residents**

Message Description and Distribution Method:

The Town is a member of the Greenscapes Coalition and contains a link to the Greenscapes website on its Stormwater Management webpage. Greenscapes messages for residents released during this reporting period included two versions of a video titled 'What Not to Flush,' a video titled 'The World Beneath Our Feet' (about grass growth with various fertilizers) a video titled 'Crumpled Watershed Activity' (to demonstrate concept of watershed and what runoff could collect), a video titled 'Groundwater Exploration Activity' (to demonstrate how behaviors on land can affect water quality) , a salt smart video titled 'More Isn't Always Better', a video titled 'Fowl Water' by ThinkBlueMA, a webinar titled 'Pesticides 101', and social media posts on pet waste, proper septic maintenance, sustainable landscaping and yard maintenance, keeping storm drains clear, and salt alternatives

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes Coalition and ThinkBlueMA

Measurable Goal(s):

Reported by Greenscapes:

What Not to Flush (version 1) - 200 views on Vimeo, 1343 people reached on Facebook

What Not to Flush (version 2) - 14 views on Youtube, 15 views on Vimeo

The World Beneath Our Feet - 76 views on Vimeo, 200 people reached on Facebook

Crumpled Watershed Activity - 13 views on Youtube, 18 views on Vimeo

Groundwater Exploration Activity - 106 views on Youtube, 8 views on Vimeo

Salt Smart - 10 people reached on Greenscapes Facebook

Fowl Water Video - 678,448 impressions in Greenscapes region

Reported by Greenscapes:

What Not to Flush (version 1) - posted by Greenscapes on April 21, 2020

What Not to Flush (version 2) - posted by Greenscapes on Youtube November 23, 2020

Message Date(s): The World Beneath Our Feet - posted by Greenscapes on May 26, 2020  
 Crumpled Watershed Activity - posted by Greenscapes on Youtube November 23, 2020  
 Salt Smart - posted on Greenscapes social media Feb. 11, 2021  
 Fowl Water Video - advertisement run from May 17 to June 2, 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: Greenscapes Coalition Messages for Industry**

Message Description and Distribution Method:

The Town is a member of the Greenscapes Coalition and receives their educational messages and newsletters. Distribution of a one page "brochure" designed for industrial audiences that details BMPs for industrial sites, and the importance of keeping waste like salts, heavy metals, oils and other hazardous materials out of our surface waters. the brochure is available on the Greenscapes website and was sent to municipal staff in the Greenscapes newsletter.

Targeted Audience: Industrial facilities

Responsible Department/Parties: Greenscapes Coalition

Measurable Goal(s):

Link to Greenscapes Coalition on Town website.

Message Date(s): Posted on Greenscapes website. Sent to municipal staff October 1, 2020

Message Completed for: Appendix F Requirements  Appendix H Requirements

Was this message different than what was proposed in your NOI? Yes  No

If yes, describe why the change was made:

### **BMP: Greenscapes School Program - Keeping Water Clean**

Message Description and Distribution Method:

Distribution of virtual classroom materials that engage 5th grade students in several activities/experiments designed to raise their stormwater and water conservation awareness. Students learn what a watershed is, what stormwater, groundwater and wastewater are, how they can negatively or positively affect those water systems and how they can become better stewards of their watershed(s). Materials include 3 "chapters" of watershed learning in the form of powerpoints, videos, hands-on experiments, quizzes and more. All materials are available on the Greenscapes website and were shared directly with 5th grade educators throughout the region.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes Coalition

Measurable Goal(s):

Sent to 113 teachers in the Greenscapes region

Message Date(s): Sent to teachers on January 29, 2021 and resent on February 22, 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:

The Keeping Water Clean program is normally conducted in person at individual schools.

### **BMP:Annual Water Quality Report**

Message Description and Distribution Method:

The annual Water Quality Report made available in May 2021 includes the following messages:

- Stormwater management tips on lawn care, recycling, auto care, pet waste
- Water conservation tips on lawn care and gardening

Targeted Audience: Residents, Businesses, institutions and commercial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

Distributed to all water customers.

Message Date(s): May 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:

The annual water report is provided to all Town water customers allowing for wide distribution of various messages geared towards promoting good water quality.

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 on Town website.

Greenscapes provided information to school teachers to incorporate into the classroom as outlined under MCM1.

Watershed Organization Involvement - Conservation Director has partnered with the Shawsheen River Watershed Association (SRWA) and the Shawsheen Greenway/Andover Trails collective, and the Merrimack River Watershed Council. Conservation Director meets with Watershed groups and discusses stormwater concerns. Volunteers from the Shawsheen River Watershed Association and other groups check outfalls into the river and work to pinpoint areas not in compliance. These areas are investigated by the Conservation staff.

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:

Number of SSOs removed:

### 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:

*Below, report on the percent of outfalls/interconnections screened **to date**.*

Percent of outfalls screened:

*Optional: Provide additional information regarding your outfall/interconnection screening:*

Outfall inspections continued into July 2021 this year. To date, the Town attempted to inspect all 865 known stormwater outfalls (includes 1 new outfall located during inspections) and interconnections within the urbanized area during dry weather. Note that some culverts originally mapped as outfalls were also inspected during this time, but are not included in these numbers as they were removed as outfalls through a desktop exercise to differentiate outfalls from culverts. Of the 865 stormwater outfalls and interconnections that were attempted to be inspected, 766 outfalls were located, 12 were determined to not be an outfall (e.g., inlet or culvert not removed through desktop exercise), and 87 could not be found or accessed. Proxy inspections of the closest upgradient structure were performed for 54 of the 87 outfalls that could not be found or accessed. The remaining 33 require another visit when the vegetation is down during Year 4. Flows were found at 145 outfall/proxy structure locations. Results of inspections are attached.

**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:

*Below, report on the percent of catchments investigated **to date**.*

Percent of total catchments investigated:

*Optional:* Provide any additional information for clarity regarding the catchment investigations below:

### **IDDE Progress**

*If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.*

- 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:

Number of illicit discharges removed:

Estimated volume of sewage removed:  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:

Total number of illicit discharges removed:

*Optional:* Provide any additional information for clarity regarding illicit discharges identified, removed, or planned to be removed below:

Outfall discharges that exceeded the Permit requirements for likely sewage input are considered high priority for further investigation.

### **Employee Training**

Describe the frequency and type of employee training conducted **during this reporting period:**

IDDE and SWPPP training was performed on 6/24/2021 and included background information on stormwater pollution, MS4 requirements, illicit discharge program requirements and investigations, general good housekeeping practices, and the SWPPP for the DPW facility. Attendees included members from Highway Department, Engineering Department, Facilities Department, and Water and Sewer Division.

*Below, report on the construction site plan reviews, inspections, and enforcement actions completed **during this reporting period.***

Number of site plan reviews completed:

Number of inspections completed:

Number of enforcement actions taken:

*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:

*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:

N/A, to be completed during Permit Year 4.

#### **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:

N/A, to be completed during Permit Year 4.

**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:

The Town completed an inventory of its permittee-owned properties. Merrimack Valley Planning Commission (MVPC) is working on identifying properties and retrofit opportunities for these facilities. This will be completed in Permit Year 4.

**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:

Number of catch basins cleaned:

Total volume or mass of material removed from all catch basins:

*Below, report on the total number of catch basins in the MS4 system.*

Total number of catch basins:

*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:

Volume of material removed:

Weight of material removed:

**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:

Describe any corrective actions taken at a facility with a SWPPP:

Removed surface debris around catch basin grates.  
  
Three formal written SWPPP inspections were performed in Permit Year 3, however, informal inspections are performed routinely by staff as part of operations when the facility is open.

### **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 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:

### **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:  Title:

Signature:  Date:   
*[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:

EPA NPDES Permit Number:

**Primary MS4 Program Manager Contact Information**

Name:

Title:

Street Address Line 1:

Street Address Line 2:

City:

State:

Zip Code:

Email:

Phone Number:

**Stormwater Management Program (SWMP) Information**

SWMP Location (web address):

Date SWMP was Last Updated:

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>

<b>Impairment(s)</b>			
<input checked="" type="checkbox"/> Bacteria/Pathogens	<input checked="" type="checkbox"/> Chloride	<input type="checkbox"/> Nitrogen	<input checked="" type="checkbox"/> Phosphorus
<input checked="" type="checkbox"/> Solids/ Oil/ Grease (Hydrocarbons)/ Metals			
<b>TMDL(s)</b>			
<i>In State:</i>	<input type="checkbox"/> Assabet River Phosphorus	<input checked="" type="checkbox"/> Bacteria and Pathogen	<input type="checkbox"/> Cape Cod Nitrogen
	<input type="checkbox"/> Charles River Watershed Phosphorus	<input type="checkbox"/> Lake and Pond Phosphorus	
<i>Out of State:</i>	<input type="checkbox"/> Bacteria/Pathogens	<input type="checkbox"/> Metals	<input type="checkbox"/> Nitrogen
			<input type="checkbox"/> Phosphorus
			<b>Clear Impairments and TMDLs</b>

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:

To be determined pending discussions with other departments. Estimated June 30, 2027.

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:

To be determined pending discussions with other departments. Estimated June 30, 2027.

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:

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. 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](https://greenscapes.org/wp-content/uploads/2022/08/MS4-Grant-Report-FINAL_reduced.pdf)

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.

### 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:

**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:*

**Chloride**

- Completed the Salt Reduction Plan due in Year 3, updated if necessary
  - The Salt Reduction Plan is attached to the email submission
  - The Salt Reduction Plan can be found at the following website:

<https://andoverma.gov/306/Stormwater-Management>

Annual Requirements

*Public Education and Outreach*

- Included an annual message in November/ December to private road salt applicators and commercial industrial site owners on the proper storage and application rates of winter deicing material, along with the steps that can be taken to minimize salt use and protect local waterbodies

*Please fill out the following information on salt usage over Year 4 of the permit. Be sure to include units for amount of salt:*

Type(s) of salt applied: Rock salt

7,913 tons

Amount of salt applied: Note: Due to equipment breakdown, some snow and ice events were not tracked via the system. Estimates range from 140-170 tons of salt per treatment event.

*Optional: If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:*

**Phosphorus (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)**

Annual Requirements

*Public Education and Outreach\**

- Distributed an annual message in the spring (April/May) encouraging the proper use and disposal of grass clippings and encouraging the proper use of slow-release and phosphorus-free fertilizers
- Distributed an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- Distributed an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter

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

*Good Housekeeping and Pollution Prevention for Permittee Owned Operations*

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

*Phosphorus Source Identification Report*

- Completed the Phosphorus Source Identification Report
  - The Phosphorus Source Identification Report is attached to the email submission
  - The Phosphorus Source Identification Report can be found at the following website:

<https://andoverma.gov/306/Stormwater-Management>

*Potential structural BMPs*

Any structural BMPs already existing or installed in the regulated area by the permittee or its agents was tracked and the phosphorus removal by the BMP was estimated consistent with Attachment 3 to Appendix F. The BMP type, total area treated by the BMP, the design storage volume of the BMP and the estimated phosphorus removed in mass per year by the BMP were documented.

- The BMP information is attached to the email submission
- The BMP information can be found at the following website:

*Optional:* If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

Street Sweeping - Every road is swept at least twice per year. Main Street Business District is swept at least 3 times per week.

Potential structural BMPs - The Town has been working on updating its inventory and map of Town-owned and private BMPs. Phosphorus loads and removals from existing BMPs have not yet been calculated. These estimates will be performed in conjunction with the update of the Phosphorus Source Identification Plan in Year 5.

**Solids, Oil and Grease (Hydrocarbons), or Metals**

Annual Requirements

*Good Housekeeping and Pollution Prevention for Permittee Owned Operations*

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

The street sweeping schedule is attached to the email submission

The street sweeping schedule can be found at the following website:

<https://andoverma.gov/306/Stormwater-Management>  
The sweeping schedule is included in the appendix of the SWMP.

Prioritized inspection and maintenance for catch basins to ensure that no sump shall be more than 50

percent full; Cleaned catch basins more frequently if inspection and maintenance activities indicated excessive sediment or debris loadings

*Optional:* If you would like to describe progress made on any incomplete requirements listed above or provide any additional details, please use the box below:

Street Sweeping - Every road is swept at least twice per year. Main Street Business District is swept at least 3 times per week. Turbidity impaired watersheds were not observed to accumulate more sediment and debris than other areas within the Town, therefore the current sweeping schedule is deemed adequate.

Catch Basin Cleaning - The Town uses a field app to track catch basins as they are cleaned. Based on these cleaning records, the Town has identified and prioritized several catch basins for more frequent cleaning, which it implements as part of its program.

*Optional:* Use the box below to provide any additional information you would like to share as part of your self-assessment:

[Empty text box for 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:

Changes to Impairments or TMDLs since NOI:

- Merrimack River (MA84A-03): impairment for Fish Passage Barrier\* added in 2018/2020.
- Rogers Brook (MA83-04): TMDL for E. Coli added in 2016; impairment for Turbidity removed in 2016.
- Shawsheen River (MA83-18): TMDL for E. Coli added in 2016; impairment for Mercury in Fish Tissue removed in 2016.
- Shawsheen River (MA83-19): TMDL for E. Coli added in 2016; impairment for Dissolved Oxygen removed in 2016
- Unnamed Tributary (MA83-15): TMDL for E. Coli and impairment for Dewatering\* added in 2016.

\*Impairments that do not require a TMDL

An updated list of outfalls and receiving waters is maintained on the Town's online ArcGIS map and database and included in periodic updates of the Town's IDDE Plan.

### Part IV: Minimum Control Measures

Please fill out all of the metrics below. If applicable, include in the description who completed the task if completed by a third party.

#### MCM1: Public Education

Number of educational messages completed during this reporting period: 12

Below, report on the educational messages completed during this reporting period. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.

**BMP: Elementary School Program - Keeping Water Clean**

Message Description and Distribution Method:

Two-day program at Andover's West Elementary School. 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.

The Greenscapes Guide, a 26 page magazine that covers sustainable landscaping tips, DIY stormwater management for homeowners and more, was distributed at the school program.

Targeted Audience: Residents

Responsible Department/Parties: Greenscapes Coalition

Measurable Goal(s):

- 88 students in Andover
- 10 teachers and parents in Andover
- 3,000 guides distributed throughout the North Shore

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/](http://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):

18,296 impressions on Facebook/Instagram  
27,557 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: Greenscapes Materials & Social Media Pages**

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>. The Greenscapes Coalition also has a number materials directed towards residential, commercial, industrial and developer audiences.

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/>

Andover is a member of the Greenscapes North Shore Coalition and provides a link to the Greenscapes website on the Town website. The Town also provides direct links to several specific Greenscapes materials, including "Greenscapes - About Stormwater", "Greenscapes - Guide to Landscaping", "Greenscapes Rain Garden Brochure", "Greenscapes - Scoop the Poop", "Greenscapes - What goes in the drain", "Greenscapes Industrial Brochure".

Targeted Audience: Residents, Businesses, Industrial, Developers

Responsible Department/Parties: Greenscapes Coalition, Municipal Staff

Measurable Goal(s):

Continuous access to various stormwater materials.

Message Date(s): Continuously available online

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: Yard Waste**

Message Description and Distribution Method:

Recycling and Trash Guide posted on website, available for pickup at Library, Water Treatment Plant, Town Offices and the Municipal Services Building, and mailed upon request. The Recycle Guide is also handed out with recycle bins for new residents. The Recycling and Trash Guide also contains tips to keep storm drains clean, including no dumping, proper disposal of yard wastes, fertilizer and pesticide use, car washing, and septic tank pumping. Tweets on disposal/composting of leaves were posted on 10/18/21 and 11/8/21.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Updated and distributed each fiscal year. Posted on social media.

Message Date(s): 10/18/21, 11/8/21

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 20 - April 23, 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: Pet Waste Outreach**

Message Description and Distribution Method:

Pet waste literature is distributed with dog license paperwork when issued and made available at the Town Clerk's office for distribution to residents who visit the Town Office to purchase dog licenses. The literature is posted on the Town website. Scoop the poop signage with pet bylaw information is posted at various locations throughout Town and included as an insert in printed copies of Andover's Recycling and Trash Guide. Social media posts on picking up pet waste were posted on Twitter and/or Facebook on 9/10/21, 9/24/21, 1/19/22, 3/1/22, 3/23/22, 6/7/22, 6/8/22.

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Continuously available on website; Posted on Social Media.

Message Date(s): Continuously available; social media posts on 9/10/21, 9/24/21, 1/19/22, 3/1/22, 3/23/22, 6/7/22, 6/8/22

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):

Unknown number of materials handed out.

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: Stormwater Drain Outreach**

Message Description and Distribution Method:

A message on clearing catch basins of leaves and debris was posted on Facebook and/or Twitter on 10/25/21, 10/26/21, 11/4/21, 2/3/22. The virtual and printed trash and recycling guide also contains a message to residents to "Help Keep our Storm Drains Clean".

Targeted Audience: Residents

Responsible Department/Parties: DPW

Measurable Goal(s):

Posted on social media.

Message Date(s): 10/25/21, 10/26/21, 11/4/21, 2/3/22

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: Annual Water Quality Report**

Message Description and Distribution Method:

The annual Water Quality Report made available in mid-June 2022 includes the following messages:  
-Stormwater management tips on lawn care, recycling, auto care, pet waste  
-Water conservation tips on lawn care and gardening

Targeted Audience: Residents, Businesses, institutions and commercial facilities

Responsible Department/Parties: DPW

Measurable Goal(s):

Distributed to all water customers.

Message Date(s): 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:

The annual water report is provided to all Town water customers allowing for wide distribution of various messages geared towards promoting good water quality.

**BMP: Miscellaneous Social Media**

Message Description and Distribution Method:

Andover shared a tweet on pesticide pollution on 9/17/21 and a post on Facebook about cigarette butts as a source of pollution and their proper disposal on 9/30/21.

Targeted Audience: Residents, businesses

Responsible Department/Parties: DPW

Measurable Goal(s):

Message Date(s): 9/17/21, 9/30/21

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:

These messages address other common sources of pollution.

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 on Town website.

Greenscapes provided information to school teachers to incorporate into the classroom as outlined under MCM1.

Residents are encouraged to "Pledge to Scoop the Poop" on the Town's website via a form. The pledge can be found at AndoverMA.Gov/Dogs.

Watershed Organization Involvement - Conservation Director has partnered with the Shawsheen River Watershed Association (SRWA) and the Shawsheen Greenway/Andover Trails collective, and the Merrimack River Watershed Council. Conservation Director meets with Watershed groups and discusses stormwater concerns. Volunteers from the Shawsheen River Watershed Association and other groups check outfalls into the river and work to pinpoint areas not in compliance. These areas are investigated by the Conservation staff.

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:

Number of SSOs removed:

#### MS4 System Mapping

*Optional:* Provide additional status information regarding your map:

All map updates are stored in an online ArcGIS platform.

#### 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:

[Empty text box]

Below, report on the number of outfalls/interconnections screened during this reporting period.

Number of outfalls screened: 184

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:

187 potential outfall locations were inspected in Year 4. Of these, outfalls were confirmed to exist at 184 locations, which were screened for dry weather flows either at the outfall or the upgradient structure. Where an outfall could not be located, the upgradient structure was inspected to determine whether the outfall existed and inspected for dry weather flow as a proxy. All known outfalls have been screened.

**Catchment Investigations**

If conducted, please submit all data collected during this reporting period as part of the dry and wet weather investigations. Also include the presence or absence of System Vulnerability Factors for each catchment.

- 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:

[Empty text box]

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:

[Empty text box]

**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:

[Empty text box]

*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:

IDDE and SWPPP training was performed on 6/15/2022 and included background information on stormwater pollution, MS4 requirements, illicit discharge program requirements and investigations, general good housekeeping practices, and the SWPPP for the DPW facility. Attendees included members from the Highway Department and Water and Sewer Division.

**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: 15

Number of inspections completed: 30

Number of enforcement actions taken: 0

*Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:*

[Empty rectangular box]

### MCM5: Post-Construction Stormwater Management in New Development and Redevelopment

#### Ordinance or Regulatory Mechanism

Date update was completed (due in year 3): Stormwater Regulations approved 5/11/21

#### 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:*

[Empty rectangular box for optional information]

#### Retrofit Properties Inventory

Below, list the permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas (at least 5):

1. Andover Water Treatment Plant, 10 Geneva Road
2. Andover Fire Station West, 200 Greenwood Road
3. Andover Police and Fire, 32 North Main Street
4. Bancroft Elementary School, 15 Bancroft Road
5. South Elementary School, 55 Woburn Street
6. Poms Pond Beach, 147-163 Abbot Street
7. Municipal Parking Lot and Old Town Hall Parking Lot, 51 Park Street and 20 Main Street - These parking lots are slated for improvements in 2022 and include the incorporation of a bioretention area to treat some of the runoff from the parking lot.
8. New West Elementary School, 60 Beacon Street - The Town is building a new school on the site to replace the existing school. Stormwater treatment BMPs are incorporated into the new site design.

The full list of properties evaluated and identified for retrofit opportunities is included as an appendix to the Phosphorus Source Identification Plan.

### 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: 1,045

Number of catch basins cleaned: 1,045

Total volume or mass of material removed from all catch basins: 836 tons

Below, report on the total number of catch basins in the MS4 system.

Total number of catch basins: 4,755

If applicable:

Report on the actions taken if a catch basin sump is more than 50% full during two consecutive routine inspections/cleaning events:

These are marked as priority catch basins and slated for more frequent cleaning.

**Street Sweeping**

Report on street sweeping completed during this reporting period using one of the three metrics below.

Number of miles cleaned: 380

Volume of material removed: 2,377 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: 4

Describe any corrective actions taken at a facility with a SWPPP:

None taken.

**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:

## 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:  Title:

Signature:  Date:

*[Signatory may be a duly authorized representative]*