Stormwater Management Program (SWMP) Plan

Town of Barnstable, Massachusetts

Prepared June 30, 2019
Revised June 30, 2022

Prepared For:

Town of Barnstable
367 Main Street
Hyannis, MA 02601

Prepared By:

Comprehensive Environmental Inc.
41 Main Street
Bolton, MA 01740

Stormwater Management Program (SWMP) Plan Revision Log

Revision Date	Section(s) Revised	Revisions Made	Revisions Made by
June 30, 2019	All	Original SWMP Plan prepared.	Comprehensive Environmental Inc
September 26, 2019	All	Minor plan corrections throughout.	Comprehensive Environmental Inc
June 30, 2021	All	SWMP Plan amended to document work completed during Permit Year 2 and Permit Year 3.	Comprehensive Environmental Inc
June 30, 2022	1.5, 2.4, 7.3.4, 7.3.5, 9.0, and appendices	Responsible parties, TMDL and impaired waterbodies/status, regulatory LID, GI, and impervious cover update, municipal BMP retrofit inventory	Comprehensive Environmental Inc.

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Stormwater Management Program (SWMP) Plan Certification

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

Name: _____ Title: _____

Signature: _____ Date: _____

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1 Introduction

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

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

1.1 Regulatory Background

The Stormwater Phase II Final Rule was promulgated in 1999 and was the next step after the 1987 Phase I Rule in 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 permits, to implement programs and practices to control polluted stormwater runoff. Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of stormwater discharges that have the greatest likelihood of causing continued environmental degradation. Under the Phase II rule all MS4s with stormwater discharges from Census designated Urbanized Area are required to seek NPDES permit coverage for those stormwater discharges.

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

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

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

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

1.2 MS4 Program

As required by the 2016 MS4 Permit, the Town of Barnstable submitted a NOI and required accompanying information, including endangered species, historic preservation, and an outfall map to EPA Region 1 by the September 28, 2018 deadline (**Appendix A**) requesting authorization to discharge under the new permit. Barnstable 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 at June 30, 2022.

This Stormwater Management Program Plan has been developed by the Town of Barnstable 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 is 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.

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

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

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

1.3 Regulated Area

Requirements of the 2016 MS4 Permit are limited to a regulated area, defined as the Town's Urbanized 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. 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. **Figure 1-1** shows the UA in the Town of Barnstable which covers the majority of the town limits with the exception of much of the village of West Barnstable at the northwest part of town and the areas surrounding the Three Bays area in Osterville and Cotuit (see **Section 2** for more information on Barnstable's village areas). The UA is subject to change every 10 years based on the application of the Census definition, thus a larger area may be covered in the future.

1.4 How to Use this Plan

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

1. SWMP Plan (this document);
2. Illicit Discharge Detection and Elimination (IDDE) Plan (standalone document);
3. Operation and Maintenance (O&M) Plan (standalone document);
4. Stormwater Pollution Prevention Plan (SWPPP) (standalone document); and
5. Phosphorus Source Identification Report (standalone document).

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.

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

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

Section 8 **MCM 6: Good Housekeeping and Pollution Prevention** – regulated MS4s must review their 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.

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

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

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

1.5 Program Responsibilities

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

Table 1-1. MS4 Responsible Personnel

Name	Title, Department	Contact
Amber Unruh.	Senior Project Manager – Special Projects Department of Public Works	(508) 790-6400 Amber.Unruh@town.barnstable.ma.us

The Town of Barnstable has 10 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

Department / Division	General Responsibilities
Building Department	Information distribution for public education; ordinance and regulation development; site plan review procedures; site inspections and procedures; as-built submittal; target properties to reduce impervious areas and for BMP retrofit; develop operation and maintenance procedures; inventory buildings and facilities; TMDL and water quality limited requirements (nutrients)
Community Services	Information distribution for public education; website management; TMDL and water quality limited requirements (bacteria and nutrients)
Conservation Commission	Information distribution for public education; maintain Mutt Mitt dispensers; website management; public participation; ordinance and regulation development; site plan review procedures; site inspections and procedures; as-built submittal; TMDL and water quality limited requirements (bacteria and nutrients)
Department of Public Works	Information distribution for public education; maintain Mutt Mitt dispensers; website management; public participation; Sanitary Sewer Overflow (SSO) inventory; system mapping; IDDE program creation and implementation; IDDE training; target properties to reduce impervious areas and for BMP retrofit; develop operation and maintenance procedures; inventory buildings and facilities; SWPPP development and implementation; catch basin cleaning and street sweeping; road salt optimization program; BMP inspections and maintenance; TMDL and water quality limited requirements (bacteria and nutrients)
Information Technology	Website management; social media participation; public participation; system mapping
Planning and Development	Information distribution for public education; ordinance and regulation development; site plan review procedures; site inspections and procedures; as-built submittal; target properties to reduce impervious areas and for BMP retrofit; inventory buildings and facilities; TMDL and water quality limited requirements (nutrients)

Table 1-2 (continued). Program Responsibilities

Department / Division	General Responsibilities
Public Health Division	Information distribution for public education; maintain Mutt Mitt dispensers; website management; public participation; SSO inventory; IDDE program creation and implementation; IDDE training; ordinance development; TMDL and water quality limited requirements (bacteria and nutrients)
Recreation Department	Information distribution for public education; maintain Mutt Mitt dispensers; public participation; develop operation and maintenance procedures; inventory buildings and facilities
Regulatory Services	Information distribution for public education; ordinance and regulation development; site plan review procedures; site inspections and procedures; as-built submittal; TMDL and water quality limited requirements (nutrients)
Town Clerk	Information distribution for public education

2 Town Characteristics

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

2.1 Community Information

Barnstable is a coastal community located in Cape Cod, Massachusetts, within Barnstable County. It is the largest community, both in land area and population, on Cape Cod and generally serves as the region's economic and commercial hub, including housing the main regional hospital, superior court, and regional shopping mall. It is generally bordered by Sandwich, Massachusetts to the northwest, Mashpee, Massachusetts to the southwest, and Yarmouth, Massachusetts to the east. The Town is also bordered by the Cape Cod Bay to the north and the Nantucket Sound to the south. Barnstable is also unique, in that the town is comprised of 7 village areas, each with their own characteristics. Village areas include:

- Barnstable and Cummaquid;
- Centerville and Craigville;
- Cotuit;
- Hyannis and Hyannisport;
- Marstons Mills
-
- Osterville; and
- West Barnstable

Select relevant community profile information is provided below:

- Total Area = 76.3 square miles *(source: Wikipedia)*
- 2010 Full-Time Population = 45,121 *(source: EPA maps based on 2010 US Census)*
- 2010 Urbanized Area Population = 43,576 *(source: EPA maps based on 2010 US Census)*
- 2010 Seasonal Population = 120,000 to 150,000 *(source: town estimate)*

2.2 Land Use

The types of land uses within the regulated area of the Town of Barnstable as of 2018 are shown on **Figure 2-1** and provided below.

Impervious area is shown on **Figure 2-2**.

- Commercial 5.1%
- Forest 44.4%
- Industrial 1.3%
- Open Land and Agriculture 3.9%
- Residential 29.1%
- Transportation and Utilities 4.2%
- Wetlands 4.3%
- Water 7.1%

As shown above, Barnstable has substantial forest, open land, and water/wetland area (approximately 60%), with much of the remaining land uses consisting of residential development (approximately 29%). Remaining land use (approximately 11%) consists largely of roadways and commercial/industrial development.

2.3 303(d) Impaired Waterbodies

The ultimate goal of this Stormwater Management Plan is to outline a program to effectively maintain stormwater infrastructure and improve water quality of receiving waters in compliance with the 2016 MS4 Permit. As part of the 2016 MS4 Permit, communities must implement BMPs to address waters with an approved Total Maximum Daily Load (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 4a, 4c, or 5 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 Barnstable must meet MS4 permit requirements based on the Final Massachusetts Integrated List of Waters produced by MassDEP every 2 years[1]. These waterbodies are shown on **Figure 2-3**. Barnstable reviews changes as new lists are published and updates this plan as required.

Table 2-1. Impaired Waters

Waterbody Name	Segment ID and Category		Impairment(s)	Approved TMDL[2]
Barnstable Harbor	MA96-01	4a	Fecal Coliform	36771
Bearse Pond	MA96012	4a	(Fanwort*)	
			Mercury in Fish Tissue	42393
Bumps River	MA96-02	4a	Fecal Coliform	36771
Centerville River	MA96-04	4a	Estuarine Bioassessments	33858
			Fecal Coliform	36771
			Nitrogen (Total)	33858
Cotuit Bay	MA96-63	4a	Fecal Coliform	36582
			Nitrogen (Total)	33988
Halls Creek	MA96-93	4a	Fecal Coliform	42356
Hyannis Inner Harbor	MA96-82	4a	Fecal Coliform	42357
			Nitrogen (Total)	64145
Mill Creek	MA96-37	4a	Fecal Coliform	36771
Mill Creek	MA96-80	4a	Fecal Coliform	42365
			Nitrogen (Total)	64148 & 9
North Bay	MA96-66	4a	Estuarine Bioassessments	33990
			Fecal Coliform	36584
Popponesset Bay	MA96-40	4a	Estuarine Bioassessments	33967-9
Prince Cove	MA96-07	4a	Estuarine Bioassessments	33991-3
			Fecal Coliform	36585
Santuit River	MA96-92	4a	Fecal Coliform	42360
Seapuit River	MA96-64	4a	Fecal Coliform	36583
Shoestring Bay	MA96-08	4a	Estuarine Bioassessments	33966
			Fecal Coliform	36771
Snows Creek	MA96-81	4a	Fecal Coliform	42361
Stewarts Creek	MA96-94	4a	Fecal Coliform	42363
West Bay	MA96-65	4a	Estuarine Bioassessments	33989

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

Table 2-1 (continued). Impaired Waters

Waterbody Name	Segment ID and Category		Impairment(s)	Approved TMDL
Wequaquet Lake	MA96333	4a	(Fanwort*)	
			(Fish Passage Barrier*)	
			Mercury in Fish Tissue	33880
Lake Elizabeth	MA96080	4c	(Fish Passage Barrier*)	
Long Pond	MA96184	4c	(Non-Native Aquatic Plants*)	
Unnamed Tributary	MA96-128	4c	(Fish Passage Barrier*)	
Unnamed Tributary	MA96-132	4c	(Fish Passage Barrier*)	
Centerville Harbor	MA96-03	5	Estuarine Bioassessments	
Hamblin Pond	MA96126	5	Mercury in Fish Tissue	33880
			Oxygen, Dissolved	
			Harmful Algal Blooms	
Hyannis Harbor	MA96-05	5	Estuarine Bioassessments	
Lewis Bay	MA96-36	5	Estuarine Bioassessments	64146 & 7
			Fecal Coliform	36771
			Nitrogen (Total)	
			Nutrient/Eutrophication Biological Indicators	
Little River	MA96-99	5	(Fish Passage Barrier*)	
			Escherichia coli	
Lovells Pond	MA96185	5	(Fish Passage Barrier*)	
			Chlorophyll-a	
			Harmful Algal Blooms	
			Oxygen, Dissolved	
			Phosphorus (Total)	
			Turbidity, Transparency/Clarity	
Maraspin Creek	MA96-06	5	Fecal Coliform	36771
			Nutrient/Eutrophication Biological Indicators	
Middle Pond	MA96198	5	(Curly-leaf Pondweed*)	
			Oxygen, Dissolved	
			Harmful Algal Blooms	
Mystic Lake	MA96218	5	(Non-Native Aquatic Plants*)	
			Oxygen, Dissolved	
Red Lily Pond	MA96257	5	(Aquatic Plants (Macrophytes)*)	
			Fecal Coliform	
			Nutrient/Eutrophication Biological Indicators	
Santuit River	MA96-91	5	(Fish Passage Barrier*)	
			Temperature	
Unnamed Tributary	MA96-100	5	Escherichia coli	

Category 4a Waters – impaired waters with a completed TMDL.
Category 4c Waters – impaired waters where the impairment is not caused by a pollutant. No TMDL required.
Category 5 Waters – impaired waters that require a TMDL.
*TMDL not required (Non-pollutant)

Note that although Barnstable has several waterbodies with an approved TMDL for mercury in fish tissue, the 2016 MS4 Permit does not specify a wasteload allocation or other requirements for MS4 discharges. Remaining requirements for TMDL or water quality limited waterbodies related to nitrogen, phosphorus, bacteria, and turbidity are outlined further in Section 9.

2.4 Measures to Protect Surface Drinking Water Supplies

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

2.5 Endangered Species Act Determination

In order to be eligible to discharge stormwater under the 2016 MS4 Permit, the Town of Barnstable 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 and met "Criterion B" on the Notice of Intent with the results documented in **Appendix A**. The Northern Long-eared Bat *(Myotis septentrionalis),* Piping Plover *(Charadrius melodus),* Red Knot *(Calidris canutus rufa),* Roseate Tern *(Sterna dougallii dougallii),* and Sandplain Gerardia *(Agalinis acuta)* were the only species identified as potentially being present within Barnstable's regulated area. No critical habitats were identified.

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

3.1 Summary of Permit Requirements

3.1.1 Core Permit Requirements

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

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

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

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

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

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

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

3.1.2 TMDL & Impaired Waters Requirements

Public education and outreach programs must also address impaired waterbodies or those identified as priority waters. As noted in **Table 2-1**, Barnstable has a substantial number of waterbodies throughout the community that are listed as impaired for bacteria, nitrogen, and estuarine bioassessments due to nitrogen loading which are considered high priority. Barnstable also has an additional waterbody listed as impaired for phosphorous. Therefore, relevant public information on nitrogen, phosphorus, and bacteria topics as outlined in the 2016 MS4 Permit, and summarized below, are included within the education program.

Nitrogen and Phosphorus TMDL and Water Quality Limited Waterbody Requirements (Residents & Businesses)

- Spring (April-May): proper disposal of grass clippings and fertilizer usage, such as slow-release and phosphorus-free;
- Summer (June-July): proper management of pet waste; and
- Fall (August-October): proper disposal of leaf litter.

Bacteria TMDL and Water Quality Limited Waterbody Requirements (Residents)

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

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

3.2 Objectives and Goals

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

3.3 Public Education Program

Tables 3-1 through **3-4** summarize Barnstable's public education program, by targeted audience, 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**.

3.4 Measuring Public Education Program Effectiveness

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

Table 3-1. Residential Public Outreach (BMP 1-1)

Topics	Materials	Distribution	Measurable Goal/ Effectiveness	Schedule	Responsible Department									
					Town Clerk	Recreation Dept.	DPW	Public Health Div.	Community Svcs.	Cons. Com.	Info. Technology	Building Dept.	Regulatory Svcs.	Planning & Dev.
Pet waste management	Brochure / fact sheet	With dog licenses	Track number distributed	With dog licenses / renewals	x	x	x	x	x					
	Mutt Mitt dispensers	Public areas frequented by dog walkers	Track amount of waste collected	Continually available		x	x	x		x				
Roof & yard maintenance	Brochure / fact sheet / pamphlet and poster board	Display in 2 public buildings	Track number distributed	Continually available			x	x	x					
• Pet waste management • Lawn care • Leaf litter • On-site infiltration • Auto & car washing • Swimming pool water disposal • Septic system maintenance	Flyers / bookmarks developed in conjunction with the Cape Cod Commission Project Storm Team	Select public events	Track number distributed	Once per year			x		x	x				
	Relevant information & links for viewing and/or download from Town webpage	Website	Track number of hits to website	Continually available, update as needed			x	x	x	x	x			
Stormwater topics covered by "ThinkBlue" campaign	Relevant stormwater information via various social media platforms, as well as through the town blog	Social media & town blog	Track number of followers	Continually available							x			

Table 3-2. Businesses, Institutions, & Commercial Public Outreach (BMP 1-2)

Topics	Materials	Distribution	Measurable Goal/ Effectiveness	Schedule	Responsible Department									
					Town Clerk	Recreation Dept.	DPW	Public Health Div.	Community Svcs.	Cons. Com.	Info. Technology	Building Dept.	Regulatory Svcs.	Planning & Dev.
• Pet waste management • Lawn maintenance • Leaf litter • On-site infiltration • Building maintenance & storage of materials • Salt use & storage • Waste & dumpster management • Parking lot management • Car care activities • Swimming pool water disposal	Relevant information & links for viewing and/or download from Town webpage	Website	Track number of hits to website	Continually available, update as needed			x	x	x	x	x			
Stormwater topics covered by "ThinkBlue" campaign	Relevant stormwater information via various social media platforms, as well as through town blog	Social media & town blog	Track number of followers	Continually available							x			

Table 3-3. Developers and Construction Public Outreach (BMP 1-3)

Topics	Materials	Distribution	Measurable Goal/ Effectiveness	Schedule	Responsible Party									
					Town Clerk	Recreation Dept.	DPW	Public Health Div.	Community Svcs.	Cons. Com.	Info. Technology	Building Dept.	Regulatory Svcs.	Planning & Dev.
• Erosion & sediment control • LID • EPA's CGP	Brochure/fact sheet	Distribute with permit applications	Track number of applications	Continually with new permit applications					x	x		x	x	x
	Relevant information & links for viewing and/or download from Town webpage	Website	Track number of hits	Continually available, update as needed			x	x	x	x	x			
Stormwater topics covered by "ThinkBlue" campaign	Provide relevant stormwater information via various social media platforms, as well as through the Town blog	Social media & town blog	Track number of followers	Continually available							x			

Table 3-4. Industrial Public Outreach (BMP 1-4)

Topics	Materials	Distribution	Measurable Goal/ Effectiveness	Schedule	Responsible Party									
					Town Clerk	Recreation Dept.	DPW	Public Health Div.	Community Svcs.	Cons. Com.	Info. Technology	Building Dept.	Regulatory Svcs.	Planning & Dev.
• Equipment inspection & maintenance • Storage & management of materials & dumpsters • Waste management & disposal • Salt use & storage • Parking lot maintenance • EPA's CGP	Relevant information & links for viewing and/or download from Town webpage	Website	Track number of hits	Continually available, update as needed			x	x	x	x	x			
Stormwater topics covered by "ThinkBlue" campaign	Provide relevant stormwater information via various social media platforms, as well as through the Town blog	Social media & town blog	Track number of followers	Continually available							x			

4 MCM 2: Public Participation and Involvement

4.1 Summary of Permit Requirements

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

4.2 Objectives and Goals

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

4.3 Public Participation and Involvement Opportunities

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 is posted to the website as additional tasks are completed.

Table 4-1 summarizes Barnstable's 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 Summary

BMP ID#	BMP Description	Responsible Parties	Measurable Goal
2-1	Make SWMP Plan and Annual Reports Publicly Available	Information Technology, Department of Public Works	Annual review of stormwater management plan and posting on website. Allow public to comment on the plan at least annually. Track number of website hits.
2-2	Sponsor Household Hazardous Waste Event	Public Health Division, Department of Public Works	Continue to allow public to drop off household hazardous waste up to 4 times per year in conjunction with the Cape Cod Cooperative Extension as budget allows.

Table 4-1 (continued). Public Participation and Involvement Summary

BMP ID#	BMP Description	Responsible Parties	Measurable Goal
2-3	Hold Shoreline / Waterbody Cleanup Events	Conservation Commission, Recreation Department, Department of Public Works	Allow annual participation in an annual COASTSWEEP cleanup event of beaches and Town landings. Track number of events and/or amount of trash removed.
2-4	Solicit public involvement through the Water Resources Advisory Committee (WRAC)	Department of Public Works	Continue to promote involvement in the WRAC to improve water quality throughout Town.
2-5	Continue involvement in the Massachusetts Estuary Program (MEP)	Department of Public Works, Public Health Division	Continue to promote good water quality through meetings and periodic sampling under the MEP. Track number of meetings and sampling events held.

5 MCM 3: Illicit Discharge, Detection, and Elimination

5.1 Summary of Permit Requirements

Under MCM 3, permittees must implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its MS4 and implement procedures to prevent such discharges. 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 Barnstable, 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 2 phases. Phase 1 must be completed within 2 years and include infrastructure such as outfalls and preliminary catchment delineations, waterbodies, open channel conveyances, interconnections with other MS4s, and structural stormwater BMPs. Phase 2 must be completed within 10 years and include information such as outfalls with high accuracy GPS location and refined catchment delineations, catch basins, manholes, pipe connectivity, and sanitary or combined sewer systems as available/applicable.

- **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

written IDDE Program must be prepared as 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 shall, at a minimum, include information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program.

5.2 Objectives and Goals

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

5.3 IDDE Program

Barnstable has conducted multiple activities to identify illicit discharges. A separate written IDDE plan is available and outlines legal authority, program responsibilities, ranks catchment areas, and outlines procedures for investigation and removal in accordance with the permit. This written plan is updated and refined as needed to incorporate findings of field investigations. The following sections outlines Barnstable's IDDE program to meet the requirements of the 2016 MS4 Permit.

5.3.1 Establish Legal Authority

The Town of Barnstable will establish a new or amended ordinance to:

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

The Town is currently reviewing a sample ordinance and determining changes that must be made to suit the Town. Ongoing progress on legal authority is documented in **Appendix B**.

5.3.2 Complete System Mapping

The Town has mapped much of its stormwater system and c. Current mapping status is provided in **Appendix C**. All information is incorporated into its GIS library and where applicable, GIS information can be exported into other formats. Where applicable, GIS information can be exported into other formats, such as Microsoft Excel, for use with annual reporting or tracking. The Town will continue to update its stormwater mapping by the required deadlines to include the above information.

5.3.3 Complete Sanitary Sewer Overflow Inventory

The Town of Barnstable completed an inventory of SSOs that have discharged to the MS4 within the 5 years prior to submitting the Year 1 Annual Report to EPA. The inventory is also included in the IDDE Plan, including the status of mitigation and corrective measures to address each identified SSO. The inventory is updated annually to as part of the Town's annual report submittal to EPA in September of each year.

5.3.4 Develop and Implement Written IDDE Program

Barnstable has developed a written IDDE Plan as a separate standalone document to address the illicit discharge requirements of the 2016 MS4 Permit. This includes dry and wet weather screening on Town outfalls, including those with SVFs where applicable and address select requirements of bacteria-impaired TMDL and water quality limited waterbody requirements. Ongoing screening will also be performed after the conclusion of the initial sampling rounds. Barnstable is working towards implementing a comprehensive IDDE Plan and program, according to the schedule set forth in the permit.

5.3.5 Perform Dry and Wet Weather Outfall Screening

Barnstable developed an outfall sampling program under the IDDE Plan which is being implemented moving forward according to the schedule outlined in the 2016 MS4 Permit. This includes dry and wet weather screening on Town outfalls, including those with SVFs where applicable. Ongoing screening will also be performed after the conclusion of the initial sampling rounds.

5.3.6 Perform Annual IDDE Training

The 2016 MS4 Permit requires annual IDDE training to be provided to all employees involved in the IDDE program. Barnstable provides annual training that at a minimum includes information on how to identify illicit discharges and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. Frequency and type(s) of training is included in the annual report.

5.4 IDDE Program Summary

The following table outlines Barnstable's IDDE program to meet permit requirements. Measurable goals, responsible departments and a schedule for implementation of all BMPs under the SWMP are provided in **Section 11**.

Table 5-1. IDDE Program Summary

BMP ID#	BMP Description	Responsible Parties	Measurable Goal
3-1	Enact and Enforce IDDE Ordinance	Department of Public Works, Public Health Division	Regulatory mechanism in place within 1 year of the permit effective date.
3-2	Phase I Storm Sewer System Map	Information Technology - GIS, Department of Public Works	Complete preliminary system map within 2 years of effective date of permit
3-3	Phase II Storm Sewer System Map	Information Technology - GIS, Department of Public Works	Complete full system map 10 years after effective date of permit
3-4	Complete SSO Inventory	Department of Public Works, Public Health Division	Develop SSO inventory and complete within 1 year of effective date of permit
3-5	Written IDDE Program	Department of Public Works, Public Health Division	Create written IDDE program within 1 year of the effective date of the permit and update periodically
3-6	Outfall Inventory and Ranking	Department of Public Works, Public Health Division	Classify and rank outfalls and interconnections within 1 year of the effective date of the permit.
3-7	Implement IDDE Program	Department of Public Works, Public Health Division	Implement catchment investigations and complete within 10 years of the effective date of the permit
3-8	Dry Weather Screening	Department of Public Works, Public Health Division	Complete in accordance with outfall screening procedure within 3 years of the effective permit date
3-9	Wet Weather Screening	Department of Public Works, Public Health Division	Complete in accordance with outfall screening procedure within 10 years of the effective permit date
3-10	Ongoing Screening	Department of Public Works, Public Health Division	Conduct ongoing dry and wet weather outfall screening upon completion of the IDDE program
3-11	Perform IDDE Training	Department of Public Works, Public Health Division	Complete annual training

5.5 Measuring IDDE Program Effectiveness

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

- Storm system mapping progress;

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

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

6 MCM 4: Construction Site Stormwater Runoff Control

6.1 Summary of Permit Requirements

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

- **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 Barnstable, 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 includes 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;
    - Site inspections and enforcement actions to take place both during construction of BMPs and after construction of BMPs; and
    - Requirements for construction site to implement a sediment and erosion control program that includes BMPs appropriate for the conditions at the construction site.

6.2 Objectives and Goals

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

6.3 Construction Site Stormwater Runoff Control Program

The following sections outlines Barnstable's Construction Site Stormwater Runoff Control program is meeting the requirements of the 2016 MS4 Permit.

6.3.1 Establish Legal Authority

The Town will establish a new or amended ordinance to require the use of sediment and erosion control practices at construction sites and include controls for other wastes on construction sites. Barnstable is currently reviewing a sample ordinance and determining changes that must be made to suit the Town. Ongoing progress on legal authority is documented in **Appendix B**.

6.3.2 Establish Written Procedures for Site Plan Review

The Town of Barnstable requires site plan review as part of its Site Plan Review and Subdivision regulations, however regulations do not cover all development regulated under the MS4 program. The Town will reassess its current regulations for compliance with the 2016 MS4 Permit and make changes as required, including establishing written procedures for pre-construction plan review of the site design, planned operations, planned BMPs during construction, and planned BMPs to manage runoff after development that:

- Address potential water quality impacts;
- Consider information submitted by the public;
- Evaluate of opportunities for use of LID and green infrastructure (GI); and
- Track the number of site reviews for annual reporting.

6.3.3 Establish Procedures for Site Inspections and Enforcement

The Town of Barnstable's subdivision regulations require site inspections; however, this does not apply for all development regulated under the MS4 program and does not have formal written procedures. The Town will reassess its current inspection process for compliance with the 2016 MS4 Permit and make changes as required, including development of written procedures for site inspections and enforcement actions to take place both during construction of BMPs and after construction of BMPs is completed to ensure they are working as described in the approved plans. Procedures will define the following:

- Who is responsible and necessary qualifications for performing site inspections;
- Who has authority to implement enforcement procedures;
- Ability to impose sanctions to ensure program compliance;
- Use of standardized inspection forms (if appropriate); and
- How to track the number inspections and enforcement actions for reporting.

6.3.4 Establish a Sediment and Erosion Control Program

The Town will develop a sediment and erosion control program to regulate construction site operators performing land disturbance activities within the MS4 jurisdiction that result in stormwater discharges to the MS4. This will include implementing a sediment and erosion control program that includes BMPs appropriate for the conditions at the construction site.

6.4 Construction Site Stormwater Runoff Control Program Summary

The following table outlines Barnstable's Construction Site Stormwater Runoff Control program to meet permit requirements. Measurable goals, responsible departments and a schedule for implementation of all BMPs under the SWMP are provided in **Section 11**.

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

BMP ID#	BMP Description	Responsible Parties	Measurable Goal
4-1	Develop and Enforce Construction Ordinance	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Complete ordinance within 1 year of the effective date of the permit
4-2	Develop Written Procedures for Site Plan Review	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Establish procedures for site plan review within 1 year of the effective date of the permit
4-3	Develop Written Procedures for Site Inspections and Enforcement	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Establish procedures for site inspections and enforcement within 1 year of the effective date of the permit
4-4	Establish a Sediment and Erosion Control Program	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Establish procedures for development of an erosion and sediment control program within 1 year of the effective date of the permit
4-5	Develop Procedures for Waste Control	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Establish requirements to control construction site wastes within 1 year of the effective date of the permit

7 MCM 5: Stormwater Management in New Development and Redevelopment

7.1 Summary of Permit Requirements

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

- **Legal Authority –** The Post Construction Stormwater Management Program shall include adequate legal authority in the form of a currently effective ordinance, bylaw, or other regulatory mechanism to:
    - Require LID site planning and design strategies;
    - Meet many of the requirements of the Massachusetts Stormwater Handbook and associated stormwater standards;
    - Incorporate runoff volume storage and/or pollutant removal requirements; and
    - Meet additional requirements for TMDL and water quality limited waterbodies.

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

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

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

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

- **Inventory of Potential Retrofit Sites –** The permittee must complete an inventory of municipal properties with significant impervious cover within 4 years of the effective permit date to determine at least 5 properties that could be modified or retrofitted with stormwater BMP improvements. As BMPs are constructed, the inventory should be updated so that it always contains at least 5 sites in the inventory

for potential improvement.

7.2 Objectives and Goals

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

7.3 Post-Construction Stormwater Management Program

The following sections outlines Barnstable's Post-Construction Stormwater Management Program to meet the requirements of the 2016 MS4 Permit.

7.3.1 Establish Legal Authority

The Town will establish a new or amended ordinance to require provisions that are as least as stringent as the following:

1. Use LID site planning and design strategies unless in feasible;
2. Stormwater management system designs shall be consistent with, or more stringent than, the requirements of the 2008 Massachusetts Stormwater Handbook, as amended;
3. Stormwater management systems on new development shall be designed to meet an average annual pollutant removal equivalent to 90% of the average annual load of Total Suspended Solids (TSS) related to the total post-construction impervious area on the site AND 60% of the average annual load of Total Phosphorus related to the total postconstruction impervious surface area on the site as calculated based on the average annual loading and not on the basis of any individual storm event.
    a) Average annual pollutant removal requirements are achieved through one of the following methods:
        1) Installing BMPs that meet the pollutant removal percentages based on calculations developed consistent with EPA Region 1's BMP Accounting and Tracking Tool (2016) or other BMP performance evaluation tool provided by EPA Region 1, where available. If EPA Region 1 tools do not address the planned or installed BMP performance, then any federally or State-approved BMP design guidance or performance standards (e.g., State stormwater handbooks and design guidance manuals) may be used to calculate BMP performance; or
        2) Retaining the volume of runoff equivalent to, or greater than, one inch multiplied by the total post-construction impervious surface area on the new development site; or
        3) Meeting a combination of retention and treatment that achieves the above standards; or
        4) Utilizing offsite mitigation that meets the above standards within the same USGS HUC12 as the new development site.

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

Additionally, the ordinance must include requirements for stormwater structural BMPs proposed as part of new or redevelopment to be optimized as follows in order to meet TMDL and water quality limited waterbodies requirements:

- For nitrogen removal for development within the watershed draining to nitrogen-impaired waterbodies; and
- For phosphorus removal for development within the Lovells Pond watershed.

See **Section 9** for more information.

Barnstable is currently reviewing a sample ordinance and determining changes that must be made to suit the Town. Ongoing progress on legal authority is documented in **Appendix B**.

7.3.2 Require Submittal of As-Built Plans

The Town of Barnstable currently requires final submittal of subdivision as-built plans that include depicting storm drain facilities, however does not specifically call for the depiction of non-structural stormwater controls or a timeframe for submittal. The Town will review and update its program to comply with the 2016 MS4 Permit and make changes to require the submission of as-built drawings that include structural and non-structural stormwater controls as required.

7.3.3 Require Long Term Operation and Maintenance

As part of its Post Construction Stormwater Management Program, the Town of Barnstable will develop procedures to ensure that the adequate long-term operation and maintenance of BMPs is accounted for at the conclusion of a construction project, along with a dedicated funding source, within 3 years of the effective permit date.

7.3.4 Complete Regulatory Assessment

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

7.3.5 Complete Inventory of Potential BMP Retrofit Sites

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

7.4 Stormwater Management in New and Redevelopment Program Summary

The following table outlines Barnstable's Stormwater Management in New Development and Redevelopment program to meet permit requirements. Measurable goals, responsible departments and a schedule for implementation of all BMPs under the SWMP are provided in **Section 11**.

Table 7-1. Stormwater Management in New and Redevelopment Program Summary

BMP ID#	BMP Description	Responsible Parties	Measurable Goal
5-1	Develop Post-Construction Ordinance	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Complete ordinance within 3 years of the effective date of the permit
5-2	Require Stormwater As-Built Plan Submittal	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Require submittal of as-built plans for completed projects within 3 years of completion
5-3	Require Long Term Operation and Maintenance	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Require submittal of operation and maintenance plans and dedicated funding to ensure long term maintenance within 3 years of the effective date of the permit
5-4	Allow green infrastructure	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Complete regulatory updates within 4 years of the effective date of the permit
5-5	Street design and parking lot guidelines	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Complete regulatory updates within 4 years of the effective date of the permit
5-6	Target properties to reduce impervious areas	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Complete inventory within 4 years of the effective date of the permit and update annually on retrofitted properties

8 MCM 6: Good Housekeeping and Pollution Prevention

8.1 Summary of Permit Requirements

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

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

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

8.2 Objectives and Goals

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

8.3 Good Housekeeping and Pollution Prevention Program

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

8.3.1 Complete Facilities O&M Procedures

The Town of Barnstable completed an inventory of all parks and open space, buildings and facilities where pollutants are exposed to stormwater runoff, including those coming from vehicles and equipment, within 2 years of the permit effective date. The inventory must be reviewed annually and updated as necessary. Upon completion, the Town then established

written procedures as part of an Operation and Maintenance Plan within 2 years of the permit effective date for the following items:

Parks and Open Space

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

Buildings and Facilities

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

Vehicles and Equipment

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

The Town has prepared a comprehensive written O&M Plan, a standalone document separate from this SWMP Plan, that meets the above requirements. This document also includes the inventory of relevant Town-owned properties. In addition, the Town's O&M Plan established requirements for use of slow release fertilizers on permittee owned properties and establish procedures to manage grass cuttings and leaf litter on permittee property within areas of town draining to the nitrogen-impaired waterbodies. This plan also established requirements for use of slow release and phosphorus-free fertilizers on permittee owned properties and establish procedures to manage grass cuttings and leaf litter on permittee property within areas of town draining to the Lovells Pond watershed, a waterbody impaired for phosphorus.

8.3.2 Complete Infrastructure O&M Procedures

The Town of Barnstable has established written procedures as part of an Operation and Maintenance Plan to ensure that MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4 in accordance with the following:

Street Sweeping Prioritization Plan (**Appendix F**)

- Sweeping all streets and Town-owed parking lots, with the exception of rural uncurbed roads with no catch basins or high-speed limited access highways at least 1 per year in the spring following winter sanding events;
- More frequent sweeping of targeted areas based on inspections, land use, or known water quality impacts;
- Increasing street sweeping frequency of all municipal owned streets and parking lots to a minimum of 2 times per year; once in the spring (following winter activities such as sanding) and at least once in the fall (Sept 1 – Dec 1; following leaf fall) for areas within the nitrogen and phosphorus-impaired watersheds; and
- For rural uncurbed roadways with no catch basins or limited access highways, either an evaluation to meet the minimum frequencies above or development and implementation of an inspection, documentation, and targeted sweeping plan within 2 years of the effective date and submitted with the Year 1 annual report.

Catch Basin Optimization Plan (**Appendix G**)

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

Catch Basin and Street Sweeping Residuals Management

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

Winter Operation and Maintenance

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

8.3.3 Stormwater Pollution Prevention Plans

The permittee must establish written Stormwater Pollution Prevention Plans for the following permittee-owned or operated facilities: maintenance garages, public works yards, transfer stations, and other waste handling facilities where pollutants are exposed to stormwater as determined by the permittee. The Town of Barnstable determined that its DPW Facility required preparation of a SWPPP; thus, one was prepared by the end of Year 2. The SWPPP complies with the following permit requirements:

- 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.

The Barnstable DPW Facility SWPPP should be updated when there is a significant change in design, construction, operation, or maintenance of the Barnstable DPW Facility that affects the discharge or potential discharge of pollutants. This plan is made available in hardcopy at the Barnstable DPW Facility to members of federal, state, or local agencies during normal working hours for review upon request. Copies of the plan are accessible to all persons responsible for implementing and administering it.

In addition, an exemption memo was also prepared for the Barnstable Transfer Station and Mosswood Cemetery Storage Area as they do not discharge to Waters of the United States or the Town's MS4. The exemption memo is provided in **Appendix H**.

8.3.4 Structural Stormwater BMP Inspections

The Town of Barnstable completed an inventory (**Appendix I**) of known structural stormwater BMPs within the Town's regulated area. The Town also developed inspection and maintenance procedures for the various types of BMPs located within the Town's regulated area. BMP inspection Standard Operating Procedures (SOPs) and logs for BMP inspection and maintenance are provided in the standalone O&M Plan. Stormwater BMPs are inspected annually, with results documented in **Appendix I**.

8.4 Good Housekeeping and Pollution Prevention Program Summary

The following table outlines Barnstable's Good Housekeeping and Pollution Prevention program to meet permit requirements. Measurable goals, responsible departments and a schedule for implementation of all BMPs under the SWMP are provided in **Section 11**.

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

BMP ID#	BMP Description	Responsible Parties	Measurable Goal
6-1	Inventory MS4 properties	Department of Public Works, Recreation Department, Building Department, Planning and Development	Complete inventory of open spaces, buildings and facilities, and vehicles and equipment within 2 years of the effective date of the permit
6-2	Establish Facilities Operation and Maintenance Procedures	Department of Public Works, Recreation Department, Building Department	Create written O&M Plan for open spaces, buildings and facilities, and vehicles and equipment within 2 years of the effective date of the permit
6-3	Establish Infrastructure O&M Procedures	Department of Public Works	Create written O&M Plan for stormwater infrastructure within 2 years of the effective date of the permit
6-4	Perform Catch Basin Cleaning	Department of Public Works	Clean catch basins on established schedule and report number of catch basins cleaned and volume of material moved annually
6-5	Perform Street Sweeping	Department of Public Works	Sweep all streets and parking lots at least annually and sweep all streets within nitrogen and phosphorus-impaired waterbody watersheds twice per year.
6-6	Develop road salt optimization program	Department of Public Works	Implement salt use optimization during winter maintenance operations
6-7	Assess regulated facilities to determine SWPPP eligibility	Department of Public Works	Complete facilities assessment within 2 years of the effective date of permit.
6-8	Develop SWPPPs for applicable facilities	Department of Public Works	Complete and implement within 2 years of the effective date of the permit
6-9	Establish BMP O&M Procedures	Department of Public Works	Create written O&M Plan for stormwater BMPs within 2 years of the effective date of the permit
6-10	Inspect and maintain stormwater BMPs	Department of Public Works	Inspect and maintain treatment structures annually

9 TMDL and Impaired Waters Controls

9.1 Permit Requirements

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

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

Table 9-1. TMDL and Impaired Waters Requirements

Waterbody Name (Applicable TMDL)	Impairment	2016 Permit Requirements
Barnstable Harbor (*Cape Cod*) Bumps River (*Cape Cod*) Centerville River (*Cape Cod*) Cotuit Bay (*Three Bays*) Halls Creek (*Cape Cod addendum*) Hyannis Inner Harbor (*Cape Cod addendum*) Lewis Bay (*Cape Cod*) Maraspin Creek (*Cape Cod*) Mill Creek (*Cape Cod and Cape Cod addendum*) North Bay (*Three Bays*) Prince Cove (*Three Bays*) Santuit River (*Cape Cod addendum*) Seapuit River (*Three Bays*) Shoestring Bay (*Cape Cod*) Snows Creek (*Cape Cod addendum*) Stewarts Creek (*Cape Cod addendum*)	Fecal Coliform	Appendix F, Part A.III
Centerville River (*Centerville River, East Bay*) Cotuit Bay (*Tree Bays*) Hyannis Inner Harbor (*Lewis Bay & Halls Creek*) Mill Creek (*Lewis Bay & Halls Creek*)	Nitrogen	Appendix F, Part A.IV
Lewis Bay (*Lewis Bay & Halls Creek*) North Bay (*Tree Bays*) Popponesset Bay (*Popponesset Bay*) Prince Cove (*Tree Bays*) Shoestring Bay (*Popponesset Bay*) West Bay (*Tree Bays*)	Estuarine Bioassessment (Nitrogen)	Appendix F, Part A.IV

Table 9-1 (continued). TMDL and Impaired Waters Requirements

Waterbody Names (Applicable TMDL)	Impairment	2016 Permit Requirements
Centerville Harbor (*N/A*) Hyannis Harbor (*N/A*) Lewis Bay (*N/A*) Maraspin Creek (*N/A*) Red Lily Pond (*N/A*)	Estuarine Bioassessments or Nutrient/ Eutrophication Biological Indicators (Nitrogen)	Appendix H, Part I
Lovells Pond (*N/A*)	Phosphorus	Appendix H, Part II
Red Lily Pond (*N/A*) Little River (*N/A*) Unnamed Tributary (*N/A*)	Fecal Coliform, Escherichia coli	Appendix H, Part III
Lovells Pond (*N/A*)	Turbidity, Transparency/ Clarity	Appendix H, Part V

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

9.2 Discharges to Approved TMDL Waterbodies

Approved TMDLs are those that have been approved by EPA as of the effective date of the permit, or July 1, 2018. As shown in **Table 9-1**, the Town of Barnstable currently has multiple waterbodies with an approved TMDL for fecal coliform and nitrogen. The Town is required to implement the following requirements as outlined in Appendix F of the 2016 MS4 Permit.

9.2.1 Fecal Coliform TMDL Requirements

The Town of Barnstable currently has a number of waterbodies as outlined in **Table 9-1** with an approved TMDL for fecal coliform. The Town is required to implement the following requirements as outlined under Appendix F, Part III of the 2016 Permit:

- **Public Education** – supplement its Residential program with an annual message encouraging the proper management of pet waste and disseminate educational materials to dog owners at the time of issuance or renewal of a dog license. 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 Barnstable's IDDE Plan.

9.2.2 Cape Cod Nitrogen TMDL Requirements

The Town of Barnstable currently has a number of waterbodies as outlined in **Table 9-1** that are subject to the Cape Cod nitrogen TMDL. The Town is required to implement the following requirements as outlined under Appendix F, Part A.IV of the 2016 Permit:

- **Public Education** – supplement its Residential and Business/Commercial/Institution programs with additional annual messages as follows:
  - Spring (April-May): Proper use and disposal of grass clippings and use of slow-release 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 ordinance requirements to also mandate the use of stormwater BMPs optimized for nitrogen removal as part of new development and redevelopment projects. Additionally, retrofit opportunities must also consider the potential to reduce nitrogen discharges for properties within nitrogen-impaired waterbody watersheds.

- **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.

9.3 Discharges to Water Quality Limited Waterbodies

Water quality limited waterbodies are those that have been listed on the most recent approved Massachusetts Integrated List of Waters. For Barnstable, existing water quality limited waterbodies listed in **Table 9-1** must adhere to the requirements in Appendix H of the 2016 MS4 Permit. The following sections describe those additional requirements. The Town reviews the most recent approved list of impaired waters as it is released and outline any additional requirements associated with the most recent list.

9.3.1 Nitrogen Water Quality Limited Waterbody Requirements

The Town of Barnstable currently has a number of waterbodies as outlined in **Table 9-1** that are subject to the nitrogen water quality limited waterbody requirements for discharges. The Town is required to implement the following requirements as outlined under Appendix H, Part I of the 2016 Permit:

- **Public Education** – supplement its Residential and Business/Commercial/Institution programs with additional annual messages as follows:
    - Spring (April-May): Proper use and disposal of grass clippings and use of slow-release 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 ordinance requirements to also mandate the use of stormwater BMPs optimized for nitrogen removal as part of new development and redevelopment projects.

- **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 Barnstable is required to prepare a Nitrogen Source Identification Report that generally does the following by the end of Year 4:

- Identifies, delineates, and prioritizes areas of town at the catchment-level that have the highest nitrogen loading potential based on land use and other factors;
- Accounts for the urbanized area that discharges to the Red Lily Pond 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.

Upon completion of the Nitrogen Source Identification Report, the Town will evaluate all properties identified under the report or using the procedures identified under **Section 7.3.5** to complete a site-specific evaluation addressing the following:

- Identifies the next planned redevelopment activity or planned retrofit date;
- Determines an estimated cost of redevelopment or retrofit BMPs; and
- Determines the engineering and regulatory feasibility BMP installation.

Upon completion, the Town should provide a list of planned structural BMPs, along with a plan and schedule for implementation by the end of Year 5. At least 1 BMP must be designed and constructed as a demonstration project by the end of Year 6 that targets a catchment with a high nitrogen load potential. Remaining structural BMPs must be constructed according to the provided plan and schedule. Nitrogen removals must be tracked and reported annually.

It is assumed that all waterbodies currently listed as impaired for total nitrogen or estuarine bioassessments will eventually be covered under the Cape Cod Nitrogen TMDL or similar document. As currently written, this document largely identifies wastewater as the primary cause of nitrogen pollution rather than stormwater and exempts communities from completing the Nitrogen Source Identification Report, as well as the accompanying BMP evaluation and construction of a stormwater demonstration BMP. Thus, the Town is not currently planning on completing these requirements. Remaining items outlined above as required are being completed according to the schedule outlined in the permit.

9.3.2 Phosphorus Water Quality Limited Waterbody Requirements

The Town of Barnstable is also subject to the phosphorus water quality limited waterbody requirements for discharges to Lovells Pond. The Town is required to implement the following requirements as outlined under Appendix H, Part II of the 2016 Permit:

- **Public Education** – supplement its Residential and Business/Commercial/Institution 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 ordinance 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 Lovells Pond 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 Barnstable prepared a Phosphorus Source Identification Report that generally does the following, completed by the end of Year 4:

- 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 to the Lovells Pond watershed;
- Determines impervious area based on catchment delineations;
- Accounts for any screening results performed under MCM 3 when developing conclusions; and
- Identify potential retrofit opportunities for installing structural BMPs during redevelopment.

Upon completion of the Phosphorus Source Identification Report, the Town will evaluate all properties identified under the report or using the procedures identified under **Section 7.3.5** to complete a site-specific evaluation addressing the following:

- Identifies the next planned redevelopment activity or planned retrofit date;
- Determines an estimated cost of redevelopment or retrofit BMPs; and
- Determines the engineering and regulatory feasibility BMP installation.

Upon completion, 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 1 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.

9.3.3 Fecal Coliform and E. coli Water Quality Limited Waterbodies Requirements

The Town of Barnstable currently has a number of waterbodies as outlined in **Table 9-1** that are subject to the fecal coliform and E. coli water quality limited waterbody requirements for discharges. The Town is required to implement the following requirements as outlined under Appendix H, Part III of the 2016 Permit:

- **Public Education** – supplement its Residential program with an annual message encouraging the proper management of pet waste and disseminate educational materials to dog owners at the time of issuance or renewal of a dog license. 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 Barnstable's IDDE Plan.

9.3.4 Turbidity Water Quality Limited Waterbodies Requirements

The Town of Barnstable has 1 water quality limited waterbody, Lovells Pond, listed as impaired for turbidity, transparency/clarity. The Town must implement the following requirements as outlined under Appendix H, Part V of the 2016 Permit:

- **Stormwater Management in New Development and Redevelopment** – Stormwater management 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.

- **Good Housekeeping and Pollution Prevention** – increase street sweeping frequency of all municipal streets and parking lots 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 will be addressed as part of the regulatory and other program updates once completed. The Town of Barnstable has addressed street sweeping requirements under **Section 8.2.2**. The catch basin cleaning program is ongoing as outlined under **Section 8.2.2**.

9.4 TMDL and Impaired Waters Controls Program Summary

The following table outlines Barnstable's TMDL and Impaired Waters Controls program to meet permit requirements.

Table 9-2. TMDL and Impaired Waters Controls Program Summary

BMP ID#	BMP Description	Responsible Parties	Measurable Goal
TMDL Requirements			
7-1	Fecal Coliform	Department of Public Works, Public Health Department, Community Services, Conservation Commission	Adhere to requirements in part A.III of Appendix F
7-2	Cape Cod Nitrogen	Building Department, Planning and Development, Regulatory Services, Department of Public Works, Public Health Department, Community Services, Conservation Commission	Adhere to requirements in part A.IV of Appendix F
Water Quality Limited Waterbody Requirements			
7-3	Nitrogen	Building Department, Planning and Development, Regulatory Services, Department of Public Works, Public Health Department, Community Services, Conservation Commission	N/A
7-4	Phosphorus	Building Department, Planning and Development, Regulatory Services, Department of Public Works, Public Health Department, Community Services, Conservation Commission	Adhere to requirements in Part II of Appendix H
7-5	Fecal Coliform	Department of Public Works, Information Technology, Town Clerk, Planning Board, Conservation Commission, Building Department	Adhere to requirements in part III of Appendix H

10 Annual Reporting

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

- A self-assessment review of compliance with the permit terms and conditions.
- An assessment of the appropriateness of the selected BMPs.
- The status of any plans or activities, including:
    - Identification of all discharges determined to be causing or contributing to an exceedance of water quality standards and description of response;
    - For discharges subject to TMDL or water quality limited waterbody requirements, identification of BMPs used to address the impairment and assessment of the BMPs effectiveness;
    - For discharges to water quality limited waters a description of each BMP and any deliverables required.
- An assessment of the progress towards achieving the measurable goals and objectives of each of the 6 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 Barnstable's Best Management Practices Plan as outlined in the Town's NOI (**Appendix A**) is summarized in **Table 11-1**. For consistency with the 6 MCMs and impaired water requirements, the BMPs are broken down into 7 categories:

1. Public Education and Outreach;
2. Public 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 also performs the following activities throughout the duration of the permit:

1. **Program Evaluation** – conduct annual evaluations of the Stormwater Management Program for compliance with permit conditions. The evaluation must include a determination of the appropriateness of the selected BMPs in efforts towards achieving the measurable goals outlined in **Table 11-1**.

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

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

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

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
						Year / Schedule						
						1	2	3	4	5	6	
BMP ID	**BMP Description**	**Implementation**	**Responsible Dept./Person**	**Measurable Goal**	**Report Section**	**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**	
1. Public Education and Outreach												
1-1	**Residential Education Program**	1. Distribute flyers and bookmarks developed in conjunction with the Cape Cod Commission Project Storm Team.	Department of Public Works, Conservation Commission, Community Services	Continue to make information available at select public events. Track number distributed.	3.3; Table 3-1	*	*	*	*	*	*	
		2. Provide fact sheets on pet waste management with all dog registrations and renewals.	Town Clerk, Recreation Department, Department of Public Works, Public Health Division, Community Services	Provide information with all applications and renewals. Track number distributed.		*	*	*	*	*	*	
		3. Distribute flyers on roof and yard maintenance, such as the "Get Your Mind in the gutter" program.	Department of Public Works, Public Health Division, Community Services	Continue to make informational flyers available. Provide download links and develop poster boards for use at public locations. Track number distributed.		*	*	*	*	*	*	
		4. Provide "Mutt Mitt" dispensers and refills at public areas frequented by dog walkers to encourage pet waste pickup.	Recreation Department, Department of Public Works, Public Health Division, Conservation Commission	Continue to maintain Mutt Mitt dispensers at certain public areas. Track amount of waste collected.		*	*	*	*	*	*	
		5. Provide comprehensive stormwater information on the Town's website, including on septic system maintenance, illicit discharges, pet waste disposal, lawn care, pesticide and fertilizer use, grass clippings and leaf litter disposal, car washing, and use of environment- ally friendly products.	Information Technology, Community Services, Department of Public Works, Public Health Division, Conservation Commission	Continue to update and maintain the websites. Track number of hits to website.			*	*	*	*	*	
		6. Provide relevant stormwater information to different audiences via social media.	Information Technology	Follow statewide "Think Blue" campaign on social media platforms. Track number of followers			*	*	*	*	*	
1-2	**Businesses, Institutions, and Commercial Education Program**	1. Provide comprehensive stormwater information on the Town's website, including effects of outdoor activities such as lawn care on water quality; 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.	Information Technology, Community Services, Department of Public Works, Public Health Division, Conservation Commission	Continue to update and maintain the websites. Track number of hits.	3.3; Table 3-2		*	*	*	*	*	
		2. Provide relevant stormwater information to different audiences via social media.	Information Technology	Follow statewide "Think Blue" campaign on social media platforms. Track number of followers			*	*	*	*	*	

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
BMP ID	BMP Description	Implementation	Responsible Dept./Person	Measurable Goal	Report Section	Year / Schedule						
						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	
1-3	Developer and Construction Education Program	1. Distribute erosion control fact sheets to developers with building permit applications	Building Department, Regulatory Services, Planning and Development, Conservation Commission, Community Services	Distribute with all permit applications	3.3; Table 3-3		*	*	*	*	*	
		2. Provide comprehensive stormwater information on the Town's website, including 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).	Information Technology, Community Services, Department of Public Works, Public Health Division, Conservation Commission	Continue to update and maintain the websites. Track number of hits.			*	*	*	*	*	
		3. Provide relevant stormwater information to different audiences via social media.	Information Technology	Follow statewide "Think Blue" campaign on social media platforms. Track number of followers			*	*	*	*	*	
1-4	Industrial Education Program	1. Provide comprehensive stormwater information on the Town's website, including equipment inspection and maintenance; proper storage of industrial materials; proper management and disposal of wastes; proper management of dumpsters; minimization of use and 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; and information about EPA's CGP.	Information Technology, Community Services, Department of Public Works, Public Health Division, Conservation Commission	Continue to update and maintain the websites. Track number of hits.	3.3; Table 3-4		*	*	*	*	*	
		2. Provide relevant stormwater information to different audiences via social media.	Information Technology	Follow statewide "Think Blue" campaign on social media platforms. Track number of followers			*	*	*	*	*	

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
BMP ID	BMP Description	Implementation	Responsible Dept./Person	Measurable Goal	Report Section	Year / Schedule						
						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	
2. Public Participation and Involvement												
2-1	**Make SWMP Publicly Available**	1. Post SWMP Plan on Town website, along with contact name, email address and/or phone number of a Town official for more information or to submit comments.	Information Technology, Department of Public Works	Annual review of stormwater management plan and posting on website. Allow public to comment on the plan at least annually	4.4; Table 4-1	*	*	*	*	*	*	
2-2	**Sponsor Household Hazardous Waste Event**	1. Hold at least four household hazardous waste collection events a year in conjunction with the Cape Cod Cooperative Extension.	Public Health Division, Department of Public Works	Continue to allow public drop-off of household hazardous waste for proper disposal		*	*	*	*	*	*	
2-3	**Hold Shoreline / Waterbody Improvement Events**	1. Organize and support annual COASTSWEEP volunteer cleanup of freshwater and marine Town shorelines	Conservation Commission, Recreation Department, Department of Public Works	Allow annual participation in COASTSWEEP cleanup event		*	*	*	*	*	*	
2-4	**Solicit Public Involvement through the Water Resources Advisory Committee**	1. Promote Water Resources Advisory Committee (WRAC) involvement to improve water quality throughout the town.	Department of Public Works	Continue to solicit public involvement in the WRAC		*	*	*	*	*	*	
2-5	**Continue involvement in the Massachusetts Estuary Program**	1. Continue to take part in the Massachusetts Estuary Program (MEP) and promote good water quality through meetings and periodic volunteer water sampling.	Department of Public Works, Public Health Division	Continue to promote good water quality through periodic meetings and sampling for MEP		*	*	*	*	*	*	

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
						Year / Schedule						
						1	2	3	4	5	6	
BMP ID	**BMP Description**	**Implementation**	**Responsible Dept./Person**	**Measurable Goal**	**Report Section**	**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**	
3. Illicit Discharge Detection and Elimination												
3-1	**Enact and Enforce IDDE Bylaw**	1. Establish a legal authority to enact and enforce IDDE bylaw.	Department of Public Works, Public Health Division	Regulatory mechanism in place within 1 year of permit effective date	5.3.1	*	*	*	*	*	*	
3-2	**Phase I Storm Sewer System Map**	1. Delineate catchment areas based on topography for each MS4 outfall and map in GIS.	Information Technology - GIS, Department of Public Works	Updated map within 2 years of effective date of permit	5.3.2	*						
		2. Update outfalls, conveyances receiving waters, interconnections, MS4-owned BMPs & initial catchment delineations.				*	*					
3-3	**Phase II Storm Sewer System Map**	1. Update outfall spatial location, pipes, manholes, catch basins, refined catchment delineations as new information becomes available.	Information Technology - GIS, Department of Public Works	Updated map within 10 years of effective date of permit	5.3.2	*	*	*	*	*	*	
3-4	**Sanitary Sewer Overflow Inventory**	1. Complete an inventory of Sanitary Sewer Overflows (SSOs) that have discharged to the MS4 within the previous 5 years and update annually.	Department of Public Works, Public Health Division	Develop SSO inventory and complete within 1 year of effective date of permit and update annually	5.3.3	*	*	*	*	*	*	
3-5	**Written IDDE Program Development**	1. Prepare written IDDE Plan to include procedures on assessing and priority ranking outfalls and interconnections, dry and wet weather outfall sampling, catchment investigations, system vulnerability factor assessment, identification of an illicit discharge, illicit discharge removal, and ongoing screening requirements.	Department of Public Works, Public Health Division	Complete within 1 year of the effective date of permit and update as required	5.3.4	*						
3-6	**Outfall / Interconnection Inventory & Ranking**	1. Develop an outfall and interconnection inventory that identifies each outfall and interconnection discharging from the MS4, records its location and condition and provides a framework for tracking inspections, screenings and other activities under the IDDE program.	Department of Public Works, Public Health Division	Identification of outfalls and initial ranking by July 1, 2019	5.4	*						
		2. Classify/rank outfalls. Initial ranking by end of Year 1. Update ranking annually with new information.				*	*	*	*	*	*	
3-7	**Implement IDDE Program**	1. Inspect key catchment structures (manholes, catch basins) during dry weather conditions. Where flowing water is observed, collect samples for analysis.	Department of Public Works, Public Health Division	Implement catchment investigations according to program and permit conditions (Problem Outfalls by July 1, 2025, all outfalls by July 1, 2028)	5.3.4		*	*	*	*	*	
		2. Inspect key catchment structures (manholes, catch basins) in all catchments during dry weather conditions. Where flowing water is observed, collect samples for analysis.					*	*	*	*	*	
3-8	**Conduct Dry Weather Screening**	1. Inspect drainage outfalls classified as High or Low priority during dry weather.	Department of Public Works, Public Health Division	Complete in accordance with outfall screening procedure and permit conditions by July 1, 2021	5.3.4	*	*	*				
		2. Investigate potential illicit discharges, if any.				*	*	*	*	*	*	
		3. Enforce removal of illicit discharges, if any.				*	*	*	*	*	*	
3-9	**Conduct Wet Weather Screening**	1. 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.	Department of Public Works, Public Health Division	Complete in accordance with outfall screening procedure within 10 years of the effective permit date	5.3.4						*	
3-10	**Ongoing Screening**	1. Upon completion of catchment investigations, reprioritize outfalls for ongoing screening.	Department of Public Works, Public Health Division	Conduct ongoing dry and wet weather outfall screening upon completion of the IDDE program	5.3.4						*	
		2. Continue performing dry and wet weather sampling according to the new prioritization at least once every 5 years.									*	
3-11	**Employee Training**	1. Provide annual training to employees involved in the IDDE program.	Department of Public Works, Public Health Division	Train applicable employees annually	5.3.5	*	*	*	*	*	*	

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities											
						Year / Schedule					
						1	2	3	4	5	6
BMP ID	**BMP Description**	**Implementation**	**Responsible Dept./Person**	**Measurable Goal**	**Report Section**	**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**
4. Construction Site Stormwater Runoff Control											
4-1	**Develop and Enforce Construction Bylaw**	1. Establish a legal authority to enact and enforce a Construction Site Stormwater Runoff Control Bylaw.	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Complete bylaw within 1 year of the effective date of the permit	6.3.1	*					
4-2	**Develop Written Procedures for Site Plan Review**	1. Review and update existing requirements mandating site plan review and make changes as needed, such as incorporating additional information submitted by the public.	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Establish procedures for site plan review within 1 year of the effective date of the permit	6.3.2	*					
4-3	**Develop Written Procedures for Site Inspections and Enforcement**	1. Review and update existing requirements mandating site inspections, enforcement, and requirements for submittal of monthly inspection reports as needed	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Establish procedures for site inspections and enforcement within 1 year of the effective date of the permit	6.3.3	*					
4-4	**Establish a Sediment and Erosion Control Program**	1. Develop an Erosion and Sediment Control Program for construction sites.	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Establish procedures for development of an erosion and sediment control program within 1 year of the effective date of the permit	6.3.4	*					
4-5	**Develop Procedures for Waste Control**	1. Establish requirements to control construction site wastes within 1 year of the effective date of the permit	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Establish requirements to control construction site wastes within 1 year of the effective date of the permit	6.4	*					

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
						Year / Schedule						
						1	2	3	4	5	6	
BMP ID	**BMP Description**	**Implementation**	**Responsible Dept./Person**	**Measurable Goal**	**Report Section**	**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**	
5. Stormwater Management in New Development and Redevelopment												
5-1	**Enact and Enforce Post-Construction Bylaw**	1. Establish a legal authority to enact and enforce a post-construction bylaw, and incorporate specific design requirements outlined in the final permit regarding new development and redevelopment tied to the Massachusetts Stormwater Handbook. Include a requirement that stormwater management BMPs that ultimately discharge to a nitrogen or phosphorus impaired water body be optimized for nitrogen or phosphorus removal.	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Complete bylaw within 2 years of the effective date of the permit	7.3.1	*	*					
5-2	**Require Stormwater As-Built Plan Submittal**	1. Review existing as-built submittal requirements and make changes as necessary to require submittal of structural and nonstructural stormwater controls on as-built drawings.	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Require submittal of as-built plans for completed projects within 2 years of completion	7.3.2	*	*					
5-3	**Require Long Term Operation and Maintenance**	1. Review existing Stormwater Management for Discharges to Municipal Stormwater System bylaw and make changes as necessary to require long term operation and maintenance, such as addressing funding sources.	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Require submittal of operation and maintenance plans to ensure long term maintenance within 1 year of the effective date of the permit	7.3.3	*	*					
5-4	**Street Design and Parking Lot Guidelines**	1. 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. 2. Prepare a report assessing whether existing street and parking lot design regulations allow for incorporation of LID practices and recommendations for changes.	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Complete regulatory updates within 4 years of the effective date of the permit	7.3.4		*	*	 *			
5-5	**Allow Green Infrastructure**	1. Review existing by-laws, regulations and guidance to determine the feasibility of making green practices allowable. 2. Prepare a report assessing existing local regulations to determine the feasibility of allowing green roofs, infiltration practices, and water harvesting devices.	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Complete regulatory updates within 4 years of the effective date of the permit	7.3.4		*	*	 *			
5-6	**Identify 5 MS4-owned Properties for Potential Retrofits**	1. Identify 5 properties for potential retrofits to stormwater impacts, as well as nitrogen and phosphorus impacts to the Hyannis Inner Harbor and Lovells Pond, respectively. 2. Track and report annually properties that have been modified or retrofitted with BMPs.	Building Department, Planning and Development, Conservation Commission, Regulatory Services	Complete inventory within 4 years of the effective date of the permit and update annually on retrofitted properties	7.3.5				 *	 *	 *	

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
						Year / Schedule						
						1	2	3	4	5	6	
BMP ID	**BMP Description**	**Implementation**	**Responsible Dept./Person**	**Measurable Goal**	**Report Section**	**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**	
6. Good Housekeeping and Pollution Prevention												
6-1	**Inventory MS4 Properties**	1. Inventory all permittee-owned parks and open spaces, building and facilities (including storm drains), and vehicles and equipment in the regulated area.	Department of Public Works, Recreation Department, Building Department, Planning and Development	Complete inventory of open spaces, buildings and facilities, and vehicles and equipment within 2 years of the effective date of the permit	8.3.1		*					
6-2	**Establish Facilities Operation and Maintenance Procedures**	1. Evaluate practices at MS4 properties (parks and open spaces, building and facilities, vehicles and equipment) and develop written Facilities O&M Plan.	Department of Public Works, Recreation Department, Building Department	Create written O&M Plan for open spaces, buildings and facilities, and vehicles and equipment within 2 years of the effective date of the permit	8.3.1		*					
		2. Distribute written O&M/SOPs as part of employee training.					*					
		3. Update inventory annually					*	*	*	*	*	
		4. Ensure all vehicle maintenance and washing is performed indoors.				*	*	*	*	*	*	
6-3	**Establish Infrastructure O&M Procedures**	1. Develop written O&M procedures or SOPs for the storm drain system, roadways and existing Town-owned BMPs (e.g., catch basin cleaning, street sweeping, winter road maintenance, stormwater BMPs).	Department of Public Works	Create written O&M Plan for stormwater system within 2 years of the permit effective date.	8.3.2		*					
		2. Distribute written O&M/SOPs as part of employee training.					*					
6-4	**Perform Catch Basin Cleaning**	1. Establish a cleaning schedule and maintain catch basins so that they remain less than 50% full of sediment.	Department of Public Works	Clean catch basins on established schedule and report number of catch basins cleaned and volume of material moved annually	8.3.2	As Needed						
		2. Properly manage storage of catch basin residuals.				*	*	*	*	*	*	
6-5	**Perform Street Sweeping**	1. Sweep streets once a year in spring and twice a year where drainage is to nitrogen impaired water.	Department of Public Works	Sweep all streets and parking lots at least annually and sweep all streets within the Mount Hope Bay watershed twice per	8.3.2	*	*	*	*	*	*	
		2. Properly manage storage of street sweeping residuals.										
6-6	**Develop Road Salt Optimization Program**	1. Establish and implement procedures for proper winter road maintenance, including use and storage of salt and sand, and procedures to minimize the use of road salt.	Department of Public Works	Implement salt use optimization during winter maintenance operations	8.3.2	*						
6-7	**Assess Regulated Facilities to Determine SWPPP Eligibility**	1. 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.	Department of Public Works	Document whether a SWPPP is needed and where required.	8.3.3		*					
6-8	**Develop SWPPPs for Applicable Facilities**	1. 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. Complete SWPPP or document No Exposure as applicable.	Department of Public Works	Document whether a SWPPP is needed and where required, prepare SWPPP by July 1, 2020.	8.3.3		*					
6-9	**Establish BMP O&M Procedures**	1. Establish written inspection and maintenance procedures and frequencies for inspection of all structural stormwater BMPs.	Department of Public Works	Create written O&M Plan for stormwater BMPs within 2 years of the effective date of the permit	8.3.4		*					
6-10	**Inspect and Maintain Stormwater BMPs**	1. Annually inspect MS4-owned stormwater treatment BMPs. Document inspections and maintenance performed.	Department of Public Works	Inspect and maintain treatment structures annually	8.3.4		*	*	*	*	*	

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
						Year / Schedule						
						1	2	3	4	5	6	
BMP ID	**BMP Description**	**Implementation**	**Responsible Dept./Person**	**Measurable Goal**	**Report Section**	**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**	
7. TMDL and Impaired Waters Controls												
7-1	**Discharges to Approved TMDL Waterbodies - Bacteria (see Table 9-1)**	1. Enhanced BMPs - Public Education. Include management of pet waste and septic system maintenance with the Residential public education program.	Department of Public Works, Public Health Department, Community Services, Conservation Commission	Distribute materials with Residential education program.	9.2.1	*	*	*	*	*	*	
		2. Enhanced BMPs - Illicit Discharge, Detection, and Elimination. Designate catchment draining to bacteria/pathogen impaired segments as "Problem Catchments" or "High" priority catchments in IDDE ranking.		Complete initial ranking within 1 year of the effective date of the permit		*						
7-2	**Discharges to Approved TMDL Waterbodies - Nitrogen (see Table 9-1)**	1. Enhanced BMPs - Public Education. Include fertilizer use, disposal of grass clippings and leaf litter, and pet waste management with the Residential and Commercial public education programs.	Building Department, Planning and Development, Regulatory Services, Department of Public Works, Public Health Department, Community Services, Conservation Commission	Distribute materials with Residential education program.	9.2.2	*	*	*	*	*	*	
		2. Enhanced BMPs - Stormwater Management in New Development and Redevelopment. Include a requirement in the regulatory mechanism that new development and redevelopment stormwater management BMPs be optimized for nitrogen removal.		Complete bylaw updates within 2 years of the effective date of the permit		*	*					
		3. Enhanced BMPs - Consider BMPs to reduce nitrogen discharges when identifying MS4 properties for retrofits.		Evaluate stormwater BMPs for nitrogen removal during facility inventory within 2 years of the effective date of the permit		*	*					
		4. Enhanced BMPs - Good Housekeeping and Pollution Prevention. Incorporate nitrogen reduction practices into Town good housekeeping practices such as fertilizer use and managing grass cuttings and leaf litter.		Create written O&M Plan for open spaces, buildings and facilities, and vehicles and equipment within 2 years of the effective date of the permit			*					
		5. Enhanced BMPs - Good Housekeeping and Pollution Prevention. Increase street sweeping to twice per year (spring and fall) for catchment areas that discharge to nitrogen-impaired waters.		Sweep streets and parking lots twice per year.		*	*	*	*	*	*	

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
						Year / Schedule						
						1	2	3	4	5	6	
BMP ID	**BMP Description**	**Implementation**	**Responsible Dept./Person**	**Measurable Goal**	**Report Section**	**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**	
7-3	**Discharges to Water Quality Limited Waterbodies - Nitrogen (Red Lily Pond)**	1. Enhanced BMPs - Public Education. Include fertilizer use, disposal of grass clippings and leaf litter, and pet waste management with the Residential and Commercial public education programs.	Building Department, Planning and Development, Regulatory Services, Department of Public Works, Public Health Department, Community Services, Conservation Commission	Distribute materials with Residential and Commercial education programs.	9.3.1	*	*	*	*	*	*	
		2. Enhanced BMPs - Stormwater Management in New Development and Redevelopment. Include a requirement in the regulatory mechanism that new development and redevelopment stormwater management BMPs be optimized for nitrogen removal.		Complete bylaw updates within 2 years of the effective date of the permit		*	*					
		3. Enhanced BMPs - Consider BMPs to reduce nitrogen discharges when identifying MS4 properties for retrofits.		Evaluate stormwater BMPs for nitrogen removal during facility inventory within 2 years of the effective date of the permit		*	*					
		4. Enhanced BMPs - Good Housekeeping and Pollution Prevention. Incorporate nitrogen reduction practices into Town good housekeeping practices such as fertilizer use and managing grass cuttings and leaf litter.		Create written O&M Plan for open spaces, buildings and facilities, and vehicles and equipment within 2 years of the effective date of the permit			*					
		5. Enhanced BMPs - Good Housekeeping and Pollution Prevention. Increase street sweeping to twice per year (spring and fall) for catchment areas that discharge to nitrogen impaired waters.		Sweep streets and parking lots twice per year.		*	*	*	*	*	*	
		6. Prepare a Nitrogen Source Identification Report to identify, delineate, and prioritize catchments with high nitrogen loading and identify potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment.		Complete Nitrogen Source Identification Report within 4 years of the effective date of the permit.				*	*			
		7. Evaluate municipal properties for potential BMPs to construct one that will treat nitrogen, determine estimated costs, and determines engineering and regulatory feasibility.		Evaluate municipal facilities within 5 years of the permit effective date to determine candidates for a nitrogen BMP.						*	*	
		8. Design and install a demonstration BMP to treat nitrogen from stormwater runoff.		Installed demonstration BMP within 6 years of the effective date of the permit.						*	*	
		9. Track BMPs installed, including type, total area treated, design storage volume and estimated nitrogen removal and report annually to EPA and MassDEP.		Summary progress table.							*	

Table 11-1. Proposed BMP Plan - Implementation of Phase II Activities												
						Year / Schedule						
						1	2	3	4	5	6	
BMP ID	**BMP Description**	**Implementation**	**Responsible Dept./Person**	**Measurable Goal**	**Report Section**	**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**	
7-4	**Discharges to Water Quality Limited Waterbodies - Phosphorus (Lovells Pond)**	1. Enhanced BMPs - Public Education. Include fertilizer use, disposal of grass clippings and leaf litter, and pet waste management with the Residential and Commercial public education programs.	Building Department, Planning and Development, Regulatory Services, Department of Public Works, Public Health Department, Community Services, Conservation Commission	Distribute materials with Residential and Commercial education programs.	9.3.2	*	*	*	*	*	*	
		2. Enhanced BMPs - Stormwater Management in New Development and Redevelopment. Include a requirement in the regulatory mechanism that new development and redevelopment stormwater management BMPs be optimized for phosphorus removal.		Complete bylaw updates within 2 years of the effective date of the permit		*	*					
		3. Enhanced BMPs - Consider BMPs to reduce phosphorus discharges when identifying MS4 properties for retrofits.		Evaluate stormwater BMPs for phosphorus removal during facility inventory within 2 years of the effective date of the permit		*	*					
		4. Enhanced BMPs - Good Housekeeping and Pollution Prevention. Incorporate nitrogen reduction practices into City good housekeeping practices such as fertilizer use and managing grass cuttings and leaf litter.		Create written O&M Plan for open spaces, buildings and facilities, and vehicles and equipment within 2 years of the effective date of the permit			*					
		5. Enhanced BMPs - Good Housekeeping and Pollution Prevention. Increase street sweeping to twice per year (spring and fall) for catchment areas that discharge to nitrogen or phosphorus impaired waters.		Sweep streets and parking lots twice per year.		*	*	*	*	*	*	
		6. Prepare a Phosphorus Source Identification Report to identify, delineate, and prioritize catchments with high phosphorus loading and identify potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment.		Complete Phosphorus Source Identification Report within 4 years of the effective date of the permit.				*	*			
		7. Evaluate municipal properties for potential BMPs to construct one that will treat phosphorus, determine estimated costs, and determines engineering and regulatory feasibility.		Evaluate municipal facilities within 5 years of the permit effective date to determine candidates for a phosphorus BMP.						*	*	
		8. Design and install a demonstration BMP to treat phosphorus from stormwater runoff.		Installed demonstration BMP within 6 years of the effective date of the permit.						*	*	
		9. Track BMPs installed, including type, total area treated, design storage volume and estimated phosphorus removal and report annually to EPA and MassDEP.		Summary progress table.							*	
7-5	**Discharges to Water Quality Limited Waterbodies - Bacteria (Red Lily Pond)**	1. Enhanced BMPs - Public Education. Include management of pet waste and septic system maintenance with the Residential public education program.	Department of Public Works, Information Technology, Town Clerk, Planning Board, Conservation Commission, Building Department	Distribute materials with Residential education program.	9.3.3	*	*	*	*	*	*	
		2. Enhanced BMPs - Illicit Discharge, Detection, and Elimination. Designate catchment draining to bacteria/pathogen impaired segments as "Problem Catchments" or "High" priority catchments in IDDE ranking.		Complete initial ranking within 1 year of the effective date of the permit		*						

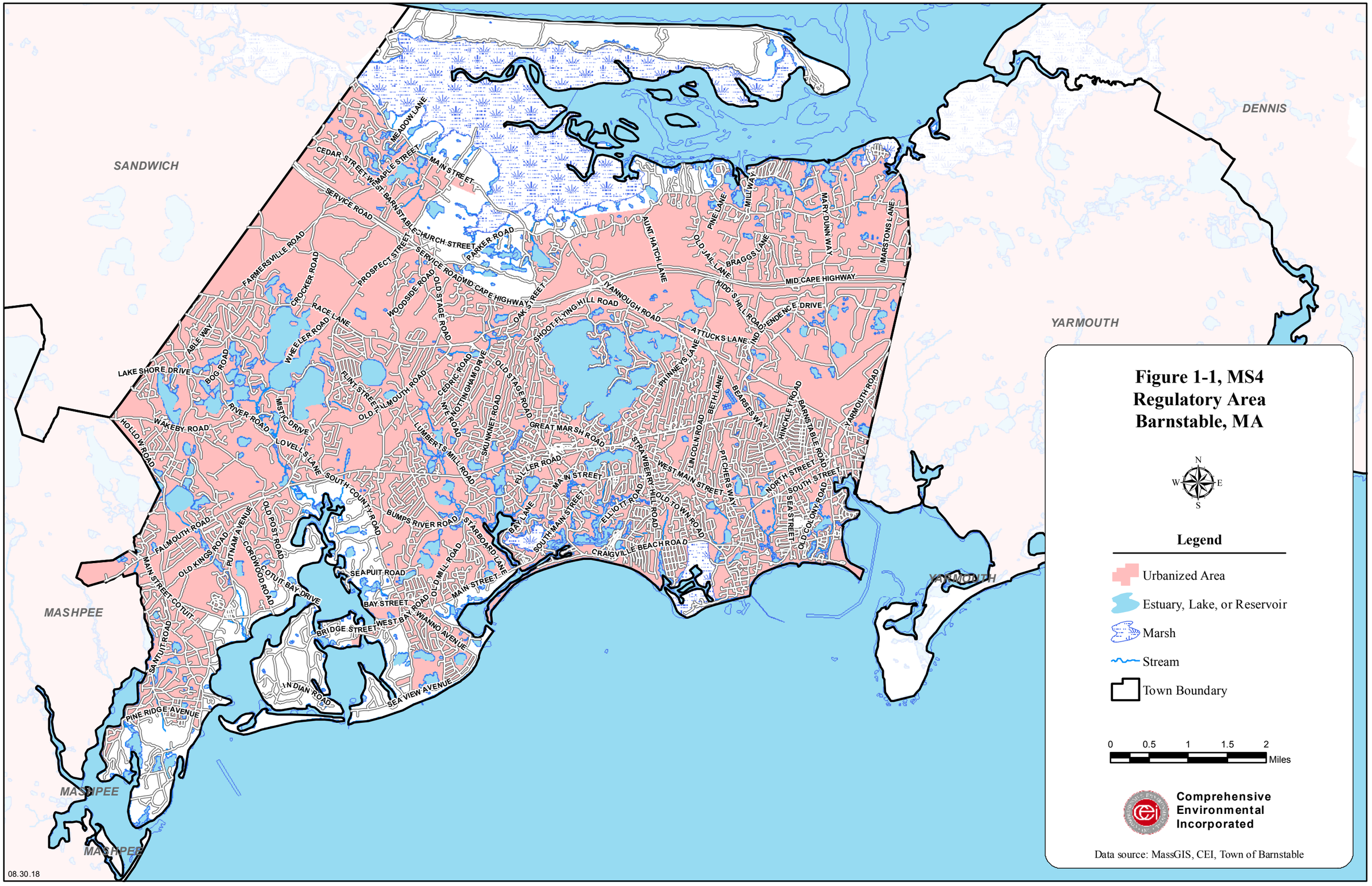


Figure 1-1, MS4
Regulatory Area
Barnstable, MA

N
W E
S

Legend

- Urbanized Area
- Estuary, Lake, or Reservoir
- Marsh
- Stream
- Town Boundary

0 0.5 1 1.5 2 Miles

Comprehensive Environmental Incorporated

Data source: MassGIS, CEI, Town of Barnstable

SANDWICH

DENNIS

YARMOUTH

MASHPEE

MASHPEE

MASHPEE

06.25.19

Figure 2-1, Land Use
Barnstable, MA

N
W E
S

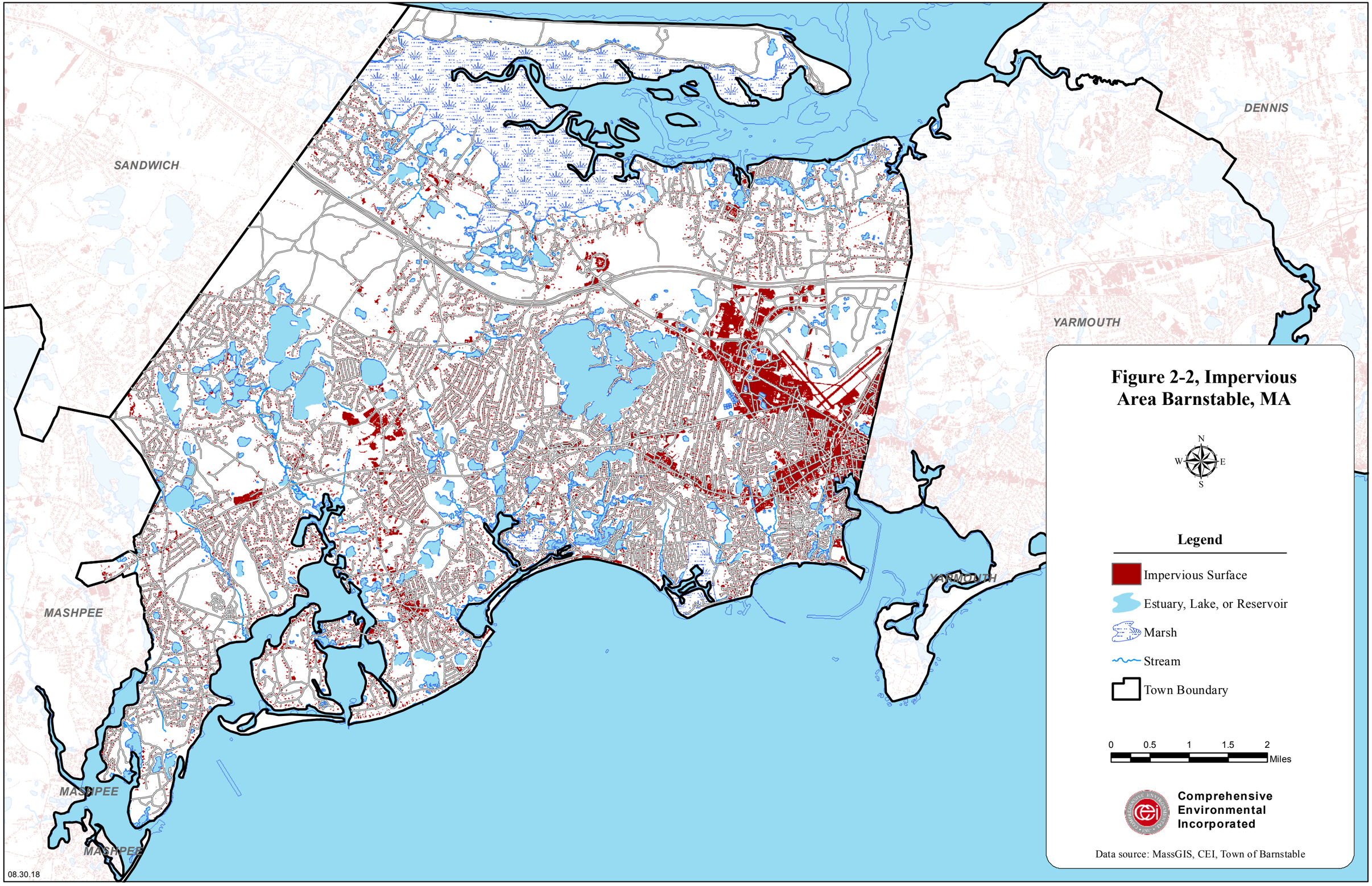
Legend

- Forest
- Agriculture
- Residential
- Commercial
- Industrial
- Transportation
- Wetland
- Water
- Disturbed Land
- Other Cleared Land

0 0.5 1 1.5 2 Miles

Comprehensive Environmental Incorporated

Data source: MassGIS, CEI, Town of Barnstable


SANDWICH
DENNIS
YARMOUTH
MASHPEE
MASHPEE
MASHPEE
YARMOUTH
08.30.18
Figure 2-2, Impervious Area Barnstable, MA
N
W
E
S
Legend
Impervious Surface
Estuary, Lake, or Reservoir
Marsh
Stream
Town Boundary
0
0.5
1
1.5
2
Miles
Comprehensive Environmental Incorporated
Data source: MassGIS, CEI, Town of Barnstable

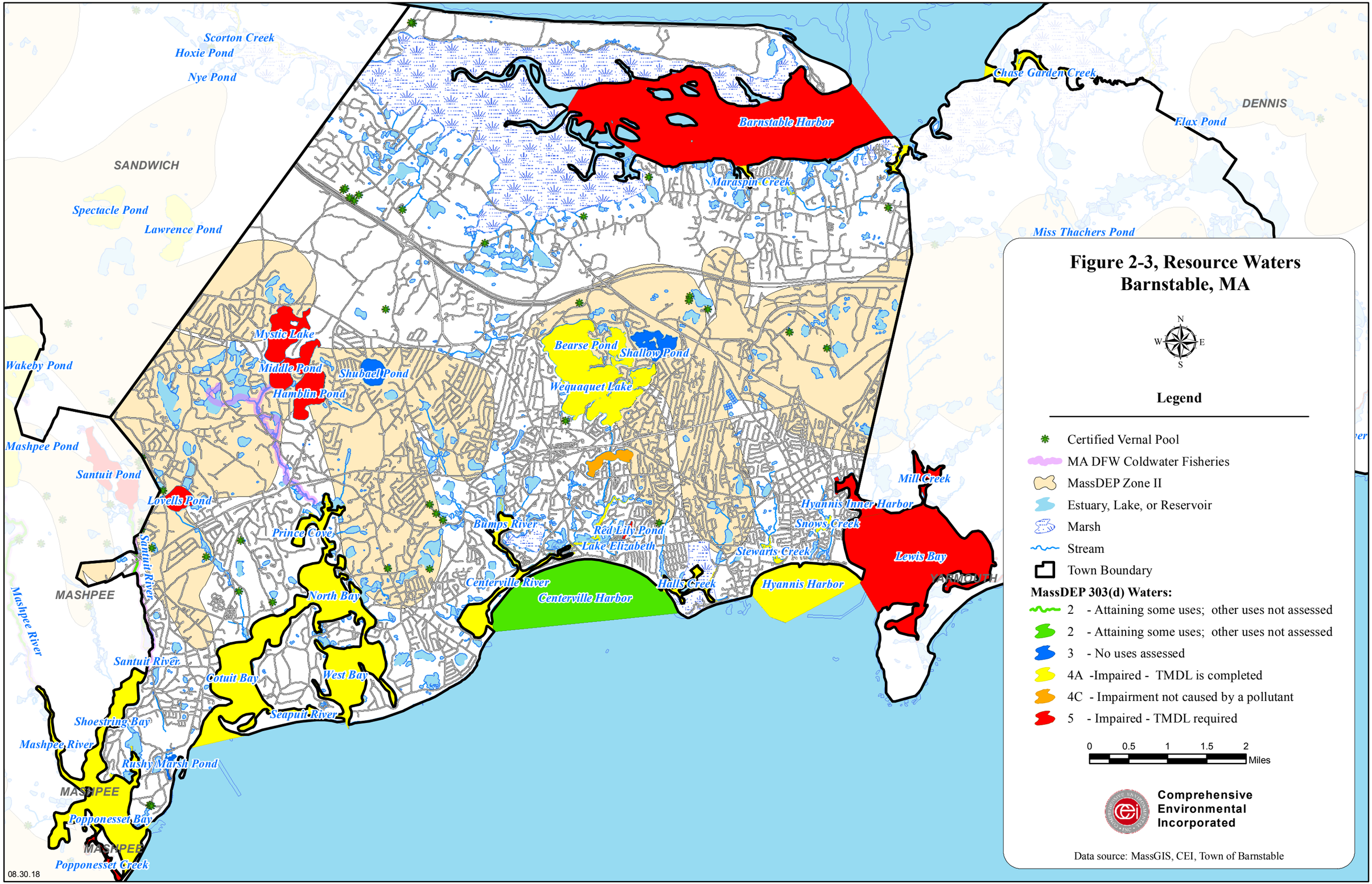


Figure 2-3, Resource Waters Barnstable, MA

N W E S

Legend

- Certified Vernal Pool
- MA DFW Coldwater Fisheries
- MassDEP Zone II
- Estuary, Lake, or Reservoir
- Marsh
- Stream
- Town Boundary

MassDEP 303(d) Waters:

- 2 - Attaining some uses; other uses not assessed
- 2 - Attaining some uses; other uses not assessed
- 3 - No uses assessed
- 4A -Impaired - TMDL is completed
- 4C - Impairment not caused by a pollutant
- 5 - Impaired - TMDL required

0 0.5 1 1.5 2 Miles

Comprehensive Environmental Incorporated

Data source: MassGIS, CEI, Town of Barnstable

Appendix A

Notice of Intent and Authorization to Discharge

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

Part I: General Conditions

General Information

Name of Municipality or Organization: Town of Barnstable | State: MA

EPA NPDES Permit Number (if applicable): MAR 041090

Primary MS4 Program Manager Contact Information

Name: Dale Saad | Title: Senior Project Manager

Street Address Line 1: 382 Falmouth Road

Street Address Line 2:

City: Hyannis | State: MA | Zip Code: 02601

Email: Dale.Saad@town.barnstable.ma.us | Phone Number: (508) 790-6400

Fax Number:

Other Information

Stormwater Management Program (SWMP) Location (web address or physical location, if already completed): http://www.town.barnstable.ma.us/bids/adendums/Addendum 2 Attachment B NOI 7 2003.pdf

Eligibility Determination

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

National Historic Preservation Act (NHPA) Determination Complete? Yes | Eligibility Criteria (check all that apply): ☒ A ☐ B ☐ C

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

MS4 Infrastructure (if covered under the 2003 permit)

Estimated Percent of Outfall Map Complete? *(Part II, III, IV or V, Subpart B.3.(a.) of 2003 permit)*: 100%

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)*: No | Effective Date or Estimated Date of Adoption (MM/DD/YY): 06/30/19

Construction/Erosion and Sediment Control (ESC) Authority Adopted? *(Part II,III,IV or V, Subpart B.4.(a.) of 2003 permit)*: No | Effective Date or Estimated Date of Adoption (MM/DD/YY): 06/30/19

Post- Construction Stormwater Management Adopted? *(Part II, III, IV or V, Subpart B.5.(a.) of 2003 permit)*: No | Effective Date or Estimated Date of Adoption (MM/DD/YY): 06/30/20

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

Part II: Summary of Receiving Waters

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

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

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

Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
MA96-04 Centerville River	5	☐	☐	☐	☒	☐	☐	☐	☐	☐	Estuarine Bioassessments, Fecal Coliform
MA96-82 Hyannis Inner Harbor	14	☐	☐	☐	☒	☐	☐	☐	☐	☐	Fecal Coliform
MA96-06 Maraspin Creek	11	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fecal Coliform
MA96-93 Halls Creek	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fecal Coliform
MA96012 Bearse Pond	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	Non-Native Aquatic Plants, Mercury in Fish Tissue
MA96333 Wequaquet Lake	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	Non-Native Aquatic Plants, Mercury in Fish Tissue
MA96184 Long Pond (Centerville area)	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Non-Native Aquatic Plants
MA96-81 Snows Creek	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fecal Coliform
MA96-02 Bumps River	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fecal Coliform
MA96-01 Barnstable Harbor	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fecal Coliform, Estuarine Bioassessments
MA96293 Shubael Pond	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
MA96-66 North Bay	1	☐	☐	☐	☒	☐	☐	☐	☐	☐	Fecal Coliform, Estuarine Bioassessments
MA96-05 Hyannis Harbor	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fecal Coliform
MA96-37 Mill Creek	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	Fecal Coliform
Aunt Betty's Pond	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Long Pond (Yarmouth Station area)	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed stream from Fawcetts Pond to Stewart's Creek	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Fawcetts Pond	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
Unnamed pond south of Sylvan Dr	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed wetlands near Old Colony Rd near McKeon Park	12	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed pond south of Oak St at Great Hill Dr	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed wetland south of Shell Ln	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed wetland west of Chickadee Ln	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed pond north of Main St at Maple St	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed pond west of Estey Ave	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed tributary to Centerville River	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed tributary to Halls Creek	3	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed tributary to Stewart's Creek	3	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed pond north of Wingfoot Dr	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Round Pond	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed tributary to Mill Pond, next to River Rd	2	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed stream from Mill Pond to Prince Cove	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed pond at end of Ralyn Rd	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Unnamed tributary to Prince Cove	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
		☐	☐	☐	☐	☐	☐	☐	☐	☐	

Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/ PAH	Phosphorus	Solids/ TSS/ Turbidity	E. coli	Enterococcus	Other pollutant(s) causing impairments
		☐	☐	☐	☐	☐	☐	☐	☐	☐	
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Click to lengthen table

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

Part III: Stormwater Management Program Summary

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

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

MCM 1: Public Education and Outreach

BMP Media/Category (enter your own text to override the drop down menu)	**BMP Description**	**Targeted Audience**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal**	**Beginning Year of BMP Imple-mentation**
Brochures/Pamphlets	Distribute fact sheets or brochures on pet waste	Residents	Public Health Division, MEA, Town Clerk	Continue to provide informational flyers with all applications and renewals.	2018
Brochures/Pamphlets	Distribute flyers and bookmarks developed in conjunction with the Cape Cod Commission Project Storm Team	Residents	Department of Public Works	Continue to make information available at select public events.	2018
Brochures/Pamphlets	Distribute information on roof and yard maintenance, such as the "Get Your Mind in the Gutter" program.	Residents	Public Health Division	Continue to make informational flyers available. Provide download links and develop poster boards for use at public locations.	2018
Brochures/Pamphlets	Develop town standards & distribute standards & fact sheets on erosion & sediment control as conditions of permit applications.	Developers (construction)	Building Department, Planning and Development, Conservation Com	Provide information with all applications	2019

Mutt Mitt Dispensers	Maintain existing Mutt Mitt dispensers & refills at public areas frequented by dog walkers to encourage pet waste pickup.	Residents	Department of Public Works	Continue to maintain Mutt Mitt dispensers at certain public areas.	2018
Web Page	Provide web access to erosion and sediment control standards, Low Impact Development, and the NPDES Construction General Permit.	Developers (construction)	Department of Public Works, Public Health Division, Conservation Co	Each Dept. will maintain links to standards and fact sheets.	2019
Web Page	Provide web information on pesticide and fertilizer use, grass clippings and leaf litter disposal, building maintenance, storage of materials and wastes, car washing, benefits of infiltration, and use of environmentally friendly products.	Businesses, Institutions, and Commercial Facilities	Public Health Division	Continue to update and maintain the websites.	2019
Web Page	Provide web information on septic system maintenance, illicit discharges, pet waste disposal, lawn care, pesticide and fertilizer use, grass clippings and leaf litter disposal, car washing, and use of environment-ally friendly products.	Residents	Public Health Division	Continue to update and maintain the websites.	2019

Web Page	Provide web information on equipment maintenance and inspection, material storage, solid waste handling, benefits of onsite infiltration, and management of parking lot surfaces.	Industrial	Public Health	Continue to update and maintain the websites.	2019
Social Media	Provide relevant stormwater information to different audiences via social media.	Residents, Businesses, Institutions, Commercia	Town Communication Officer	Follow statewide "ThinkBlue" campaign on social media platforms.	2019
Channel 18 TV	Provide relevant stormwater information to different audiences by recording programs.	Residents, Businesses, Institutions and Comme	Public Health	Record with Channel 18 TV presentations/ interviews/projects focused on stormwater infrastructure on public land.	

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Part III: Stormwater Management Program Summary (continued)

MCM 2: Public Involvement and Participation

BMP Categorization	Brief BMP Description (enter your own text to override the drop down menu)	Responsible Department/Parties (enter your own text to override the drop down menu)	Additional Description/ Measurable Goal	Beginning Year of BMP Imple-mentation
Public Review/ Participation	SWMP Review; Develop and upload SWMP to the Town website and pr	Department of Public Works	Allow annual review and comment of stormwater management plan and posting of stormwater management plan on website.	2018
Public Participation	Continue involvement in the Massachusetts Estuary Program (MEP) san	Department of Public Works	Continue to promote good water quality through meetings and periodic sampling under the MEP	2018
Public Participation	Cleanups - Shoreline/Water body	Conservation Commission	Allow annual participation in an annual COASTSWEEP cleanup event of beaches and Town landings	2018
Public Participation	Household haz. waste/used oil collection	Department of Public Works	Continue to allow public to drop off household hazardous waste four times per year in conjunction with the Cape Cod Cooperative Extension	2018

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Part III: Stormwater Management Program Summary (continued)

MCM 3: Illicit Discharge Detection and Elimination (IDDE)

BMP Categorization (enter your own text to override the drop down menu)	**BMP Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal** (all text can be overwritten)	**Beginning Year of BMP Imple-mentation**
SSO inventory	Develop SSO inventory in accordance of permit conditions	Department of Public Works	Complete within 1 year of effective date of permit	2018
Storm sewer system map	Create map and update during IDDE program completion	Department of Public Works	Update map within 2 years of effective date of permit and complete full system map 10 years after effective date of permit	2018
Written IDDE program	Create written IDDE program	Department of Public Works	Complete within 1 year of the effective date of permit and update as required	2018
Implement IDDE program	Implement catchment investigations according to program and permit conditions	Department of Public Works	Complete 10 years after effective date of permit	2020
Employee training	Train employees on IDDE implementation	Department of Public Works	Train annually	2018
Conduct dry weather screening	Conduct in accordance with outfall screening procedure and permit conditions	Department of Public Works	Complete 3 years after effective date of permit	2019
Conduct wet weather screening	Conduct in accordance with outfall screening procedure	Department of Public Works	Complete 10 years after effective date of permit	2024
Ongoing screening	Conduct dry weather and wet weather screening (as necessary)	Department of Public Works	Complete ongoing outfall screening upon completion of IDDE program	2024

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

Part III: Stormwater Management Program Summary (continued)

MCM 4: Construction Site Stormwater Runoff Control

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

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

Part III: Stormwater Management Program Summary (continued)

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

BMP Categorization (enter your own text to override the drop down menu or entered text)	**BMP Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal** (all text can be overwritten)	**Beginning Year of BMP Imple-mentation**
As-built plans for on-site stormwater control as by permit	The procedures to require submission of as-built drawings and ensure long term operation and maintenance will be a part of the SWMP	Building Department, Planning and Development, Conservation Commission, Pul	As by permit require submission of as-built plans for completed projects	2018
Target properties to reduce impervious areas	Identify at least 5 permittee-owned properties within MS4 areas that could be modified or retrofitted with BMPs to reduce impervious areas and update annually	Department of Public Works	Complete 4 years after effective date of permit and report annually on retrofitted properties	2020
Allow green infrastructure	Develop a report assessing existing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist	Department of Public Works, Planning and Development	Complete 4 years after effective date of permit and implement recommendations of report	2020
Street design and parking lot guidelines	Develop a report assessing requirements that affect the creation of impervious cover. The assessment will help determine if changes to design standards for streets and parking lots can be modified to support low impact design options.	Department of Public Works, Planning and Development	Complete 4 years after effective date of permit and implement recommendations of report	2020

Develop stormwater controls or management practices for new development and redevelopment.	Adoption, amendment, or modification of regulatory mechanism to meet permit requirements	Building Department, Planning and Development, Conservation Commission, De	Complete 2 years after effective date of permit	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

BMP Categorization (enter your own text to override the drop down menu or entered text)	**BMP Description**	**Responsible Department/Parties** (enter your own text to override the drop down menu)	**Measurable Goal** (all text can be overwritten)	**Beginning Year of BMP Imple-mentation**
Inspections and maintenance of stormwater treatment structures	Establish and implement inspection and maintenance procedures and frequencies	Department of Public Works	Inspect and maintain treatment structures at least annually	2018
Inventory all permittee-owned parks and open spaces, buildings and facilities, and vehicles and equipment	Create inventory	Department of Public Works	Complete 2 years after effective date of permit and implement annually	2018
Infrastructure O&M	Establish and implement program for repair and rehabilitation of MS4 infrastructure	Department of Public Works	Complete 2 years after effective date of permit	2018
Stormwater Pollution Prevention Plan (SWPPP)	Create SWPPPs for maintenance garages, transfer stations, and other waste-handling facilities	Department of Public Works	Complete and implement 2 years after effective date of permit	2018
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	Clean catch basins on established schedule and report number of catch basins cleaned and volume of material moved annually	2018
Street sweeping program	Sweep all streets and permittee-owned parking lots in accordance with permit conditions	Department of Public Works	Sweep all streets and permittee-owned parking lots once per year in the spring. Sweep downtown Hyannis roads approximately 8 times per year.	2018
Road salt use optimization program	Establish and implement a program to minimize the use of road salt	Department of Public Works	Implement salt use optimization during deicing season	2018

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

Part III: Stormwater Management Program Summary (continued)

Actions for Meeting Total Maximum Daily Load (TMDL) Requirements

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

Applicable TMDL	Action Description	Responsible Department/Parties (enter your own text to override the drop down menu)
Lewis Bay and Halls Creek System (Nitrogen)	Adhere to requirements in part A.IV of Appendix F	Department of Public Works
Cape Cod (Bactria/Pathogen)	Adhere to requirements in part A.III of Appendix F	Department of Public Works
Three Bays Watershed (Bactria/Pathogen)	Adhere to requirements in part A.III of Appendix F	Department of Public Works
Centerville River – East Bay System (Nitrogen)	Adhere to requirements in part A.IV of Appendix F	Department of Public Works
Three Bays System (Nitrogen)	Adhere to requirements in part A.IV of Appendix F	Department of Public Works
Popponesset Bay (Nitrogen)	Adhere to requirements in part A.IV of Appendix F	Department of Public Works
	Adhere to requirements in part A.IV of Appendix F	

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

Part III: Stormwater Management Program Summary (continued)

Actions for Meeting Requirements Related to Water Quality Limited Waters

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

Pollutant	Waterbody ID(s)	Action Description	Responsible Department/Parties (enter your own text to override the drop down menu)
Phosphorus	MA96185 Lovells Pond	Adhere to requirements in part II of Appendix H	Building Department, Planning and Development, Department of Publ
Fecal Coliform	MA96257 Red Lily Pond	Adhere to requirements in part III of Appendix H	Department of Public Works, Public Health Department, Conservation (
Nitrogen	MA96257 Red Lily Pond	Adhere to requirements in part I of Appendix H	Building Department, Planning and Development, Department of Publ

Part IV: Notes and additional information

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

Click to add text

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:	Mark S. Ells	Title:	Barnstable Town Manager
Signature:		Date:	9.19.2018

[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 Department of the Interior

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

In Reply Refer To: October 03, 2017
Consultation Code: 05E1NE00-2018-SLI-0014
Event Code: 05E1NE00-2018-E-00031
Project Name: Barnstable MA MS4

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

To Whom It May Concern:

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

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

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

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the

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

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

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

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

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

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

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

Project Summary

Consultation Code: 05E1NE00-2018-SLI-0014

Event Code: 05E1NE00-2018-E-00031

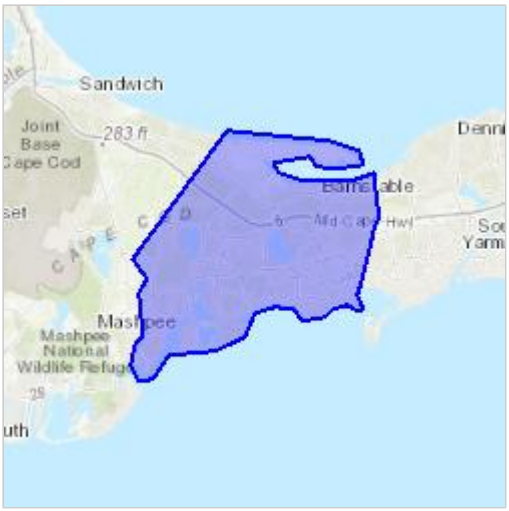
Project Name: Barnstable MA MS4

Project Type: Regulation Promulgation

Project Description: Barnstable MA MS4, Endangered Species Act Determination

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/41.66452973747511N70.36323065276716W



Counties: Barnstable, MA

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Birds

NAME	STATUS
Piping Plover *Charadrius melodus* Population: except Great Lakes watershed There is **final designated** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot *Calidris canutus rufa* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Roseate Tern *Sterna dougallii dougallii* Population: northeast U.S. nesting pop. No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2083	Endangered

Flowering Plants

NAME	STATUS
Sandplain Gerardia *Agalinis acuta* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8128	Endangered

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
North Atlantic Right Whale *Eubalaena glacialis* For information on why this critical habitat appears for your project, even though North Atlantic Right Whale is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/159#crithab	Final designated

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

VIA EMAIL

June 4, 2019

Mark S Ells
Town Manager

And;

Dale Saad
Senior Project Manager
382 Falmouth Rd
Hyannis, MA. 02601
dale.saad@town.barnstable.ma.us

Re: National Pollutant Discharge Elimination System Permit ID #: MAR041090, Town of Barnstable

Dear Dale Saad:

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

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

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

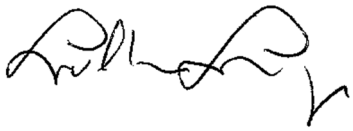
Information about the permit and available resources can be found on our website: https://www.epa.gov/npdes-permits/massachusetts-small-ms4-general-permit. Should you have

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

Sincerely,

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

and;



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

Appendix B

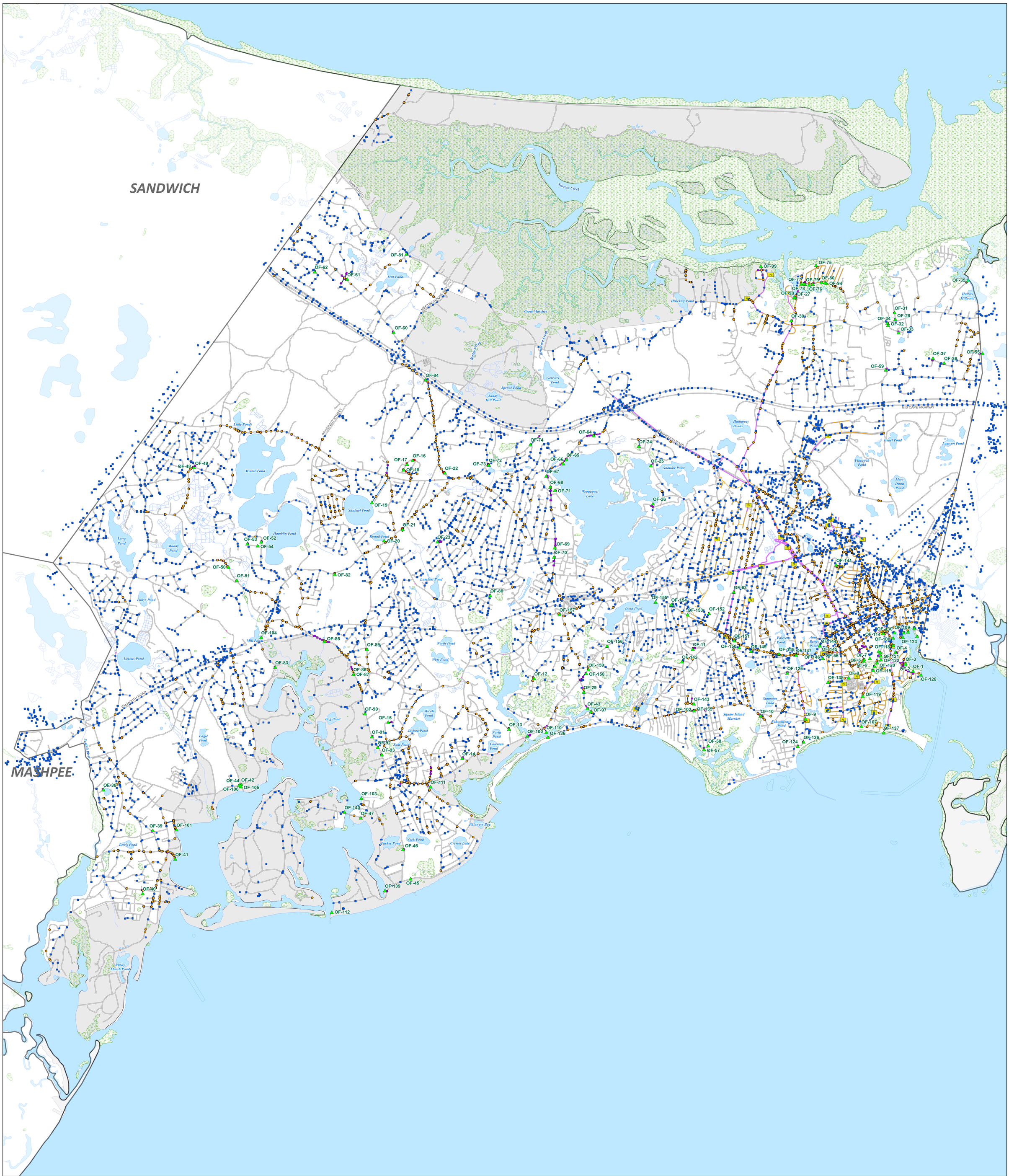
Stormwater Ordinances and Regulations

Appendix C

Stormwater System Mapping

Mapping Status

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



Stormwater Infrastructure Map

Barnstable, MA

Comprehensive Environmental Incorporated

Data Sources: CEI, MassGIS, Town of Barnstable

11/4/2021

Appendix D

Regulatory Assessments

LID, GI, AND IA REGULATORY ASSESSMENT

To: Amber Unruh, Senior Project Manager – Special Projects, Town of Barnstable

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

Date: May 11, 2022

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

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

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

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

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

- Town Ordinances
  - Chapter 240: Zoning
  - Chapter 237: Wetlands Protection
  - Chapter 801: Subdivision Rules and Regulations

Recommendations

The following items are provided as recommendations and next steps:

- Table 1 (attached) provides a detailed assessment and recommended regulatory changes that should be considered when updating relevant sections of the town's regulatory mechanisms.
  - CEI recommends the following documents also be made available and reviewed for the feasibility of LID practices:

  - Town of Barnstable Department of Public Works Standard Specifications
  - Additional specifications and details available from the Engineering Division regarding:
    - Wheelchair ramps;
    - Concrete and brick sidewalks;
    - Curbs;
    - Specifications for Construction of Required Improvements.

- Regulatory review and permitting processes such as Site Plan Review, Subdivision, Wetlands, and/or any other similar processes should be updated to specifically reference the stormwater regulatory mechanisms adopted to meet MS4 regulations for projects that disturb one or more acres. This should include the construction and post-construction stormwater requirements, including requirements for treating stormwater from new development and redevelopment, so that project proponents are aware of the additional requirements under MS4 regulations.
- Changes should be made as part of the next major regulatory update undertaken by the town for each relevant section, or more suitable timeframe as determined by the Planning Board and/or other regulatory board/department.
- This memorandum should be provided to the Planning Board and local transportation board, if applicable, as recommended by the permit.

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

Nick Cristofori, P.E.
Principal, Project Manager

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

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

Topic	Reference	Existing Requirement	Recommendations
General design for environmental sensitivity	Zoning Article IX: Site Plan Review 240-103. Site development standards	Provides for general protection of natural features and slopes which exceed 10%.	Consider expanding this section to include: • Precautions to prevent pollution from stormwater runoff; • Minimization of cuts and fills.
	Subdivision Article VI: Design Standards 801-33. Protection of natural features	Provides for due regard of all natural features.	Consider expanding these sections to include: • Precautions to prevent pollution from stormwater runoff; • Minimization of cuts and fills; • Minimization of disturbance of steep slopes.
	Zoning Article I: Introduction 240-2. Purpose	Provides for the general welfare and safety of inhabitants by regulating size of buildings and structures, location and use of buildings, structures, and land, size and width of lots, etc.	
Stormwater Management			
Drainage system design	Zoning Article IX: Site Plan Review 240-103. Site development standards	Requires drainage systems be designed to minimize discharge of pollutants by providing appropriately designed vegetated drainage channels and sedimentation basins that allow for adequate settling of suspended solids and maximum infiltration.	No changes recommended.
	Subdivision Article VI: Design Standards 801-27. Drainage	Current requirements permit the use of stormwater Best Management Practices (BMPs) (vegetated swales, grass-lined retention basins, detention ponds, etc.) in addition to standard piped drainage systems with catch basins and manholes to provide adequate drainage of all portions of the street system.	
		Requires BMPs be utilized to treat the first one inch of rainfall, or ½ inch of runoff, whichever is greater.	

Topic	Reference	Existing Requirement	Recommendations
	Subdivision Article VI: Design Standards 801-27. Drainage	Requires catch basins be located on both sides of the roadway at intervals of not more than 300 feet at all low points and all intersections.	Consider modifying this requirement to allow for open drainage systems. Provide standard cross-sections and materials for open channels.
Storm event design	Zoning Article IX: Site Plan Review 240-103. Site development standards	Requires all calculations for drainage systems be for the 20-year storm.	Reconcile design criteria. Consider increasing the design storm to accommodate for climate change.
	Subdivision Article VI: Design Standards 801-27. Drainage	Requires storm drain systems be designed for conditions which result from a 10-, 25-, or 50-year storm.	
	Subdivision Appendix A: Design Standards, Typical Road Cross Section, and Guard Rail Warrant	Provides table of Design Standards with storm frequency for drainage calculations for street design as follows: Major: 50 year Secondary, Minor A, & Minor B: 25 year	
Open Space			
Open space residential development (OSRD)	Zoning Article III: District Regulations 240-17. Open space residential development	Permits OSRD in all residential districts by special permit from the Planning Board.	Consider allowing open space residential development (OSRD) as a "by right" form of development (no special permit required).
Landscaping	Zoning Article III: District Regulations 240-17. OSRD	Requires common open space be maintained in an open and natural condition without clearing, predominantly in its present condition, for the protection of natural habitats except as permitted by the Planning Board. Includes list of permitted uses such as the creation of unpaved walking paths, construction of fences, development of common recreational areas, etc.	Consider explicitly allowing LID stormwater management practices (bioretention areas, filter strips, swales, rain gardens, constructed wetlands, etc.) in common open space areas and allow these structures to count toward the open space minimum percentage requirement.

Topic	Reference	Existing Requirement	Recommendations
Site design	Zoning Article III: District Regulations 240-17. OSRD	No current requirements to explicitly require LID design techniques for OSRD site plan and supporting stormwater management features.	Consider requiring OSRD sites to be designed as LID and addressing the following site design strategies: • Minimizing pavement, retaining natural drainage paths and features, and treating runoff as close to its source as feasible; • Directing runoff from roofs and pavements into natural or planted areas to "disconnect" runoff from the formal drainage system; • Maximizing the use of infiltration practices to reduce runoff volume that must otherwise be conveyed and treated; • Use of surface-based stormwater management systems (rather than subsurface systems) that incorporate vegetation to enhance stormwater treatment.
Rain Water Harvesting	--	No current provisions regarding rain water harvesting.	Expand LID language as discussed under "LID and green infrastructure design" to encourage reuse of stormwater as part of site design.
Setbacks and frontages	Zoning Article III: District Regulations 240-12. Pond Village District of Critical Planning Concern (PVDCPC)	Provides bulk regulations for OSRD minimum lot frontage and yard setbacks. Min. lot frontage: 20 feet Min. front yard setback: 30 feet Min. side/rear yard setback: 15 feet	Consider allowing further reduction in frontage (and corresponding road length/ paved area) in OSRD.

Topic	Reference	Existing Requirement	Recommendations
	Zoning Article III: District Regulations 240-17. OSRD	Allows the Planning Board to grant a reduction of the bulk regulations, provided that no lot contain less than 15,000 SF or have less than 20 feet of frontage, 20 feet front yard setback, and 12 feet side/rear setbacks.	
Cluster Development	--	No current provisions to explicitly require LID design techniques for cluster development or open space developments	Consider allowing flexible development such as cluster/open space development as a "by right" form of development (no special permit required) and developing guidance that requires cluster development sites to be designed as LID with guidance regarding what is meant by the LID • Site design strategy for minimizing pavement, retaining natural drainage paths and features, and treating runoff as close to its source as feasible; • Directing runoff from roofs and impervious areas to "disconnect" runoff from the formal drainage system; • Maximizing the use of infiltration practices to reduce runoff volume that must otherwise be conveyed and treated; • Use of surface-based stormwater management systems that

Topic	Reference	Existing Requirement	Recommendations
			incorporate vegetation to enhance stormwater treatment.
Street Design			
Materials	Zoning Article IX: Site Plan Review 240-103. Site development standards	Requires all areas designed for vehicular use be paved with a minimum of either a 3-inch bituminous asphalt concrete, a 6-inch Portland cement concrete pavement, or other surfaces, such as brick, cobblestone or gravel, as approved by Town Engineer.	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 with the use of conventional paving for travel lanes only.
	Subdivision Article III: Requirements for Submission and Approval of Plans 801-12. Adequacy of access	Provides table of Standards of Adequacy for Existing Ways, requires 3-4 inches of bituminous concrete for all streets.	
	Subdivision Article VII: Specifications for Construction of Required Improvements 801-45. Roadway surface	Requires all roadways be paved to conform with the finished grade and width as specified with Class 1 bituminous concrete paving Mass. Type I-1 in accordance with the DPW's specifications.	
Curbs and berms	Subdivision Article VI: Design Standards 801-30. Curbing and berms	Requires all streets have bituminous concrete "Cape Cod berms", vertical granite or sloped granite curving at the discretion of the Board.	Consider 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 flush curbs, that enable the use of bioretention, treatment swales, and open drainage instead of piped drainage systems.
	Subdivision Article VII: Specifications for Construction of Required Improvements 801-47. Curbing and berms		
Width	Subdivision	Provides table of Standards of Adequacy for Existing Ways, requires surface width of 14-	LID practices recommend allowing a minimum pavement width of 18-22 feet on low-traffic

Topic	Reference	Existing Requirement	Recommendations
	Article III: Requirements for Submission and Approval of Plans 801-12. Adequacy of access	18 feet for residential lots, depending on the total number of dwelling units on the street.	local streets in residential neighborhoods and allowing narrower pavement widths along sections of roadway where there are no houses, buildings, or intersections, and where on-street parking is not anticipated. For non-residential mixed-use roadways, pavement widths should be set based on traffic volume, types of vehicles, parking and pedestrian requirements. Be sure to involve public works and emergency response officials in this decision.
	Subdivision Appendix A: Design Standards, Typical Road Cross Section, and Guard Rail Warrant	Provides table of Design Standards with widths of traveled ways as follows: Major: 28 feet Secondary: 24 feet Minor A: 20 feet Minor B: 16 feet	
Right-of-Way (ROW)	Subdivision Article III: Requirements for Submission and Approval of Plans 801-12. Adequacy of access	Provides table of Standards of Adequacy for Existing Ways, requires minimum ROW width of 33-60 feet, depending on the total number of dwelling units of the street.	Consider allowing for flexibility of ROW widths. Wherever possible, residential ROW widths should reflect the minimum required to accommodate the travel-way, the sidewalk, and vegetated open channels.
	Subdivision Appendix A: Design Standards, Typical Road Cross Section, and Guard Rail Warrant	Provides table of Design Standards with widths of ways as follows: Major: 60 feet Secondary: 50 feet Minor A: 50 feet Minor B: 40 feet	
	Subdivision Article VI: Design Standards 801-27. Drainage	Requires all stormwater BMPs be located within easements or the road ROW.	No changes recommended. LID practices encourage allowing stormwater BMPs within the road ROW.
Street layout	Subdivision Article VI: Design Standards 801-26. Streets	Requires streets be designed with considerations for preservation of natural features and existing contours and to minimize the length of roads.	No changes recommended. LID practices recommend street layout considerations include reducing street length and minimizing total paved area (including cul-de-sacs) with the goal of protecting site hydrology, reducing

Topic	Reference	Existing Requirement	Recommendations
			cut and fill, and protecting steep slopes/ important natural features.
Dead-end streets	Subdivision Article VI: Design Standards 801-26. Streets	Requires minor and secondary dead-end residential streets end with a turnaround having an outside paved roadway diameter of 90 feet and a ROW diameter of 105 feet.	Consider minimizing the required paved diameter of cul-de-sacs to 70 feet as encouraged in LID practices and allowing alternative pavement types such as pervious pavement.
		Permits constructing a turnaround T or Y in lieu of a cul-de-sac for minor roads serving less than 10 lots.	No changes recommended.
		Requires natural vegetation be retained in the center of the turnaround. Damaged areas are required to be replanted with a combination of ground cover, shrubs, and/or trees common to the Cape.	Consider allowing the use of vegetated stormwater management practices (bioretention areas, filter strips, swales, rain gardens, constructed wetlands, etc.) within the center of turnarounds.
Landscaping	Subdivision Article VII: Specifications for Construction of Required Improvements 801-48. Grass plots	Requires grass plots be provided on each side of all roadways according to typical road cross sections.	Consider allowing LID stormwater practices (bioretention areas, rain gardens, filter strips, swales, etc.) in required grassed areas.
Sidewalks			
General requirements	Subdivision Article VI: Design Standards 801-29. Sidewalks	Requires sidewalks be installed on both sides of major streets, on one or both sides of secondary and minor streets, unless deemed unnecessary by Planning Board.	No changes recommended, implies flexibility in providing sidewalks only when there is a need for them, which is desirable for promoting low impact design.
	Zoning Article III: District Regulations 240-40.1. Former Grade 5 School Planned Unit Development Overlay District	Limited provisions regarding sidewalk layout currently exist, besides in 240-40.1. which provides circulation system design standards for the overlay district.	Consider providing flexibility with sidewalk layout and encouraging alternative pedestrian circulation layout that uses common areas, with materials such as pervious, cross-country pathway, rather than street ROWs.

Topic	Reference	Existing Requirement	Recommendations
Width	Subdivision Article VI: Design Standards 801-29. Sidewalks	Requires sidewalks have a minimum width of 5 feet along major and secondary roads.	Consider lowering requirement to a minimum sidewalk width of 4 feet and establishing a maximum width.
Materials	Ordinances Ch. 404: Excavations 404-21. Sidewalks and bike paths	Provides for bituminous concrete, concrete or brick sidewalks and bike paths.	Consider allowing or requiring the use of permeable surfaces for sidewalks.
	Subdivision Article VII: Specifications for Construction of Required Improvements 801-46. Sidewalks	Requires all sidewalks be constructed of bituminous or Portland cement concrete. Sidewalks constructed of all-weather materials other than bituminous concrete may be approved if deemed appropriate by the Planning Board.	
Drainage design	Subdivision Article VI: Design Standards 801-29. Sidewalks	Requires sidewalks and/or bicycle paths be separated from the roadway with a green strip, loamed and seeded as required in 801-48. Grass plots, and street trees be planted within the green strip.	Consider allowing LID stormwater management practices (tree-box filters, rain gardens, vegetated swales, etc.) within required green strips.
Parking Lots			
Number of spaces	Ordinances Ch. 104: Handicapped Parking 104-2. Number of handicapped spaces required for certain uses	Specifies number of handicapped parking spaces required based on total number of parking spaces in lot.	Consider establishing parking maximums and adjusting current minimum requirements to meet the following LID recommendations: • Do not require more than 3 off-street parking spaces per 1000 SF of gross floor area in professional office buildings; • Do not require more than 4.5 off-street parking spaces per 1000 SF of gross floor area of shopping centers; • Do not require more than 2 off-street parking spaces per single family home.
	Zoning Article VI: Off-Street Parking Regulations 240-56. Schedule of Off-Street Parking Requirements	Current provisions provide number of required off-street parking spaces based on various uses.	

Topic	Reference	Existing Requirement	Recommendations
Reduced parking requirements	Zoning Article VI: Off-Street Parking Regulations 240-57. Circumstances warranting reduction of requirements	Permits reduction of parking requirements through special permit if lesser off-street parking is shown to be adequate given circumstances such as use of a common parking area by different uses having different peak hours of demand.	Consider expanding this section to include homes and businesses near major transit stops as a special circumstance for reduced parking requirements.
Size of spaces	Zoning Article VI: Off-Street Parking Regulations 240-52. Design and screening standards	Requires each off-street parking space has minimum dimensions of 9 feet by 20 feet excluding the driveway to such space.	Consider reducing standard parking space dimensions to a width of 9 feet or less and length of 18 feet or less.
Compact car spaces	Zoning Article VI: Off-Street Parking Regulations 240-52. Design and screening standards 240-24.1.10 Hyannis Parking Overlay District (HPOD)	No provisions for compact car parking spaces currently in place besides HPOD regulations, which provide dimensions for compact spaces (6' by 14') and allow up to 10% of parking spaces be allocated to compact spaces.	Consider providing dimensional requirements for compact cars (e.g., 8' by 16') and recommending commercial parking lots have at least 30% of their spaces reserved for compact cars.
Drainage design	Zoning Article VI: Off-Street Parking Requirements 240-52. Design and screening standards	Requires drainage facilities for each parking area be designed and constructed to contain stormwater runoff on the premises.	Consider expanding to explicitly allow/ encourage drainage be designed so runoff flows towards a stormwater BMP.
Landscaping	Zoning Article IV: Off-Street Parking Regulations 240-53. Landscape requirements for parking lots	Requires at least 10% of the interior of parking lots with 21 or more parking spaces in all office and commercial districts be landscaped. Requires interior landscaped islands be distributed throughout the parking lot and include at least one tree per 8 spaces.	Consider allowing LID stormwater management practices (bioretention areas, filter strips, swales, rain gardens, constructed wetlands, etc.) to count towards fulfillment of required parking lot landscaped areas. Consider specifying dimensions for landscaped areas that are sufficient to plant large, mature trees (e.g., minimum width 6 feet or greater) which will create shade over the lot.

Topic	Reference	Existing Requirement	Recommendations
Materials	Zoning Article IX: Site Plan Review 240-103. Site development standards	Requires all areas designed for vehicular use be paved with a minimum of either a 3-inch bituminous asphalt concrete, a 6-inch Portland cement concrete pavement, or other surfaces, such as brick, cobblestone or gravel, as approved by Town Engineer.	Consider explicitly allowing the use of permeable materials such as porous pavers, paving stones, reinforced grass, and pervious pavement for parking stalls and spillover parking areas.
Driveways			
Width	Zoning Article III: District Regulations 240-24.1 Hyannis Village Zoning Districts 240-24.1.10. Hyannis Parking Overlay District	Requires entrance and exit driveways within the Hyannis Village Zoning Districts be a minimum of 14 feet wide for one-way use and a minimum of 20 feet wide for two-way use.	Consider requiring driveway width of no more than 9 feet for one-way and 18 feet for two-way driveways.
	Zoning Article III: District Regulations 240-32. IND Limited Industrial District	Establishes a maximum of two driveways, each not more than 50 feet wide for lots in IND Limited Districts.	
	Zoning Article IX: Site Plan Review 240-104. Minimum parking lot design standards 240 Attachment 2	Drawings show one-way driveways 15 feet wide and two-way driveways 25 feet wide.	
Materials	Ordinances Ch. 404: Excavations 404-20. Driveways	Requires driveways be constructed with a minimum of 3 inches of Type I asphalt or 8 inches of Portland cement concrete with all openings of bituminous concrete or cement concrete extending for a minimum of 10 feet back from existing roadway pavement.	Consider allowing pervious materials, such as porous pavers and pervious pavement, for driveways. Also consider allowing the use of "two-track" driveways (driveways only paved for the width of each wheel track) for residential driveways.

Topic	Reference	Existing Requirement	Recommendations
Shared driveways	Zoning Article III: District Regulations	Encourages shared driveways and parking area interconnections for some zoning districts.	Consider allowing / encouraging the use of common driveways to serve up to four houses in residential districts, including OSRD lots that do not meet standard dimensional requirements.
Lot Layout			
Lawn requirements	Ordinances Ch. 78: Fertilizer Nitrogen and Phosphorus Control	Requires fertilizer applications to turf, but not plants other than turf, follow Best Management Practices (BMPs) to reduce nutrients entering waterbodies.	Consider implementing similar requirements for residential lawn areas that include: • Applicators shall not apply, spill, or deposit fertilizer in a manner than allows fertilizer to enter into storm drains or fail to remove the applied, spilled, or deposited fertilizer immediately; • Applicators shall not apply fertilizer closer than 100 feet to any water body or within the Zone I of a public drinking water well; • Applicators shall not deposit grass clippings, leaves, or any other vegetative debris into or within 50 feet of water bodies, retention and detention areas, drainage ditches or stormwater drains, or onto impervious surfaces except during scheduled clean-up programs.
	Zoning Article III: District Regulations 240-11. RB, RD-1 and RF-2 Residential Districts	Provides tables of bulk regulations including minimum lot area, lot frontage, and lot width.	Consider establishing limits on the extent of lawn area in residential lots, either by area or percentage of lot. Encourage property owners to plant native, drought-resistant species on lawn areas which require less water, pesticides, and fertilizers.

Topic	Reference	Existing Requirement	Recommendations
	240-13. RC, RD, RF-1, and RG Residential Districts 240-14. RC-1 and RF Residential Districts 240-15. RC-2 Residential District 240-16. RAH Residential District		
Location of utilities	Subdivision Article VI: Design Standards 801-35. Utilities Appendix A: Design Standards, Typical Road Cross Section, and Guard Rail Warrant	Typical road cross section for major roads shows utilities buried under grass strip between sidewalk and paved traveled way. For secondary and minor roads, some utilities are placed under grass swale adjacent to road edge.	Consider allowing the placement of utilities on all roads under the paved section of the ROW, or immediately adjacent to the road edge such as in cross sections for secondary and minor roads, so that the land adjacent to the roadway can be used for swales.
Setbacks and frontages	Zoning Article III: District Regulations 240-11. RB, RD-1 and RF-2 Residential Districts 240-13. RC, RD, RF-1, and RG Residential Districts 240-14. RC-1 and RF Residential Districts 240-15. RC-2 Residential District 240-16. RAH Residential District	Provides tables of bulk regulations for minimum lot frontage and yard setbacks. For residential districts: Min. lot frontage: 20 feet Front yard setback: 20-30 feet Side/read yard setback: 10-15 feet	Consider minimizing setback distances in residential districts in order to increase flexibility with regard to house location and allow for reduction in total road length and driveway lengths.
	Zoning Article III: District Regulations	Provides bulk regulations for minimum lot frontage and yard setbacks by zoning district.	Consider allowing LID stormwater management practices (bioretention areas, rain gardens, filter strips, swales, constructed wetlands, etc.) in required setback areas.

Topic	Reference	Existing Requirement	Recommendations
Buffer areas	Ordinances Ch. 237: Wetlands Protection 237-2. Jurisdiction	Prohibits removing, filling, dredging, or altering in or within 100 feet of wetland resource areas except as permitted by the Conservation Commission or as provided in 237-3. Exceptions, which include altering existing structures or emergency projects.	Consider allowing the use of low impact stormwater structures (bioretention areas, infiltration trenches, or grass swales) within the buffer zone of wetland resource areas, provided the location of these structures is not in conflict with any other setback criteria required by Massachusetts Wetland Protection Act regulations or the MA Stormwater Management Policy Handbooks.
	Zoning Article III: District Regulations	Various requirements for landscaped buffers in different districts.	Consider allowing the location of LID stormwater management practices (bioretention areas, rain gardens, filter strips, swales, constructed wetlands, etc.) in required buffer areas.
	Zoning Article III: District Regulations 240-53. Landscape requirements for parking lots	Requires all office and commercial districts have landscaped buffers to parking lots and drives. Requires existing natural vegetation be retained where possible, and where it cannot be retained, low-maintenance grass, trees, and/or shrubs commonly found on Cape Cod be planted.	
Impervious area limits	Zoning Article III: District Regulations	Provides tables of bulk regulations with maximum lot coverage as % of lot area in office, commercial, and industrial districts. No similar regulations for residential districts.	Consider establishing limits on impervious lot coverage (e.g., 15%) in rural, low-density areas. This is not appropriate for town centers, transit-oriented districts, and moderate density neighborhoods where compact development should be encouraged.
	Zoning Article III: District Regulations 240-24.2. Marstons Mills Village Zoning District	Provides table of bulk regulations with maximum coverage by structures as a percentage of lot area (20%).	

Topic	Reference	Existing Requirement	Recommendations
	240-130. Centerville Village District		
	Zoning Article III: District Regulations 240-35. Groundwater Protection Overlay Districts	Establishes a 15% or 2,500 SF, whichever is greater, impervious lot coverage limit for Groundwater Protection Overlay Districts.	
Landscaping	Subdivision Article VI: Design Standards 801-33. Protection of natural features	No current provisions to specifically address landscaping design criteria.	Consider adding a section to address landscaping design criteria, including (for example): • Provisions for additional landscape use of shrubs, native herbaceous plantings, instead of just grass; • Use of native materials for all plantings (possibly include an approved plant list with options to provide other species upon approval); • Requiring vegetation be planted and located to maximize groundwater recharge, absorb and filter runoff and reduce erosion.
Site Work			
Removal of trees	Ordinances Ch. 180: Scenic Roads 180-4. Control	Allows the Tree Warden or his designee to approve the cutting or removal of up to 3 trees per 200 linear feet of right-of-way within the public right-of-way of designated roads. Requires written approval of the Planning Board for the cutting or removal of trees the scope of which is outside the responsibility of the Tree Warden.	No changes recommended, establishes regulatory control over tree clearance.

Topic	Reference	Existing Requirement	Recommendations
	Ordinances Ch. 221: Trees Article IV: Tree Removal and Replanting	Requires permit for trimming and removal of Town trees. Requires Town trees that are removed to be replaced.	
Soil restoration	Ordinances Ch. 198: Soil, Sand and Gravel Pits	Requires no topsoil or subsoil be removed from an area more than 5,000 SF unless entire area of such removal is replanted with rye, vetch, wheat, legumes or other soil-improving plants, or a plant with a permanent cover crop or reforest the area.	Consider adding provisions that address the following: • Minimization of the removal of topsoil from the property; • Restoration of natural soil permeability, such as rototilling of soils, within vegetated/ landscaped areas where construction has compacted soils.
	Subdivision Article VII: Specifications for Construction of Required Improvements 801-54. Cleaning up	Requires entire area of constructed subdivision be cleaned up so as to leave a neat and orderly appearance.	Consider requiring contractors to reestablish permeability of soils that have been compacted by construction vehicles, such as rototilling lawn areas prior to seeding.
	Ordinances Ch. 404: Excavations 404-24. Breaking through pavement, backfilling, and patching	Requires all grassed/ vegetated areas that are disturbed during repairs be restored to their original condition with the same or similar plantings and to meet the conditions which existed before excavation.	
Preservation of topographic features	Zoning Article III: District Regulations 240-17. OSRD	Requires OSRD design to preserve and enhance the natural topography of the land by locating roads and building sites in relationship to the existing topography so as to minimize the amount of land clearance, grading, and cuts and fills.	Consider adding this requirement for all zoning districts, not just OSRD.
ROW clearing	Subdivision	Requires entire area to be occupied by the roadway plus an additional 4 feet or	Consider requiring developers to limit clearing within the ROW to the minimum necessary to

Topic	Reference	Existing Requirement	Recommendations
	Article VII: Specifications for Construction of Required Improvements 801-39. Clearing, grubbing and excavation	extending outward to the toe of slopes in fill areas, whichever greater, be excavated.	construct roadway, drainage, sidewalk, and utilities.

Appendix E

Inventory and Ranking of Town-Owned Property

Site Name	Address	Responsible Department	Notes	General				Parks & Open Space							Buildings, Facilities, & Storage Yards										Vehicles and Equipment				Infrastructure and Maintenance						Comments
				Is property owned by the Town but under lease agreement with a private/non-profit entity?	Custodial maintenance services provided by the Town of Barnstable?	Grounds maintenance services provided by the Town of Barnstable?		Cut & dispose of grass clippings?	Collection & disposal of leaf litter?	Use, store or dispose of pesticides, herbicides, and fertilizers?	Exterior trash cans available for public?	Dogs allowed on property?	Do waterfowl congregate here?		Is there a building on the property?	Exterior dumpsters at site?	Are petroleum products or other products used, stored or disposed of?	Is salt stored on-site?	Is sand stored on-site?	Are there any floor drains located in the building?	Does the facility have a Spill Prevention Control and Countermeasures Plan (SPCC) Plan?	Does the facility have a Stormwater Pollution Prevention Plan (SWPPP)?	Any existing written Standard Operating Procedures (SOPs) or O&M Manuals?		Are vehicles and/or equipment stored outdoors?	Are vehicles and/or equipment washed outdoors?	Is fueling performed on-site?		Are there any catch basin on the property?	Do any of the catch basins have an oil//water separator?	Are there any outfalls on the property?	Does the property have paved surfaces?	Is snow stored on-site?	Are there any stormwater treatment BMPs at the site?	
MUNICIPAL BUILDINGS																																			
Barnstable Government Offices (Animal Control, Harbor master, Natural Resources)	1189 Phinneys Lane																																		
Barnstable Police Department	1200 Phinneys Lane																																		
Barnstable Public Works Dept/ Highway Dept	382 Falmouth Road																																		
Barnstable Recycling Center	45 Flint Street																																		
Barnstable Stove Shop	2481 Meetinghouse Way																																		
Barnstable Structures and Ground	800 Pitchers Way																																		
Barnstable Town Hall	367 Main Street																																		
Barnstable Town Offices	200 Main Street																																		
Cape Cod Fuel	58 Willow Ave																																		
Cape Cod Maritime Museum	135 South Street																																		
Cape Cod Model Railroad Club	2461 Meetinghouse Way																																		
Historic West Barnstable Station	2469 Meetinghouse Way																																		
Zion Union Heritage Museum	296 North Street																																		
SCHOOLS AND COMMUNITY BUILDINGS																																			
Barnstable High School	744 West Main Street, Hyannis																																		
Barnstable Intermediate School	895 Falmouth Road/ Rte 28																																		
Barnstable Senior Center	825 Falmouth Road																																		
Barnstable United Elementary School	730 Osterville West Barnstable Road																																		
Barnstable/West Barnstable Elementary School	2463 Main Street																																		
Cape Cod Collaborative	418 Bumps River Road																																		
Cape Cod YMCA	2245 Iyannough Road																																		
Centerville Elementary School	658 Bay Lane																																		
Hyannis Elementary East	165 Bearse's Way																																		
Hyannis Youth and Community Center/Recreation Dept	141 Bassett Lane																																		
HyArts Building	50 Pearl Street																																		
Maki Monument Company	918 Main Street																																		
Marstons Mills Elementary School	2095 Main Street, Marston Mills																																		
New Classics Theater	250 South Street																																		
The Old Village Store	2455 Meetinghouse Way																																		
The Waldorf School of Cape Cod	140 Old Oyster Road, Cotuit																																		
West Hyannis Elementary	529-549 West Main Street																																		
OPEN SPACES																																			
Parks																																			
Barnstable Public Lands	104 Sandy Neck																																		
Bismore Park	180 Ocean Street																																		
Burgess Park	559 Rte 149, Marstons Mills																																		
Centerville Playground	524 Main Street																																		
CJ's Ranch	1445 Osterville West Barnstable Road																																		
Empty grass lot/rotary	545 Iyannough Road																																		
Hyannis Harbor/Park	182 Pleasant Street																																		
Lombard Farms	2331 Meetinghouse Way																																		
Luke's Love Boundless Playground	2377 Meetinghouse Way																																		
McKeon Park/Unnamed Park	365 Old Colony Road																																		
Cemeteries																																			
Barnstable Cemetery	280 Putnam Avenue																																		
Beaches																																			
Cousins Cove	460 Shootflying Hill Road																																		
Craigville Beach	997 Craigville Beach Road																																		
Dowses Beach	348 East Bay Road																																		
Keyes Memorial Beach	465 Sea Street, Hyannis																																		
Loop Beach	281 Oceanview Avenue																																		
Millway Beach	399 Millway																																		
Ropes Beach	85 Old Shore Road																																		
Sandy Neck Beach	Sandy Neck Road																																		

Site Name	Address	Responsible Department	Notes	General				Parks & Open Space							Buildings, Facilities, & Storage Yards										Vehicles and Equipment				Infrastructure and Maintenance							Comments
				Is property owned by the Town but under lease agreement with a private/non-profit entity?	Custodial maintenance services provided by the Town of Barnstable?	Grounds maintenance services provided by the Town of Barnstable?		Cut & dispose of grass clippings?	Collection & disposal of leaf litter?	Use, store or dispose of pesticides, herbicides, and fertilizers?	Exterior trash cans available for public?	Dogs allowed on property?	Do waterfowl congregate here?		Is there a building on the property?	Exterior dumpsters at site?	Are petroleum products or other products used, stored or disposed of?	Is salt stored on-site?	Is sand stored on-site?	Are there any floor drains located in the building?	Does the facility have a Spill Prevention Control and Countermeasures Plan (SPCC) Plan?	Does the facility have a Stormwater Pollution Prevention Plan (SWPPP)?	Any existing written Standard Operating Procedures (SOPs) or O&M Manuals?		Are vehicles and/or equipment stored outdoors?	Are vehicles and/or equipment washed outdoors?	Is fueling performed on-site?		Are there any catch basin on the property?	Do any of the catch basins have an oil/water separator?	Are there any outfalls on the property?	Does the property have paved surfaces?	Is snow stored on-site?	Are there any stormwater treatment BMPs at the site?	
MUNICIPAL BUILDINGS																																				
Veterans Park Beach	480 Ocean Street																																			
Boat Ramps/Water Access																																				
Barnstable Marine Service	110-114 Freezer Road																																			
Golf Courses																																				
Hyannis Golf Course	1800 Iyannough Road																																			
Olde Barnstable Fairgrounds Golf Course	1500 Route 129																																			
OTHER																																				
ARFF/SRE Airport	Mary Dunn Way																																			
Marston Mills Airfield	1000 Race Lane																																			

SANDWICH

Scorton Creek
Great Marshes
SANDY NECK
HIGH STREET
CEDAR STREET
MAPLE STREET
WILLOW STREET
Bridge Creek
Brickyard Creek
Hinckley Pond
COMMERCE ROAD
Hallets Millpond
MAIN STREET
CHURCH STREET
FARMERSVILLE ROAD
CROCKER ROAD
PLUM STREET
Sandy Hill Pond
BRAGGS LANE
MARSTONS LANE
MARY DUNN ROAD
MID CAPE HIGHWAY
RACE LANE
Little Pond
OLD STAGE ROAD
SERVICE ROAD
IYANNOUGH ROAD
Hathaway Ponds
INDEPENDENCE DRIVE
Israel Pond
Lamson Pond
Flintrock Pond
Mary Dunn Pond
ATTUCKS LANE
Shallow Pond
HUCKINS NECK ROAD
BEARSES WAY
Middle Pond
OAK STREET
PATRIOT WAY
PROSPECT STREET
Shubael Pond
OLD FALMOUTH ROAD
WHISTLEBERRY DRIVE
BOG ROAD
Wequaquet Lake
Hamblin Pond
FLINT STREET
NYE ROAD
PRINCE HINCKLEY ROAD
SKUNKNET ROAD
SHOOTFLYING HILL ROAD
PHINNEYS LANE
Long Pond
Muddy Pond
WAKEBY ROAD
RIVER ROAD
Lumbert Pond
PITCHERS WAY
MEGAN ROAD
Pattys Pond
HOLLOW ROAD
LOVELLS LANE
FALMOUTH ROAD
CURTIS ROAD
Mill Pond
SOUTH COUNTY ROAD
North Pond
West Pond
BUMPS RIVER ROAD
Long Pond
Herring River
STRAWBERRY HILL ROAD
WEST MAIN STREET
Lovells Pond
OLD POST ROAD
BAY LANE
ELLIOTT ROAD
OLD TOWN ROAD
SCUDDER AVENUE
SEA STREET
OCEAN STREET
SANTUIT-NEWTOWN ROAD
PUTNAM AVENUE
STARBOARD LANE
SOUTH MAIN STREET
CRAIGVILLE BEACH ROAD
Micah Pond
POND STREET
SWIFT AVENUE
Bog Pond
Joshua Pond
Squaw Island Marshes
Schoolhouse Pond
Eagle Pond
CORDWOOD ROAD
Sam Pond
Santuit River
WIANNO AVENUE
PARKER ROAD
BRIDGE STREET
Phinneys Bay
Neck Pond
Crystal Lake
Parker Pond
GRAND ISLAND DRIVE
INDIAN TRAIL
SEA VIEW AVENUE
SCHOOL STREET
SANTUIT ROAD
Rushy Marsh Pond

N
W
E
S

Municipal Properties:

- Airfields
- Beaches
- Boat Ramps/Ways to Water
- Cemeteries
- Golf Courses
- Municipal Buildings
- Open Spaces
- Schools and Community Buildings

- Town Boundary
- Lake, Pond, Reservoir
- Wetland, Marsh, Swamp
- Stream, Brook
- Urbanized Area

0 0.5 1 1.5 2
Miles

Municipal Properties
Barnstable, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Barnstable, CEI

11/20/2019

Appendix F

Street Sweeping Optimization Plan

MI-1, Street Sweeping

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

Procedures and Practices

- Sweep all Town-owned streets within the urbanized area with the exception of high-speed limited access highways at least once per year in the spring.
- For areas subject to nitrogen and phosphorus TMDL and impaired waters requirements, sweep streets once in the spring and once in the fall.
- If required, sweep priority areas such as those with construction sites or areas subject to heavier sanding and/or traffic volumes multiple times a year to minimize sediment accumulation.
- Sweep all Town parking lots in spring after snow melts.
- If possible, notify residents and businesses of street sweeping schedule and requirements such as restricted parking and removal of objects that could obstruct sweeping operations.
- Lightly spray water on streets before sweeping to minimize airborne dust.
- Avoid pushing materials into or around storm drains and catch basins.
- Do not use kick brooms or sweeper attachments that tend to spread dirt.
- When unloading sweeper, make sure there is no dust or sediment release.
- After sweeping is finished, properly dispose of sweeper wastes (see below). Never dispose sweep debris into the storm drain systems, catch basins, or waterways.
- Never store street sweepings in areas where stormwater could transport fine materials to the storm drain system or a waterbody.
- If possible, clean catch basins after streets are swept.

Prior to the Start of the Sweeping Season (Spring)

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

Prior to Leaving the Facility for Sweeping

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

Street Sweeping

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

Upon Return to the Facility

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

Storage, Disposal and Reuse

Storage

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

Reuse

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

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

Inspection and Maintenance

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

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

Recordkeeping and Reporting

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

Street Sweeping Log

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

Weather Today:____

Supervisor/Crew Leader:_______________________________________

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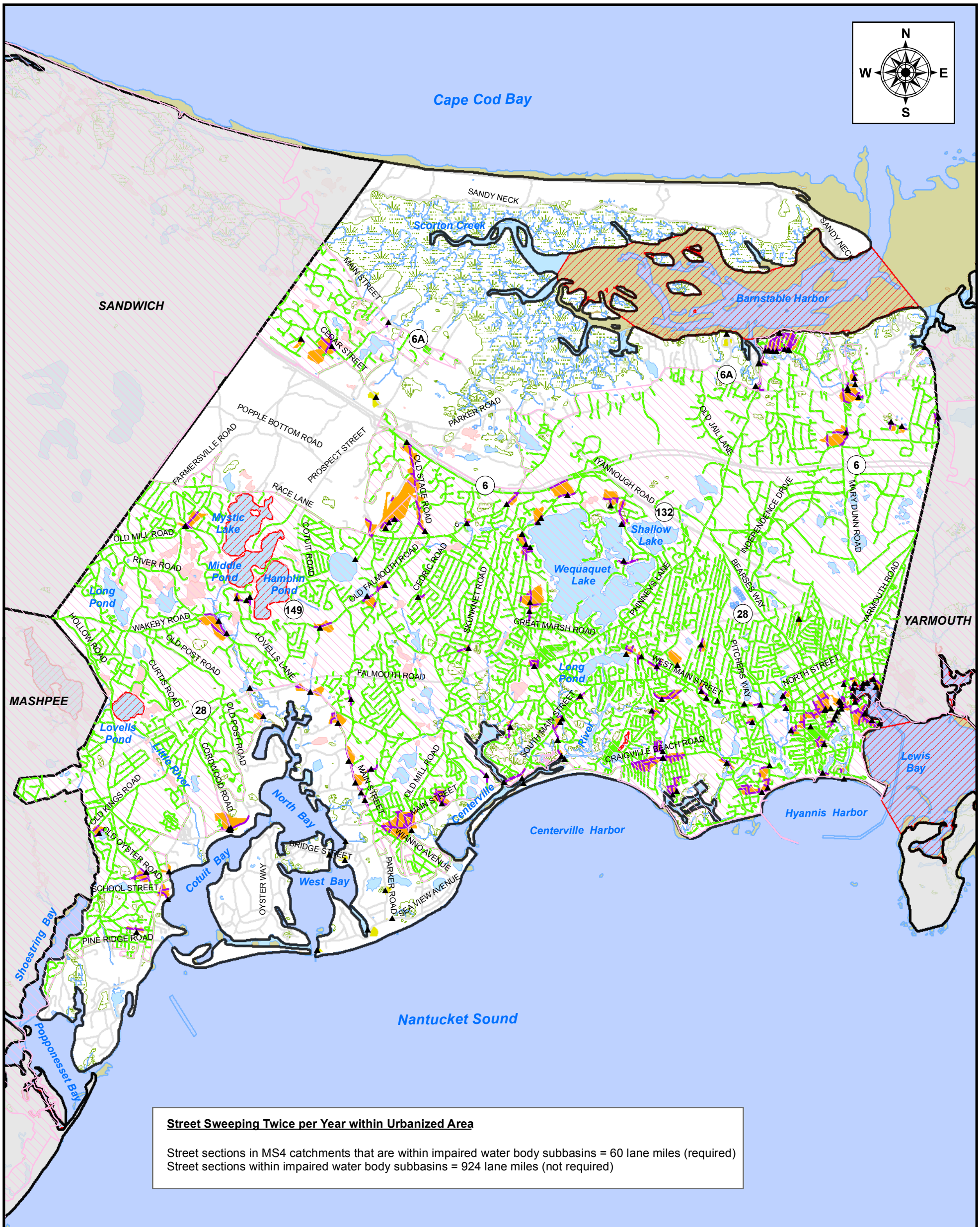
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None __ Material Storage __ Construction Activity __ Equipment Storage __ Erosion __ Other*		
		__ None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

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

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



Street Sweeping Twice per Year within Urbanized Area

Street sections in MS4 catchments that are within impaired water body subbasins = 60 lane miles (required)
Street sections within impaired water body subbasins = 924 lane miles (not required)

Legend

- ▲ MS4 Outfalls
- Urbanized Area - 2010

303d Water Bodies - Category 5

- Impaired Lake, Pond
- Impaired River, Stream

Hydrography

- Bay, Ocean
- Lake, Pond, River
- Wetland, Marsh, Bog
- Tidal Flats, Shols
- Cranberry Bog
- Stream, Brook

Outfall Catchments

- Discharges to Impaired Water Body Subbasin within UA
- Catchment Outside of UA

Street Sweeping Twice per Year, within UA

- Within MS4 Catchment (required)
- Within Impaired Water Body Subbasins (not required)

0 2,500 5,000 7,500 10,000 Feet

Street Sweeping Map

Sweeping per Phase II Requirements

Barnstable, Massachusetts

Comprehensive Environmental Inc.

Appendix G

Catch Basin Optimization Plan

Plan for Optimizing Catch Basin Cleaning

Barnstable, MA

June 30, 2019

Prepared For:

Town of Barnstable
367 Main St,
Hyannis, MA 02601

Prepared by:

Comprehensive Environmental Inc.
41 Main Street
Bolton, MA 01740

Table of Contents

Plan for Optimizing Catch Basin Cleaning – Barnstable, MA

List of Appendices

1 Introduction

This Catch Basin Cleaning Optimization Plan has been prepared by Barnstable, 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[1];

- **Prioritize** inspection and maintenance for catch basins:
  - located near construction activities[2]. 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 basin

- **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.

[1] 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.
[2] Roadway construction; residential, commercial, or industrial development or redevelopment.

3 Existing Catch Basin Management Program

The Town has 5,140 catch basins to clean and maintain. Refer to the map in **Appendix A**. Given the large number of basins and expense of cleaning, approximately 1,500 catch basins are cleaned each year using an outside contractor, with a select number of "priority" basins inspected and cleaned more frequently. An inspector accompanies the contractor to verify and log the data from the catch basin cleanings into the Town's Asset Management Program using a tablet or hardcopy forms. The Town uses the routes established in the 56 snow and ice quadrant maps to clean catch basins. Cleanings generally begin at Map 1 and the contractor continues through the maps until all are complete and then the process starts at the beginning again. Personnel follow Barnstable's "Contractor's Snow and Ice Control Manual" provided in **Appendix B** when performing work.

In addition to the catch basins cleaned using an outside contractor, DPW staff periodically clean catch basins that require more frequent cleaning, are located near sensitive areas, or that have issues. These catch basins are identified using a work order system.

The contractor is responsible for discarding of catch basin cleanings at a DEP Approved Dumping Site, however, the Town provides areas for temporary stockpiling at the Highway Barn located at 382 Falmouth Road, Hyannis and at the Barnstable Solid Waste Transfer Station located at 45 Flint Street, Marstons Mills. Once disposal arrangements are made by the contractor, Barnstable provides a front-end loader and operator for loading cleanings from the stockpiles.

4 Plans to Refine Catch Basin Cleaning Optimization

4.1 Optimization Methodology

Barnstable will continue to implement its existing catch basin cleaning schedule including more frequent cleaning of catch basins identified through the work order system. The Town will hire one to two outside catch basin cleaners with machines working in tandem to complete a catch basin cleaning contract. During the cleanings, Barnstable will have a Town inspector collect data on the sump depth and sediment depth in each catch basin before and after each cleaning. 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 C** will be used to document data collected during cleaning.

A minimum of four 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)

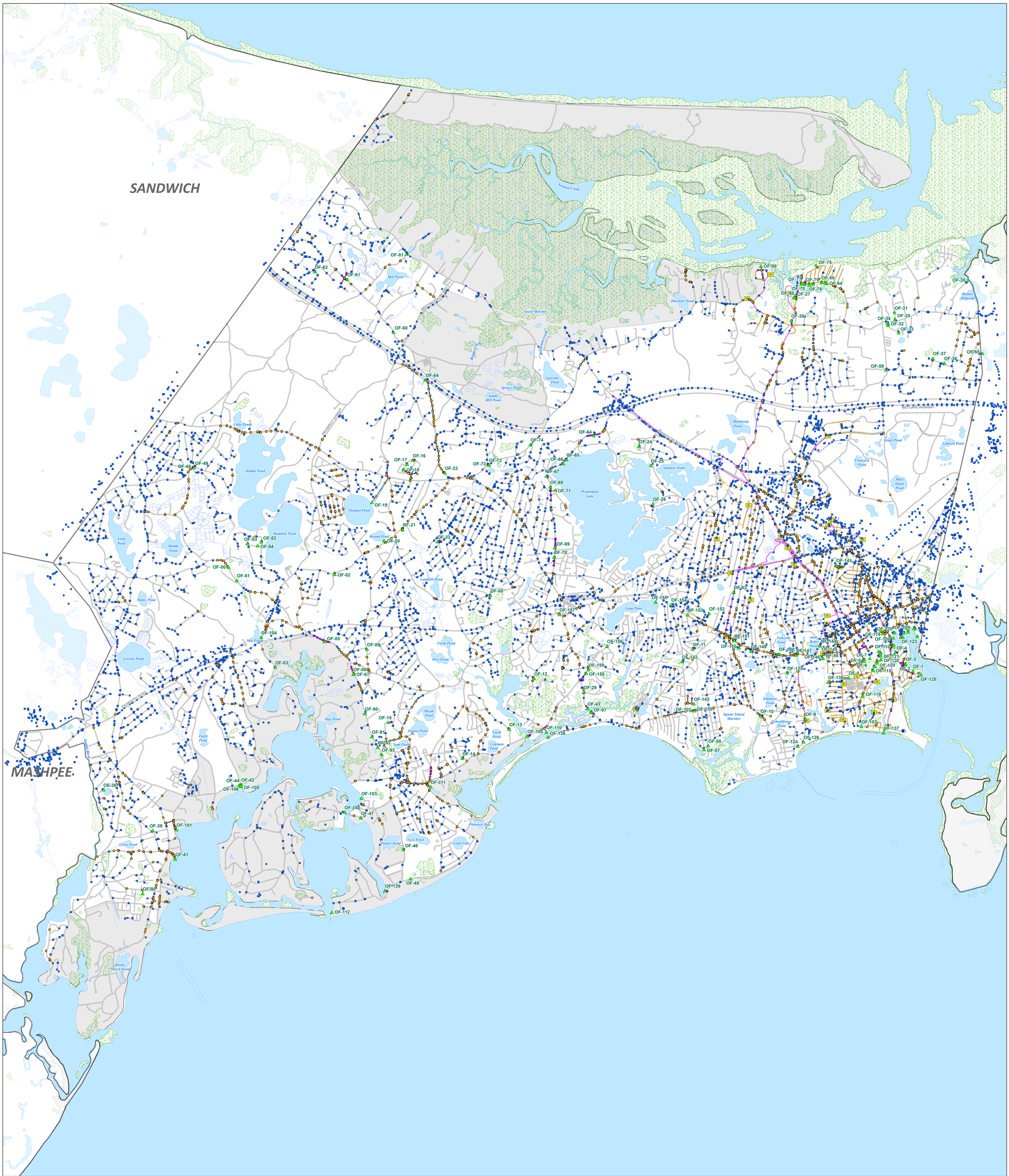
All catch basins will be inspected and cleaned following the standard operating procedures (SOP) provided in **Appendix C**.

4.3 Catch Basin Cleanings Storage and Disposal

Barnstable currently stores catch basin cleanings at either the Highway Barn located at 382 Falmouth Rd, Hyannis or the Barnstable Solid Waste Transfer Station located at 45 Flint St, Marstons Mills. The cleanings will eventually be disposed of at a DEP approved disposal site. The Town will explore possible beneficial uses for its collected catch basin cleanings.

Appendix A

Map of Drainage Infrastructure



Stormwater Infrastructure Map

Barnstable, MA

Comprehensive Environmental Incorporated

Data Sources: CEI, MassGIS, Town of Barnstable

11/4/2021

Appendix B

Contractor's Snow and Ice Control Manual

TOWN OF BARNSTABLE

DEPARTMENT OF PUBLIC WORKS

CONTRACTOR'S SNOW AND ICE CONTROL MANUAL

1.0 MISSION

During a Snow and Ice event, the Department of Public Works (DPW) is responsible for treating roads and removing the accumulated snow and ice from the town, county, and most private roads; municipal parking areas; and some sidewalks/bike paths as rapidly and efficiently as possible. The safety and mobility of the community is of the utmost importance. The DPW utilizes its own workforce and equipment, and contractor employees and equipment, to accomplish this task.

2.0 DEFINITION OF TERMS

Main Roads – A class of roads as defined by the DPW that requires larger plows and equipment. These roads tend to be wider, straighter, and have more traffic on them.

Secondary Roads – A class of roads as defined by the DPW that requires smaller plows and equipment. These roads tend to be narrower, curvy, and have less traffic on them.

Snow Plowing – to clear/remove snow via truck or machine from roads, parking areas, and sidewalks.

Snow Removal – to remove accumulated snow via mechanical means (loader/conveyor/blower into a truck) from DPW designated areas and trucking it to a separate DPW designated area.

Spreading – to evenly apply salt, sand, liquid de-icing chemicals, a mix of the same, or other substances directed by the DPW by mechanical means to roads, parking areas, and sidewalks.

3.0 SCOPE OF WORK

A. Snow Plowing – plowing shall be conducted in DPW defined predetermined routes to the following standards:
    a. All roads, parking areas, and sidewalks (both paved and unpaved) shall be cleared to their full width.

b. All paved areas shall be free from any loose accumulation of snow. Plows or buckets will be lowered /angled to their fullest extent to create a scraping effect by the steel plow/bucket edge on the pavement during plowing operations. "Shoes" or other devices used to keep the plow's or bucket's edge above the paved surface are not allowed unless written permission from the D.P.W. is granted for certain situations I;e road surface conditions, route assignments for the present contact snow and ice season only. Snow blowers are allowed to have "shoes", but with no more than 1-2 inches of clearance between the bottom of the intake chute and the top of the pavement.

c. All unpaved areas shall be cleared by leaving the plow in a slightly raised position to avoid damage to the unpaved surface.

d. All intersections/corners shall be pushed back to their fullest extent possible, as defined by DPW inspectors.

e. All sidewalk routes must have clear access from snow being piled up around obstacle's i.e. telephone poles, walls, support cables etc. If a machine cannot clear the sidewalk around these obstacles, it is up to the contractor to remove the snow by other means such as walk behind snow blowers, shoveling etc...

B. Spreading - spreading shall be conducted in DPW defined predetermined routes to the following standards:

a. Spreading shall be conducted with DPW calibrated equipment.

b. Spreading shall be at a rate prescribed by the DPW. All materials will be applied at the proper rates to ensure adequate material was applied, while avoiding over-applying material.

c. There shall be an even application of the DPW prescribed materials to no less than within one foot of the edges of the road/sidewalk/parking lot. The Contractor will refrain from applying material outside of the limits of the road/sidewalk/parking lot.

d. Intersections, curves, round-a-bouts, traffic circles, etc. and their approaches will require special attention to assure proper material applications

C. Snow Removal – snow removal will only be required upon the DPW's request. When requested, snow removal will be conducted to the following standards:

a. Snow and its associated banks/drifts shall be completely removed from the full extent of designated roads (including associated parking stalls) and sidewalks.

4.0 EQUIPMENT SPECIFICATIONS AND REQUIREMENTS

A. All equipment is required to be in good operating condition, and kept that way throughout the Snow and Ice Season. The DPW may require vehicle and equipment inspection to determine mechanical conditions of equipment. The DPW's judgment as to the condition of the units shall be final, conclusive and binding.

B. All equipment must meet the requirements of the Registry of Motor Vehicles, Commonwealth of Massachusetts, for the type of equipment and Snow and Ice class route being applied for.

C. All equipment must arrive at its specified meet point filled with fuel, in good working condition, and with all reimbursable accessories functioning properly. The DPW reserves the right to alter rates based on changed conditions.

D. Communications Equipment - all contracted equipment must have an operable, reliable communication system.

   a. Each of the contractor's operators shall have cellular phones to be able to communicate with the DPW inspectors/Emergency Response Center.

   b. Contractors supplying multi pieces of plowing/spreading equipment will need a communication device for each piece of equipment.

E. Plow Trucks/Machines – plow trucks and machines will have the following requirements:

   a. Smaller trucks (1.5 ton or 5,500 and less) require Four wheel Drive

   b. Machines (loaders, skid steers, snow blowers, etc.) – Contractors should note that machines can be used for plowing operations on roads in certain situations.

F. Spreading Equipment - spreading equipment will have the following requirements:

   a. The spreader must be able to be calibrated by DPW personnel, and capable of applying approximately 250-300 pounds of material per lane mile

   b. The spreader shall have in cab operator metered controls for both its spinner and conveyor that can be adjusted by the operator while underway.

   c. Spreader's capacity shall be appropriate for the size of the truck/route it serves as determined by DPW personnel

5.0 SAFETY REQUIREMENTS

A. The Federal Highway Administration has regulations that require employers with drivers of commercial vehicles to have an alcohol and drug-testing program in place. The specific provisions of the regulations are highly detailed and legally complex. The DPW strongly urges you to review the regulations, which are cited as 49 CFR, part 382. (www.fmcsa.dot.gov/rulesregs/fmcsr/regs/382.htm).

B. No Operator will be allowed to operate a vehicle or piece of equipment longer than 24 hours without a rest period. Contractors should make sure additional operators are available, or risk the vehicle being parked for a minimum of 6 hours while the Operator rests.

C. Any contractor's operator who must exit or work outside their vehicle for any reason while being employee by the Town of Barnstable is required to wear a reflectorized ANSI Class II safety vest, or ANSI Class II outer clothing.

D. All vehicles/machines shall comply with applicable Federal and State safety requirements.

6.0 GLOBAL POSITIONING SYSTEM (GPS)

A. The DPW will issue GPS equipment (portable) to a Contractor. The GPS system will be utilized as a way to track vehicle location, manage the snow and ice events, and increase safety.

B. The contractor will be required to have the portable GPS unit in the vehicle that is contracted by the Town at all times during a snow and ice operation, regardless of vehicle operator.

C. If the contractor swaps vehicle during a storm due to breakdown, etc., the GPS unit will go with the new vehicle that is now working for the Town.

D. If at any time, for reasons other than GPS unit failure, the contractor's vehicle(s) are not able to be tracked by the DPW, or not in their assigned route(s) (unless permission has been granted by their inspector) then the inspector will be notified to log that contractor's vehicle out, and the contractor will not be compensated for the period of time that the vehicle is out of the route or not tracked.

E. Upon the issuance of said GPS Equipment, the DPW shall further provide, under separate agreement to the Contractor the terms and conditions on the operational use and maintenance responsibility for said GPS equipment.

7.0 OBLIGATIONS OF DPW TO CONTRACTOR

A. The DPW will assign routes to the successful contractors. All assignments will be effective for the length of the Snow and Ice Season However, the DPW reserves the right to reassign routes/contractors for reasons that include, but are not limited to, the following:

   a. The operational needs of the Town.
   b. The DPW cannot reach the contractor in a timely way for whatever reason.
   c. The contractor's equipment is not available or becomes disabled during the operation.
   d. The DPW determines that the contractor is not making adequate progress during the operation.
   e. The DPW determines the Contractor has left their route without permission from their inspector.
   f. The DPW determines that the storm is of such intensity that additional equipment is required to maintain the route.
   g. The DPW determines that the Contractor's operator needs to stop and rest.
   h. The DPW determines that the route requires miscellaneous work during the operation or after the operation is completed by the contractor.
   i. The DPW determines that the storm is minimal and can be handled by Town employees.
   j. It is the DPW's opinion that is final and binding in these matters.

B. The DPW will provide road maps and route descriptions to allow for the orderly completion of the Snow and Ice removal or treatment.

C. The DPW will assign inspectors to assist the contractors and to insure the timely and satisfactory completion of the routes. The DPW Inspectors are the final arbiters regarding if the work is of adequate quality and has been properly completed.

D. The DPW will supply ballast (salt and sand) to contractors as required. The vehicle's body must be clean of all other materials before ballast is loaded. Ballast shall be

returned to the DPW when plowing has been completed. Failure to return ballast shall result in a charge to contractors.

E. The DPW will be the official timekeeper for all Snow and Ice removal activities. It is the responsibility of the contractor to finalize his/her time with their inspector at the conclusion of the snow and ice event.

F. The DPW will process and tabulate all "Snow and Ice Work Orders" for each individual contractor and route. The work orders will be processed as soon after the activity as possible. All Snow and Ice inspector time sheets shall be final, conclusive and binding. Payments will be processed and mailed to the contractors within a 30 day period after the completion of the work orders.

G. The DPW will try to leave assigned contractors in their assigned routes for the entire season. However, the DPW reserves the right to reassign routes/contractors for reasons that include, but are not limited to, the following:

   a. The operational needs of the Town.
   b. The DPW cannot reach the contractor in a timely way for whatever reason.
   c. The contractor's equipment is not available or becomes disabled during the operation.
   d. The DPW determines that the contractor is not making adequate progress during the operation.
   e. The DPW determines the Contractor has left their route without permission from their inspector.
   f. The DPW determines that the storm is of such intensity that additional equipment is required to maintain the route.
   g. The DPW determines that the Contractor's operator needs to stop and rest.
   h. The DPW determines that the route requires miscellaneous work during the operation or after the operation is completed by the contractor.
   i. The DPW determines that the storm is minimal and can be handled by Town employees.
   j. It is the DPW's opinion that is final and binding in these matters.

8.0 OBLIGATIONS OF CONTRACTOR TO TOWN.

A. The Contractor agrees to be available for Snow and Ice operations, 24 hours a day, throughout the length of the Snow and Ice season as outlined in the contract.

B. The contractor must be able to begin his/her assigned route within 1 hour of being contacted by the DPW.

C. The contractor agrees to provide the required equipment, necessary repairs, fuel and operators to satisfactorily complete the assigned routes from November 15 to April 15.

D. The contractor agrees NOT TO perform Snow and Ice removal for another person, municipality, entity, or business until being released from his/her assigned route per the DPW.

E. The Contractor agrees to accept the hourly rates that have been established by the DPW.

F. It is the responsibility of the contractor to notify the town when not available for plowing for any reason. Failure to do so may result in loss of plow route and the end of season stipend.

G. The contractor must show by past performance that he/she is capable of performing Snow and Ice removal of this magnitude.

H. The contractor is responsible for their assigned route and agrees not to sublet or assign his/her route in whole or in part.

I. The Contractor shall have adequate operators available such that no one operator will be operating the truck/machine for longer that 24-hours. If the DPW finds that an operator has been operating the equipment for over 24 hours, the DPW reserves the right to force that operator to park the equipment and rest. The Contractor will not be compensated for this time if the equipment is parked.

J. The contractor shall be responsible for damages they cause during an event. The contractor shall indemnify, defend and hold harmless the Town and their agents and employees against all suits, claims or liability of every name and nature and from all claims for things which the contractor is required to do under this contract and for or on account of any injuries to persons or damage to property or nuisances or trespasses, and specifically including death and consequential damages, arising out of or in consequence of the acts of the contractor in the performance of the work covered by the contract or failure to comply with the terms and conditions of the contract, whether by the contractor

or his agents, employees and whether or not such claims, demands, suits, or proceedings are just , unjust, groundless, false or fraudulent and the contractor shall and does hereby assume and agrees to pay for the defense of all such claims, demands, suits and proceedings. This section shall apply to all operations by the contractor in connection with Snow and Ice removal.

K. The Contractor will return all ballast to the DPW after completing the Snow and Ice operation. The Contractor shall ensure that the their truck is completely empty prior to receiving ballast, and that the ballast is kept clean and free of foreign material that may damage sanding equipment. Failure to return ballast shall result in charge to contractor.

L. The contractor's operators must have a cell phone at all times during an event to be able to communicate with the DPW Inspectors and the ERC.

M. The Contractor will obey all traffic regulations, laws, rules of the road and requirements of this policy at all times during a snowplowing event.

N. The Contractor must have a valid license (drivers, hoisting, etc.), without restriction, for the vehicle/equipment they are operating during a snow and ice event.

O. The Contractor shall immediately notify the Department of any damage that he/she caused to public or private property during a snowplowing event, and complete the required forms.

P. The Contractor or his/her operator must be able to communicate and receive oral instructions effectively with his/her inspector. Failure to be able to communicate effectively may result in the termination of the contract.

Q. The Contractor agrees to have the assigned GPS Unit installed or plugged in in his/her equipment at all times during the snow and ice event. If at any time the contractor knows the unit is longer connected or unplugged, they must notify their inspector immediately.

9.0 COMPENSATION

A. Rate of compensation is defined by the table included in Attachment A.

B. The DPW, at their sole discretion, will notify, by telephone, contractors who are required for each Snow and Ice operation. Payment for the operation will begin when the inspector logs them in at the "meet point", and will cease when the route has been completed to the satisfaction of the DPW inspector and they release the contractor.

C. The DPW will guarantee a minimum of 4 hours of compensation to contractors called for Snow and Ice operations. Contractors who are recalled to their routes to complete unsatisfactory work will not receive the guaranteed minimum compensation for the recall.

10.0 INSURANCE

A. As insurance requirements change periodically, please refer to the DPW packet for the most up to date requirements.

B. Contractors who employ other persons to operate their equipment must maintain Workman's Compensation Insurance for those employees.

11.0 HIRING AND TERMINATION

A. The DPW will choose the most experienced, well-equipped, contractors who are Interested in providing quality Snow and Ice Control.

B. All contractors who offer to provide Snow and Ice control will receive fair and equitable treatment.

C. Contractors who perform successfully during the previous winter season will be given preference over new contractors, and will be given first pick of routes.

D. If the services of the contractor are for any reason deemed unsatisfactory, the DPW will notify the contractor. If mutually agreeable arrangements cannot be achieved, the contractor will be terminated.

APPENDIX A.
FY19 SNOW AND ICE RATE SHEET

Vehicles	Hourly Rate	Early Sign-up Bonus [1]	Total
3/4 to 1 Ton, 4x4, Truck with 8 Foot Plow	$74.00	$5.50	$79.50
3/4 to 1 Ton, 4x4, Truck with 9 Foot Plow	$79.00	$5.50	$84.50
1.5 Ton, 4x4, Truck with 9 Foot Plow	$85.00	$5.50	$90.50
1.5 Ton, 4x4, Truck with 10 Foot Plow	$92.00	$5.50	$97.50
6-Wheel Truck with 10 Foot Plow	$109.00	$5.50	$114.50
6-Wheel Truck with 11 Foot Plow	$113.00	$5.50	$118.50
10-Wheel Truck with 11 Foot Plow	$118.50	$5.50	$124.00
10-Wheel Truck with 12 Foot Plow	$123.00	$5.50	$128.50
Snow Removal - 6-Wheel Dump 6-8 Yds	$75.00	$0.00	$75.00
Snow Removal - 10-Wheel Dump 10-14 Yds	$85.00	$0.00	$85.00
Snow Removal - 18-Wheel Dump Trailer	$100.00	$0.00	$100.00
Additional Vehicle Equipment Adder[2]	**Hourly Rate**	**Early Sign-up Bonus [1]**	**Total**
Wing Plow 8 ft Cutting Edge, Hydraulically Controlled	$21.50	$0.00	$21.50
Wing Plow 9 ft Cutting Edge, Hydraulically Controlled	$23.50	$0.00	$23.50
Wing Plow 10 ft Cutting Edge, Hydraulically Controlled	$27.00	$0.00	$27.00
Wing Plow 11 ft Cutting Edge, Hydraulically Controlled	$35.00	$0.00	$35.00
1.0 - 5.99 CY Spreader Body	$11.00	$0.00	$11.00
6.0 - 9.99 CY Spreader Body	$31.00	$0.00	$31.00
10 CY or Greater Spreader Body	$36.00	$0.00	$36.00
Machines	**Hourly Rate**	**Early Sign-up Bonus [1]**	**Total**
Less than 2.0 CY Loader with AWD	$81.50	$5.50	$87.00
2.0 - 3.99 CY Loader with AWD	$120.00	$5.50	$125.50
4.0 - 5.99 CY Loader with AWD	$145.00	$5.50	$150.50
Greater than 6.0 CY Loader with AWD	$155.00	$5.50	$160.50
2.0 - 4.0 CY Backhoe with AWD	$81.50	$5.50	$87.00
Skid Steer - Track	$83.50	$5.50	$89.00
Skid Steer - AWD	$70.00	$5.50	$75.50
Walk behind compact Utility loader (Dingo)	$65.00	$5.50	$70.50
Additional Machine Equipment Adder[2]	**Hourly Rate**	**Early Sign-up Bonus [1]**	**Total**
Plow Blade Attachment	$10.00	$0.00	$10.00
Snow Blower Attachment	$10.00	$0.00	$10.00
Box Plow Attachment	$10.00	$0.00	$10.00
Notes:			
1. All required paperwork, properly submitted, by November 15th			
2. The DPW has the final say as to which pieces of additional equipment will be accepted			

Appendix C

Standard Operating Procedures for Catch Basin Cleaning and Inspection

MI-2, Catch Basin Cleaning & Inspection

Catch basin cleaning (CBC) is performed to remove sediments from structures before it is washed into waterways. The Town has 5,140 catch basins to clean and maintain. For additional information, see the Town's Catch Basin Cleaning Optimization Plan.

Schedule

Approximately 1,500 catch basins are cleaned each year using an outside contractor, with a select number of "priority" basins inspected and cleaned more frequently. An inspector accompanies the contractor to verify and log the data from the catch basin cleanings into the Town's Asset Management Program using a tablet or hardcopy forms. The Town uses the routes established in the 56 snow and ice quadrant maps to clean catch basins. Cleanings generally begin at Map 1 and the contractor continues through the maps until all are complete and then the process starts at the beginning again.

In addition to the catch basins cleaned using an outside contractor, DPW staff periodically clean catch basins that require more frequent cleaning, are located near sensitive areas, or that have issues. These catch basins are identified using a work order system.

Procedures and Practices

1. If possible, notify residents and businesses of catch basin cleaning schedule to restrict parking that could obstruct catch basin cleaning operations.
2. Work upstream to downstream when cleaning catch basins within a drainage network.
3. Clean sediment and trash off grate before removing grate.
4. Inspect the outside of the grate and inside of the catch basin to determine cleaning needs and for structural integrity.
5. Either manually use a shovel to remove accumulated sediments, use a bucket loader to remove accumulated sediments, or use a high pressure washer to clean any remaining material out of the catch basin while capturing the slurry with a vacuum.
6. If necessary, after the catch basin is cleaned, use the rodder of a vacuum truck to clean downstream pipe and pull back sediment that might have entered downstream pipe.
7. After cleaning is finished, properly dispose of collected sediments (see below).
8. Collect and dispose of fluids during catch basin cleaning. Do not discharge fluids to a wetland or waterway.
9. If any suspected illicit discharges are observed or suspected, notify your supervisor.
10. At the end of each day, document location and number of catch basins cleaned, amount of waste collected, and disposal method for all screenings.

Storage and Disposal

The contractor is responsible for discarding of catch basin cleanings at a DEP Approved Dumping Site, however, the Town provides areas for temporary stockpiling at the Highway Barn located at 382 Falmouth Road, Hyannis and at the Barnstable Solid Waste Transfer Station

located at 45 Flint Street, Marstons Mills. Once disposal arrangements are made by the contractor, Barnstable provides a front-end loader and operator for loading cleanings from the stockpiles.

Storage

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

Disposal

Catch basin cleanings must be disposed of at landfills as daily cover. Sampling of the catch basin cleaning materials is not required unless there is evidence that cleanings were contaminated by a spill or other means. No reuse is allowed without first obtaining a Beneficial Use Determination (BUD) from MassDEP

Inspection and Maintenance

- Clean catch basins to maintain sediment levels in sumps at less than 50% full.
- If catch basins are more than 50% full for two consecutive cleaning events, catch basins should either be cleaned more often or the contributing area should be investigated for sediment sources.
- Inspect catch basins for structural integrity and evidence of illicit discharges during cleaning.
- Inspect tarp to ensure pile is covered and no tears.
- Immediately abate any nuisance conditions (i.e., noise, dust, odor).
- Train employees on proper CBC procedures.

Recordkeeping and Reporting

- Use attached Catch Basin Inspection Form when inspecting catch basins. Town employees should record:
    - Number of catch basins inspected.
    - Number of catch basins cleaned.
    - Log of catch basins cleaned or inspected.
    - Tons or cubic yards of catch basin cleaning materials generated.
- Use attached Catch Basin Maintenance/Repair Log to document CBC activities.

Catch Basin Inspection Procedures

Option 1: Inspection during Cleaning

1. Clean sediment and trash off of grate.
2. Remove grate.
3. Fill out **Catch Basin Inspection Form** with basin-specific information:
    - **Before cleaning**:
        - Do a visual inspection of outside of grate.
        - Do a visual inspection of the inside of the catch basin to determine cleaning needs and structural issues.
        - Measure depth from rim of catch basin to top of sediment.
        - Measure depth from rim of catch basin to the top of the outlet pipe.
        - Take photo of catch basin.
    - **Clean catch basin**:
        - For manual removal, place removed material in a location protected from potential runoff and place cleanings in a vehicle for transport to designated disposal area.
        - OR use a high-powered vac truck to remove sediment.
    - **After cleaning**:
        - Measure depth from rim to bottom of catch basin.
        - Measure depth of sum (outlet pipe to bottom of catch basin).
        - Note if the catch basin is more than 50% full with sediment.
        - Note if the catch basin requires maintenance or it there are pollutants present.
        - Take photo of catch basin.
4. If any illicit discharges are observed or suspected, notify supervisor.

Option 2: Interim Inspection between Cleaning Cycles

1. Clean sediment and trash off grate.
2. Remove grate.
3. Fill out **Catch Basin Inspection Form** with basin-specific information:
    - Do a visual inspection of outside of grate.
    - Do a visual inspection of the inside of the catch basin to determine cleaning needs and structural issues.
    - Measure depth from rim of catch basin to top of sediment.
    - Using sump depth collected during previous cleaning, note if the catch basin is more than 50% full with sediment.
    - Note if the catch basin requires maintenance or if there are pollutants present.
4. If any illicit discharges are observed or suspected, notify supervisor.

Catch Basin Inspection Form

Inspection Information			
Catch Basin ID			
Street Location		GPS Location	
Inspector's Name			
Date of Inspection		Time of Inspection	
Weather (circle)	Dry Light Rain Heavy Rain Snow		

Catch Basin Information

Location	**Surface Type**	**Grate**
☐ Road/Curb ☐ Alley ☐ Ditch ☐ Parking Lot ☐ Driveway ☐ Sidewalk Other:_____	☐ Asphalt ☐ Gravel ☐ Concrete ☐ Grass/Dirt Other:_____	____inches x ____ inches Material: _____ Shape:

Catch Basin Condition

CB Damage: No Yes	Comment:

	Materials (circle)					**Condition (circle)**			
Grate	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Frame	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Chimney	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Walls	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Trap/Hood	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent
Sump	Cast Iron	Brick	Concrete	Aluminum	Fiberglass	Poor	Fair	Good	Excellent

Sediment Depth and IDDE (inches)

A. Depth from Rim to Top of Sediment: _____ B. Depth from Rim to Bottom of Basin (after vac): _____ C. Sump Depth: _____ D. Depth of Sediment (B-A): _____ E. More than 50% Full of Sediment? (D/C): _____ **CB Cleaned?** No Yes **Suspected illicit discharge?** No Yes	Check those Present: __Sanitary Waste/Smell __Excessive Sediment __Oil Sheen __Floatables/Trash __Pet Waste: Other:_____ Potential Source: _____

Catch Basin Maintenance/Repair Log

Structure ID	Location (Street Name, Approximate Address)	Inspection Date	Problem(s) Identified, Comments	Date of Maint/Repair	Type of Maintenance/Repair, Comments

Appendix H

SWPPP Exemption Memorandum

NPDES MS4 SWPPP COMPLIANCE

TO: Mr. Nathan Collins, Assistant Town Engineer, Town of Barnstable

FROM: Mr. Nick Cristofori P.E.

DATE: September 24, 2020

SUBJECT: NPDES MS4 SWPPP Compliance

Background

Under the Environmental Protection Agency's (EPA's) 2016 National Pollutant Discharge and Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, regulated communities such as Barnstable are required to prepare Stormwater Pollution Prevention Plans (SWPPPs) for the following permittee-owned or operated facilities if they discharge stormwater to the regulated MS4 and/or surface water:

- Maintenance garages;
- Public works yards;
- Transfer stations; and
- Other waste handling facilities where pollutants are exposed to stormwater as determined by the permittee.

In response, Comprehensive Environmental Inc. (CEI) and the Town of Barnstable developed a list of town-owned facilities that may require a SWPPP, identified as the following:

Table 1 – Potential SWPPP Facilities

Facility Name	Address	Map/Lot
DPW Facility	382 Falmouth Road Hyannis, MA 02601	239-1
Transfer Station	45 Flint Street Marstons Mills, MA 02648	123-1; 123-2; 123-27; 123-28-1
Mosswood Cemetery Storage Area	280 Putnam Avenue Cotuit, MA 02635	37-9

The above facilities require preparation of a SWPPP if the following paraphrased statements from the MS4 Permit are applicable:

- "If the small MS4 is not located entirely within an urbanized area, only the portion of the MS4 that is located within the urbanized area [as per the most recent decennial census data] is regulated…"; and
- "A small municipal separate storm sewer system means all separate storm sewers that are: owned or operated by the… town… having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes… that discharges to Waters of the United States."

Per the above paraphrased permit language, only facilities located both within a community's regulated area and that discharge to Waters of the United States are regulated under the permit and thus require preparation of SWPPPs. The majority of Barnstable is located within the regulated urbanized area; however, Barnstable's MS4 drainage system largely consists of leaching drainage infrastructure due to extensive permeable sandy soils throughout the area typical of most Cape Cod communities. The Town has installed extensive leaching catch basins and similar drainage features that infiltrate stormwater locally rather than discharging into Waters of the United States. The extensive use of isolated leaching structures means that relatively little MS4 drainage infrastructure flows to Waters of the United States, and that potentially regulated SWPPP facilities must be investigated at a parcel level to determine whether or not they flow to Waters of the United States.

Desktop and Field Investigations

CEI completed a desktop evaluation of all three facilities identified in Table 1 by overlaying known drainage infrastructure with parcel, waterbody, and topography information available through GIS. Based on this desktop evaluation, it was determined that the DPW Facility requires preparation of a SWPPP on the basis of being located within a regulated area and the topography is such that stormwater runoff can potentially reach Duck Pond during large storm events. A SWPPP has been prepared for this facility as a standalone document.

Alternatively, it was determined that the Transfer Station and Mosswood Cemetery Storage Area facilities do not require preparation of a SWPPP because stormwater runoff from both facilities has no potential of reaching a waterbody even during extreme storm events. CEI completed a site inspection of the Transfer Station facility on June 17th, 2020 and Mosswood Cemetery Storage Area on August 6th, 2019 to observe relevant site-specific characteristics. A detailed description of existing on-site features, drainage infrastructure, topography, drainage patterns, and stormwater destinations for both the Transfer Station and Mosswood Cemetery Storage Area facilities is provided below.

<u>Transfer Station</u>
The Transfer Station facility receives recyclables, solid wastes, and other wastes generated primarily by residential, non-industrial sources within the Town of Barnstable. The facility is used for temporary storage for eventual transfer of recyclables, solid waste, and other wastes for off-site disposal or reuse. The facility occupies four separate properties totaling approximately 81.68 acres, however, the size of the Transfer Station facility itself is only 14.17 acres, approximately 9.84 acres of which is impervious area. The rest of the parcels largely consist of a capped landfill.

The northern part of the facility consists of various waste disposal drop-off areas, including five solid waste compactors, an open construction debris storage area two covered mattress storage trailers, a miscellaneous storage shed, a covered CRT/electronics storage trailer, an uncovered propane tank storage trailer, an open tire storage area, two open white goods storage areas, an uncovered scrap metal dumpster, an open scrap metal storage area, a precious metal lean-to shed, and several covered solid waste dumpsters awaiting pickup. Between the solid waste compactors

there are three tight tanks which collect any discharge released from the solid waste compactors. The central part of the facility also consists of various waste disposal drop-off areas and bulk material storage areas, including recycling compactors / dumpsters designated for mixed paper, cardboard, plastic, and glass drop-off, several covered recycling dumpsters awaiting pickup, solid waste dumpster, bottle redemption dumpster and shed, books trailer, paint recycle shed, a fluorescent bulbs / mercury-containing devices shed, batteries shed, and a food waste shed.

West of the recycling drop-off areas there is a large concrete pad that contains the Maintenance Garage and lean-to shed containing a 900-gallon double-walled, diesel AST. Southeast of the Maintenance Garage there is the salt shed and south of the salt shed is an Administrative Building and parking lots. Further south, there are two hazardous waste sheds and a shed containing several empty 55-gallon drums, a 500-gallon, double-walled, a waste oil AST, and two anti-freeze ASTs. Southwest of this area is an outdoor vehicle and equipment storage area, an empty trailer, a loam stockpile, an ash stockpile, a sand stockpile, a swap shop shed, several donation bins / sheds, a few empty dumpsters, and several large compost stockpiles and drop-off areas.

Drainage infrastructure at the Transfer Station consists of several leaching catch basins throughout the facility, two retention ponds on the north side of the facility, and a stormwater infiltration swale on the south side of the facility. Stormwater runoff from impervious areas in the north part of the facility generally flows west-to-east to one of the two retention ponds on the northwest or northeast corners of the facility, one of the six leaching catch basins near the solid waste compactors and gatehouse, one of the two leaching catch basins at the northeast entrance of the facility, or to a vegetated buffer. Stormwater runoff from the central part of the facility, Administrative Building, and parking lots flows northwest-to-southwest towards one of the seven catch basins spread across the area, or to a vegetated buffer. Stormwater runoff from the south side of the facility flows to the stormwater infiltration swale, or to a vegetated buffer. Runoff from the site entrance will flow easterly down the driveway to one of the leaching catch basins on Flint Street where it infiltrates into the ground. Should the runoff bypass the retention ponds, leaching catch basins, or stormwater conveyance swale during exceptionally large storm events, stormwater will infiltrate in a vegetated buffer before reaching any body of water.

Upon review of this facility, there are no Waters of the United States that will receive stormwater runoff during any conditions and thus stormwater discharges do not flow to a regulated MS4 area. Therefore, this facility does not require preparation of a SWPPP.

Mosswood Cemetery Storage Area

The Mosswood Cemetery Storage Area serves as a storage facility for materials used to maintain the cemetery. The facility occupies one property totaling approximately 70.95 acres, however, the size of the Mosswood Cemetery Storage Area itself is only 1.95 acres, all of which is pervious ground. The rest of the parcel area consists of the cemetery grounds or undeveloped wooded area.

The facility houses several material stockpiles, including loam, sand, and gravel in the center and the south portions of the facility. At the time of inspection, there were dozens of empty 55-gallon barrels located on the northwest corner of the facility, equipment (mini excavator) and material

storage areas located on the north and northeast sides of the facility, a solid waste dumpster, and equipment storage trailers on the northeast side of the facility.

There is no drainage infrastructure at the Mosswood Cemetery Storage Area. Stormwater runoff from pervious areas of the facility generally flows from the northwest side of the facility (abuts the undeveloped wooded area) or to the southeast side of the facility (abuts the cemetery grounds). Stormwater runoff generated on-site will most likely infiltrate in-place; however, should the runoff leave the facility area during exceptionally large storm events, stormwater will infiltrate in the surrounding vegetated buffer before reaching any body of water.

Upon review of this facility, there are no Waters of the United States that will receive stormwater runoff during any conditions and thus stormwater discharges do not flow to a regulated MS4 area. Therefore, this facility does not require preparation of a SWPPP.

Conclusions and Recommendations

Based on results of desktop and field investigations completed by CEI of the Transfer Station and Mosswood Cemetery Storage Area, neither facility requires preparation of a SWPPP as they do not ultimately discharge to Waters of the United States via a regulated MS4 connection. Facilities instead should have applicable O&M procedures and Standard Operating Procedures (SOPs) prepared and available for relevant activities at each location to help minimize potential pollution to other surface or subsurface locations. Should drainage at any of these facilities be altered or changed in the future, appliable facilities should be reevaluated for potential discharges to Waters of the United States.

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

Nick Cristofori, P.E.
Principal, Project Manager

Attachments:

- Facility Maps

Legend

- Outfalls
- Drainage Manholes
- Catch Basin
- Swale
- Storm Water Gravity Drain
- Contours (5 ft.)
- Parcel Boundary
- Lake, Pond, Reservoir
- Stream, Brook

N W E S

0 100 200 300 400 500

Feet

Transfer Station Drainage Map for SWPPP Compliance Barnstable, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Barnstable, CEI

9/23/2020

MOSSWOOD CEMETERY STORAGE AREA

MOSSWOOD CEMETERY

OLD POST ROAD

EAST LANE

Legend

- Drainage Manholes
- Catch Basin
- Storm Water Gravity Drain
- Parcel Boundary
- Contours (2 ft.)

N
W E
S

25 0 75

Yards

Mosswood Cemetery Storage Area
Drainage Map
Barnstable, MA

Comprehensive Environmental Incorporated

Data Sources: MassGIS, Town of Barnstable, CEI

2.27.2020

Appendix I

List of Stormwater BMPs and Inspection Records

Appendix J

Annual Reports

Year 1 Annual Report
Massachusetts Small MS4 General Permit
Reporting Period: May 1, 2018-June 30, 2019

Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form

Unless otherwise noted, all fields are required to be filled out. If a field is left blank, it will be assumed the requirement or task has not been completed.

Part I: Contact Information

Name of Municipality or Organization: Town of Barnstable

EPA NPDES Permit Number: MAR041090

Primary MS4 Program Manager Contact Information

Name: Dale Saad Title: Senior Project Manager

Street Address Line 1: 382 Falmouth Rd

Street Address Line 2:

City: Hyannis State: MA Zip Code: 02601

Email: dale.saad@town.barnstable.ma.us Phone Number: (508) 790-6400

Fax Number:

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://townofbarnstable.us/Departments/PublicWorks/Projects_and_Updates/MS4-Program.asp

Date SWMP was Last Updated: 6/30/19, next update d

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:

The Town is updating the web sites and during this change over some information may not be available online. Please call DPW at (508)790-6400 and the information will be transfer to you. Thank you

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://townofbarnstable.us/Departments/PublicWorks/Projects_and_Updates/MS4-Program.asp

☒ 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://townofbarnstable.us/Departments/PublicWorks/Projects_and_Updates/MS4-Program.asp

☐ 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)*

Nitrogen (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 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 Table 3 of Attachment 1 to Appendix H already existing or installed in the regulated area by the permittee or its agents shall be tracked and the permittee shall estimate the nitrogen 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 nitrogen removed in mass per year by the BMP in each each annual report

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:

Public Education and Outreach - can be found at https://www.townofbarnstable.us/WaterResources/reports.asp which lists "Reports and Articles" what contains other educational information including the Coastal Health Tool Kit. During August 2019, the Town developed a comprehensive public education program. In part, this program consisted of website text with a permit overview, specific messages and topics for each of the Town's four audiences, links to external websites, and links for download of approximately 20 different outreach brochures. The Town is working to bring this website online. This program also consists of a detailed schedule for material distribution, including seasonal messages for bacteria, nitrogen, and phosphorus TMDL and impaired waters requirements. Seasonal message outreach will start during fall 2019.

IDDE Ordinance and Construction/ Erosion and Sediment Control Ordinance - The Town is currently reviewing a draft IDDE ordinance and Construction/ Erosion and Sediment Control Ordinance. The Town will also be adopting an updated Post-Construction Stormwater Management Ordinance during Year 2. It is anticipated that all ordinances will go before the Town Council in 2020.
Procedures for Site Plan Review and Site Inspections - The Town has existing requirements under its Site Plan Review and Subdivision regulations, however these do not provide a comprehensive program that applies to all sites that disturb one acre or more. These will be revised along with the ordinance updates to be completed during Year 2.

Stormwater BMP Inspections - The Town is currently developing an inventory of its town-owned Stormwater BMPs.

IDDE Training - An employee IDDE Training program will be developed during Year 2, with annual training to be performed starting in Year 2 and is schedule for the DPW All Hands meeting in early December 2019.

Good Housekeeping and Pollution Prevention for Permittee Owned Operations - The Town is currently sweeping the areas subject to Permit at least once a year and more often as needed. During Year 2, the Town will increase sweeping frequency to two times per year (spring and fall) and as needed.

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: 12

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: Walking Tour, Cotuit Village Stormwater

Message Description and Distribution Method:

Developed a written brochure to accompany a Cotuit Village Stormwater Walking Tour describing stormwater features at eight different sites. Brochure was distributed local libraries, the town offices, and made available for download on the Town's website.

Targeted Audience: Developers (construction), Residents and Businesses

Responsible Department/Parties: Department of Public Works

Measurable Goal(s):

52 Brochures were taken from the DPW Office. At all other locations in Town including the Cotuit Library, volunteers were replacing as needed and unable to give counts.

Message Date(s): May 1, 2018 to 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:

Educational opportunity for groups to see different BMPs within a walking tour.

BMP: Video, Think Blue Massachusetts "Fowl Water"

Message Description and Distribution Method:

Think Blue Massachusetts "Fowl Water" video (https://www.thinkbluemassachusetts.org/)
Advertisement on Facebook, Instagram, & YouTube

Targeted Audience: Residents

Responsible Department/Parties: Information Technology

Measurable Goal(s):

40,724 social media impressions from Town residents.

Message Date(s): June 23, 2019 - 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:

BMP: Informational Presentations, Stormwater Green Infrastructure BMP Design

Message Description and Distribution Method:

Throughout Permit Year 1, the Town hosted a number of public informational meetings on ongoing and upcoming stormwater BMP construction projects. Subject projects are located at the following locations: Cotuit Library (Cotuit), South County Road (Osterville), Putnam Avenue at the Little River crossing (Cotuit), Old Shore Road/Ropes Beach (Cotuit), Cordwood Landing (Cotuit), Prince Avenue (Marstons Mills), Osterville Library (Osterville), Oyster Place Road/Town Dock (Cotuit), and Gateway Park (Hyannis). BMPs include bioretention/rain gardens, swales, sand filters, and a gravel wetland.

Targeted Audience: Businesses, Residents and Developers

Responsible Department/Parties: Department of Public Works

Measurable Goal(s):

Host at least one informational meeting per year to showcase ongoing stormwater improvement projects. A total of 9 different projects were highlighted throughout Permit Year 1 during periodic meetings.

Message Date(s): Throughout Permit Year 1

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 actively performs this item throughout the year and was determined that this would be an effective method for public education and outreach.

BMP: Mutt Mitt Dispensers

Message Description and Distribution Method:

Provide Mutt Mitt dispensers and refills at public areas frequented by dog walkers to encourage pet waste pickup.

Targeted Audience: Residents

Responsible Department/Parties: Recreation Department, Department of Public Works, Public Health Division

Measurable Goal(s):

Maintain Mutt Mitt dispensers at certain public areas frequented by dog walkers. Add additional dispensers at

problem locations as budget allows.

Message Date(s): Ongoing

Message Completed for: Appendix F Requirements ☒ Appendix H Requirements ☒

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

If yes, describe why the change was made:

Add an Educational Message

MCM2: Public Participation

Describe the opportunity provided for public involvement in the development of the Stormwater Management Program (SWMP) during the reporting period:

SWMP Plan for Download - The Town has posted the SWMP Plan on Town website along with contact information to allow for public comment.

3 Bays Stormwater Program - As part of the 3 Bays Stormwater Program, four different public meetings were held during FY2019. Additional meetings were held to familiarize neighbors with the project, as well as for submittal of Notice of Intent for the project.

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:

Coastal Cleanups – organize and support volunteer groups for the annual COASTSWEEP shoreline clean-up focusing on conservation areas and Town beaches to pick up trash and other discarded materials. Currently, beaches are cleaned bi-annually.

Massachusetts Estuary Program (MEP) – as part of the Massachusetts Estuary Program, Barnstable staff continually monitor select water quality stations, and collect representative samples at least 4 times per year. This program has been ongoing since approximately 2005.

Household Hazardous Waste Collection Days – in conjunction with the Cape Cod Cooperative Extension, the Town of Barnstable sponsors up to 4 household hazardous waste collection days a year to encourage the proper disposal of hazardous materials by its residents.

Infrastructure and Energy Committee – Barnstable's DPW continually works to promote involvement in the Infrastructure and Energy Committee (I&EC) to promote water quality and stormwater goals.

Informational Public Meetings - The Town of Barnstable also held public meetings related to specific stormwater improvement projects. Project names and meeting dates are as follows:

- Barnstable Village Improvements Project: 5/30/2018

- 3 Bays Green Stormwater BMP Program:
  - Cotuit Civic Association: 6/19/18 & 2/28/19
  - BARS: 7/11/19 & 2/5/19
  - Marstons Mills Liberty Hall: 2/26/19
- Stormwater Talk APCC at Tales of Cape Cod: 6/14/18
- UMass "Coastal Resiliency" project: 9/8/18
- Inside Barnstable Town Government: 3/19/19
- NOI for 3Bays Projects: 5/28/19 & 6/25/19

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

Below, report on the number of SSOs identified in the MS4 system and removed during this reporting period.

Number of SSOs identified: 0

Number of SSOs removed: 0

Below, report on the total number of SSOs identified in the MS4 system and removed to date. At a minimum, report SSOs identified since 2013.

Total number of SSOs identified: 6

Total number of SSOs removed: 6

MS4 System Mapping

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

The Town has mapped the majority of its known stormwater infrastructure, including catch basins, manholes, and outfalls. As new infrastructure is located, it is added to the Town's GIS library. It should be noted that the Town's drainage infrastructure has a substantial number of leaching structures and thus is generally composed of disconnected, small segments.

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:

N/A

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

Number of outfalls screened: N/A

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

Percent of total outfalls screened: 0%

Catchment Investigations

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

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

N/A

Below, report on the number of catchment investigations completed during this reporting period.

Number of catchment investigations completed this reporting period: 0

Below, report on the percent of catchments investigated to date.

Percent of total catchments investigated: 0%

Optional: Provide any additional information for clarity regarding the catchment investigations below:

Not yet formally started, however the Town inspects catchments as needed to evaluate potential illicit discharges.

IDDE Progress

If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.

- ◉ The illicit discharge removal report is attached to the email submission
- ○ The illicit discharge removal report can be found at the following website:

Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed during this reporting period.

Number of illicit discharges identified: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: 0 [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: 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 the reporting period:

An employee IDDE Training program will be developed during Year 2, with annual training to be performed annually starting in Year 2. Training is scheduled for DPW All Hands meeting in early December 2019.

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: 30

Number of inspections completed: 136

Number of enforcement actions taken: 0

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

Ordinance Development

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

The Town is currently reviewing a draft Post-Construction Stormwater Management Ordinance during Year 2. It is anticipated that this ordinance will be before the Barnstable Town Council in 2020.

As-built Drawings

Describe the status of the measures the MS4 has utilized to require the submission of as-built drawings and ensure long term operation and maintenance of completed construction sites required to be complete in year 2 of the permit term:

As part of the regulatory updates to be performed during Year 2, procedures for submittal of as-built drawings and long term operation and maintenance will be developed.

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 is currently developing an inventory of its permittee-owned properties. Once completed, facilities will be evaluated for potential BMP retrofit opportunities during future permit years.

MCM6: Good Housekeeping

Catch Basin Cleaning

Describe the status of the catch basin cleaning optimization plan:

The Town developed a Catch Basin Optimization Plan during Year 1 as a component of its SWMP Plan. This p

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://townofbarnstable.us/Departments/PublicWorks/Projects_and_Updates/MS4-Program.asp

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: 2069

Number of catch basins cleaned: 2069

Total volume or mass of material removed from all catch basins: 740 tons

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

Total number of catch basins: 5140

If applicable:

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

The Town is collecting data on catch basins and have not yet performed two consecutive inspection or cleaning events.

Street Sweeping

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

The Town developed a Street Sweeping Prioritization Plan during Year 1 as a component of its SWMP Plan. This consists of a map displaying sweeping requirements throughout the Town and a Standard Operating Procedure (SOP) for completing the sweeping.

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

- (●) Number of miles cleaned: 788, & 35 parking lo
- ( ) Volume of material removed: [UNITS]
- ( ) Weight of material removed: 250 tons

If applicable:

For rural uncurbed roadways with no catch basins, describe the progress of the inspection, documentation, and targeted sweeping plan:

N/A

Winter Road Maintenance

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

The Town developed SOPs for winter road maintenance during Year 1. These SOPs 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. During FY2019, the Town used 2,252 tons of straight salt and 1,207 tons of premixed salt to handle approximately 15" of total snow.

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:

The Town is currently developing an inventory of its permittee-owned properties, to be completed 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:

The Town is currently developing O&M Procedures for its Parks and Open Spaces, Buildings and Facilities, and Vehicles and Equipment, to be completed by the end of 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:

The Town is currently working towards completing SWPPPs for applicable facilities. The Town completed a preliminary review of its facilities during Year 1 and determined that either 2 or 3 facilities are likely regulated. During Year 2, the Town will complete a more comprehensive facility assessment and complete SWPPPs for applicable facilities by the end of 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: 0

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

N/A

O&M Procedures for Stormwater Treatment Structures

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

The Town is currently developing an inventory of its town-owned Stormwater BMPs. Once complete, the Town will inspect all regulated stormwater BMPs annually and perform maintenance 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:

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 performed during Year 1 include submittal of a Notice of Intent, development of a comprehensive Stormwater Management Program (SWMP) Plan which in part also included development of a Catch Basin Optimization Plan and Street Sweeping Plan, development of a comprehensive Illicit Discharge Detection and Elimination (IDDE) Plan which in part included creation of procedures for identifying and removing illicit discharges along with classifying, prioritizing, and delineating catchment areas. Other activities completed included development of winter operation and maintenance procedures and completing an assessment of existing stormwater-related regulatory mechanisms.

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:

As dry weather inspections are required for all regulated outfalls by the end of Year 3, the Town anticipates beginning these inspections during Year 2 to get a head start on sampling requirements. This will allow the Town more time to complete the inspections by the Year 3 deadline.

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:	Mark S. Ells	Title:	Town Manager
Signature:		Date:	

[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: Town of Barnstable

EPA NPDES Permit Number: MAR041090

Primary MS4 Program Manager Contact Information

Name: Nathan Collins Title: Assistant Town Engineer

Street Address Line 1: 382 Falmouth Road

Street Address Line 2: N/A

City: Hyannis State: MA Zip Code: 02601

Email: Nathan.Collins@town.barnstable.ma.us Phone Number: (508) 790-6400

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.townofbarnstable.us/Departments/PublicWorks/Projects_and_Updates/MS4-Program.asp

Date SWMP was Last Updated: February 26, 2020

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:

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:

Nitrogen (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) that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release 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 listed in Table 3 of Attachment 1 to Appendix H already existing or installed in the regulated area by the permittee or its agents was tracked and the nitrogen removal by the BMP was estimated consistent with Attachment 1 to Appendix H. The BMP type, total area treated by the BMP, the design storage volume of the BMP and the estimated nitrogen 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:

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:

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

☒ 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:

Charles River Watershed Phosphorus TMDL

☐ Completed Legal Analysis

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:

Lake and Pond Phosphorus TMDL

☐ Completed Legal Analysis

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

Optional: Use the box below to provide any additional information you would like to share as part of your self-assessment:

Part III: Receiving Waters/Impaired Waters/TMDL

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

- (●) Yes
- ( ) No

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

The Town has determined it is subject to the following additional TMDL and Impaired Waters requirements:
-Lovells Pond (MA96185), turbidity water quality impairments requirements (Appendix H, Part V)
-Little River (MA96-99), bacteria water quality impairments requirements (Appendix H, Part III)
-Unnamed Tributary (MA96-100), bacteria water quality impairments requirements (Appendix H, Part III)

The following changes were made that do not affect TMDL and Impaired Waters requirements:
-Hamblin Pond (MA96126), Harmful Algal Blooms impairment added to 303(d) list
-Middle Pond (MA96198), Harmful Algal Blooms impairment added to 303(d) list
-Mystic Lake (MA96218), (Aquatic Plants (Macrophytes)*) added to 303(d) list
-Hyannis Harbor (MA96-05), fecal coliform impairment removed from 303(d) list

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**: 5

*Below, report on the educational messages completed **during this reporting period**. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.*

BMP:[Message name here]

Message Description and Distribution Method:

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:[Message name here]

Message Description and Distribution Method:

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: [Message name here]

Message Description and Distribution Method:

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: [Message name here]

Message Description and Distribution Method:

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:[Message name here]

Message Description and Distribution Method:

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:

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**:

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

Describe any other public involvement or participation opportunities conducted **during this reporting period**:

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

Check off the box below if the statement is true.

☐ This SSO section is NOT applicable because we DO NOT have sanitary sewer

*Below, report on the number of SSOs identified in the MS4 system and removed **during this reporting period**.*

Number of SSOs identified: 0

Number of SSOs removed: 0

MS4 System Mapping

Below, check all that apply.

The following elements of the Phase I map have been completed:

☒ Outfalls and receiving waters
☐ Open channel conveyances
☐ Interconnections
☒ Municipally-owned stormwater treatment structures
☒ Waterbodies identified by name and indication of all use impairments
☒ Initial catchment delineations

Optional: Describe any additional progress you made on your map during this reporting period or provide additional status information regarding your map:

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: 137

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:

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:

N/A, none found to date

*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 the reporting period**:

MCM4: Construction Site Stormwater Runoff Control

*Below, report on the construction site plan reviews, inspections, and enforcement actions completed **during this reporting period**.*

Number of site plan reviews completed: 52

Number of inspections completed: 15

Number of enforcement actions taken: 0

Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:

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

Ordinance or Regulatory Mechanism

Below, select the option that describes your ordinance or regulatory mechanism progress.

- ○ Bylaw, ordinance, or regulations are updated and adopted consistent with permit requirements
- ◉ Bylaw, ordinance, or regulations are updated consistent with permit requirements but are not yet adopted

○ Bylaw, ordinance, or regulations have not been updated or adopted

As-built Drawings

Describe the measures the MS4 has utilized to require the submission of as-built drawings and ensure long term operation and maintenance of completed construction sites:

Street Design and Parking Lots Report

Describe the status of the street design and parking lots assessment due in year 4 of the permit term, including any planned or completed changes to local regulations and guidelines:

Green Infrastructure Report

Describe the status of the green infrastructure report due in year 4 of the permit term, including the findings and progress towards making the practice allowable:

Retrofit Properties Inventory

Describe the status of the inventory, due in year 4 of the permit term, of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

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: 1,809

Number of catch basins cleaned: 1,809

Total volume or mass of material removed from all catch basins: 292 tons

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

Total number of catch basins: 5,140

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: 65
- ( ) Volume of material removed: [Select Units]
- ( ) Weight of material removed: 196 tons

O&M Procedures and Inventory of Permittee-Owned Properties

Below, check all that apply.

The following permittee-owned properties have been inventoried:

- ☒ Parks and open spaces
- ☒ Buildings and facilities
- ☒ Vehicles and equipment

The following O&M procedures for permittee-owned properties have been completed:

- ☒ Parks and open spaces
- ☒ Buildings and facilities
- ☒ Vehicles and equipment

Stormwater Pollution Prevention Plan (SWPPP)

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

Number of site inspections completed: 0

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

Additional Information

Monitoring or Study Results

Results from any other stormwater or receiving water quality monitoring or studies conducted during the reporting period not otherwise mentioned above, where the data is being used to inform permit compliance or permit effectiveness must be attached.

- (●) Not applicable
- ( ) The results from additional reports or studies are attached to the email submission
- ( ) The results from additional reports or studies can be found at the following website(s):

If such monitoring or studies were conducted on your behalf or if monitoring or studies conducted by other entities were reported to you, a brief description of the type of information gathered or received shall be described below:

Additional Information

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

COVID-19 Impacts

Optional: If any of the above year 2 requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

IDDE, Construction, and Post-Construction Ordinances - the Town is working on finalizing updates to its existing regulatory mechanisms to address all EPA permit requirements, including illicit discharges, construction, and post-construction requirements. The Town formed a working group and actively reviewed regulatory updates during the first eight months of Permit Year 2, however, as a result of the COVID-19 outbreak, regulations were not finalized or updated as planned during Permit Year 2. The Town currently anticipates completing required regulatory updates during Permit Year 3.

Public Education and Outreach - a message related to spring lawn care and proper fertilizer application was posted to the Town's website in spring 2020, however, additional public education or outreach was not

completed during Year 2 in part due to the COVID-19 outbreak.

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: MARK S. [illegible] Title: TOWN MANAGER

Signature: [illegible] Date: 9.28.2020

[Signatory may be a duly authorized representative]

Year 3 Annual Report
Massachusetts Small MS4 General Permit
Reporting Period: July 1, 2020-June 30, 2021

Please DO NOT attach any documents to this form. Instead, attach all requested documents to an email when submitting the form

Unless otherwise noted, all fields are required to be filled out. If a field is left blank, it will be assumed the requirement or task has not been completed. Please ONLY report on activities between July 1, 2020 and June 30, 2021 unless otherwise requested.

Part I: Contact Information

Name of Municipality or Organization: Town of Barnstable

EPA NPDES Permit Number: MAR041090

Primary MS4 Program Manager Contact Information

Name: Nathan Collins Title: Assistant Town Engineer

Street Address Line 1: 382 Falmouth Road

Street Address Line 2:

City: Hyannis State: MA Zip Code: 02601

Email: Nathan.Collins@town.barnstable.ma.us Phone Number: (508) 790-6400

Stormwater Management Program (SWMP) Information

SWMP Location (web address): https://www.townofbarnstable.us/Departments/PublicWorks/Projects_and_Updates/MS4-Program.asp

Date SWMP was Last Updated: June 30, 2021

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:

Annual Requirements

- ☒ Provided an opportunity for public participation in review and implementation of SWMP and complied with State Public Notice requirements
- ☒ Kept records relating to the permit available for 5 years and made available to the public
- ☒ The SSO inventory has been updated, including the status of mitigation and corrective measures implemented
  - ○ This is not applicable because we do not have sanitary sewer
  - ◉ This is not applicable because we did not find any new SSOs

- ○ The updated SSO inventory is attached to the email submission
- ○ The updated SSO inventory can be found at the following website:

- ☒ Properly stored and disposed of catch basin cleanings and street sweepings so they did not discharge to receiving waters
- ☒ Provided training to employees involved in IDDE program within the reporting period
- ☐ All curbed roadways were swept at least once within the reporting period
- ☒ Updated system map due in year 2 as necessary
- ☒ Enclosed all road salt storage piles or facilities and implemented winter road maintenance procedures to minimize the use of road salt
- ☒ Implemented SWPPPs for all permittee owned or operated maintenance garages, public works yards, transfer stations, and other waste handling facilities
- ☒ Updated inventory of all permittee owned facilities as necessary
- ☒ O&M programs for all permittee owned facilities have been completed and updated as necessary
- ☒ Implemented all maintenance procedures for permittee owned facilities in accordance with O&M programs
- ☒ Implemented program for MS4 infrastructure maintenance to reduce the discharge of pollutants
- ☒ Inspected all permittee owned treatment structures (excluding catch basins)

Optional: If you would like to describe progress made on any incomplete requirements listed above, provide any additional information, and/or if any of the above annual requirements could not be completed due to the impacts of COVID-19, please identify the requirement that could not be completed, any actions taken to attempt to complete the requirement, and reason the requirement could not be completed below:

Bacteria/ Pathogens (Combination of Impaired Waters Requirements and TMDL Requirements as Applicable)

Annual Requirements

*Public Education and Outreach**

- ☒ Annual message was distributed encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- ☐ Permittee or its agents disseminated educational material to dog owners at the time of issuance or renewal of dog license, or other appropriate time
- ☒ Provided information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria

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

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

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:

Nitrogen (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) that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release 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 listed in Table 3 of Attachment 1 to Appendix H already existing or installed in the regulated area by the permittee or its agents was tracked and the nitrogen removal by the BMP was estimated consistent with Attachment 1 to Appendix H. The BMP type, total area treated by the BMP, the design storage volume of the BMP and the estimated nitrogen 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:

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:

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
- ☒ 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:

Charles River Watershed Phosphorus TMDL

- ☐ Completed the funding source assessment

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:

Lake and Pond Phosphorus TMDL

- ☐ Completed the funding source assessment

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

Optional: Use the box below to provide any additional information you would like to share as part of your self-assessment:

Part III: Receiving Waters/Impaired Waters/TMDL

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

- (●) Yes
- ( ) No

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

The Town has determined it is subject to the following additional TMDL and Impaired Waters requirements:
-Lovells Pond (MA96185), turbidity water quality impairments requirements (Appendix H, Part V)
-Little River (MA96-99), bacteria water quality impairments requirements (Appendix H, Part III)
-Unnamed Tributary (MA96-100), bacteria water quality impairments requirements (Appendix H, Part III)

Note, the Hyannis Harbor (MA96-05), fecal coliform impairment removed from 303(d) list

The following changes were made that do not affect TMDL and Impaired Waters requirements:
-Hamblin Pond (MA96126), Harmful Algal Blooms impairment added to 303(d) list
-Middle Pond (MA96198), Harmful Algal Blooms impairment added to 303(d) list
-Mystic Lake (MA96218), (Aquatic Plants (Macrophytes)*) added to 303(d) list

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**: 5

*Below, report on the educational messages completed **during this reporting period**. For the measurable goal(s) please describe the method/measures used to assess the overall effectiveness of the educational program.*

BMP:[Message name here]

Message Description and Distribution Method:

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:[Message name here]

Message Description and Distribution Method:

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:[Message name here]

Message Description and Distribution Method:

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:[Message name here]

Message Description and Distribution Method:

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:[Message name here]

Message Description and Distribution Method:

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:

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**:

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

Describe any other public involvement or participation opportunities conducted **during this reporting period**:

MCM3: Illicit Discharge Detection and Elimination (IDDE)

Sanitary Sewer Overflows (SSOs)

Check off the box below if the statement is true.

☐ This SSO section is NOT applicable because we DO NOT have sanitary sewer

*Below, report on the number of SSOs identified in the MS4 system and removed **during this reporting period**.*

Number of SSOs identified: 0

Number of SSOs removed: 0

MS4 System Mapping

Optional: Provide additional status information regarding your map:

Screening of Outfalls/Interconnections

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

○ No outfalls were inspected

◉ The outfall screening data is attached to the email submission

○ The outfall screening data can be found at the following website:

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

Number of outfalls screened: 0

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

Percent of outfalls screened: 86

Optional: Provide additional information regarding your outfall/interconnection screening:

Catchment Investigations

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

- (•) No catchment investigations were conducted
- ( ) The catchment investigation data is attached to the email submission
- ( ) The catchment investigation data can be found at the following website:

*Below, report on the number of catchment investigations completed **during this reporting period**.*

Number of catchment investigations completed this reporting period: 0

*Below, report on the percent of catchments investigated **to date.***

Percent of total catchments investigated: 0

Optional: Provide any additional information for clarity regarding the catchment investigations below:

IDDE Progress

If illicit discharges were found, please submit a document describing work conducted over this reporting period, and cumulative to date, including location source; description of the discharge; method of discovery; date of discovery; and date of elimination, mitigation, or enforcement OR planned corrective measures and schedule of removal.

- (•) No illicit discharges were found
- ( ) The illicit discharge removal report is attached to the email submission
- ( ) The illicit discharge removal report can be found at the following website:

*Below, report on the number of illicit discharges identified and removed, along with the volume of sewage removed **during this reporting period.***

Number of illicit discharges identified: 0

Number of illicit discharges removed: 0

Estimated volume of sewage removed: 0 gallons/day

*Below, report on the total number of illicit discharges identified and removed to date. At a minimum, report on the number of illicit discharges identified and removed **since the effective date of the permit (July 1, 2018)**.*

Total number of illicit discharges identified: 0

Total number of illicit discharges removed: 0

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

Employee Training

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

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: 0

Number of inspections completed: 0

Number of enforcement actions taken: 0

Optional: Enter any additional information relevant to construction site plan reviews, inspections, and enforcement actions:

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

As-built Drawings

*Below, report on the number of as-built drawings received **during this reporting period**.*

Number of as-built drawings received: 0

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:

Green Infrastructure Report

Describe the status of the green infrastructure report due in year 4 of the permit term, including the findings and progress towards making the practice allowable:

Retrofit Properties Inventory

Describe the status of the inventory, due in year 4 of the permit term, of permittee-owned properties that could be modified or retrofitted with BMPs to mitigate impervious areas and report on any properties that have been modified or retrofitted:

MCM6: Good Housekeeping

Catch Basin Cleaning

*Below, report on the number of catch basins inspected and cleaned, along with the total volume of material removed from the catch basins **during this reporting period**.*

Number of catch basins inspected: 1,809

Number of catch basins cleaned: 1,809

Total volume or mass of material removed from all catch basins: 292 tons

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

Total number of catch basins: 471

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: 746
- ( ) Volume of material removed: [Select Units]
- ( ) Weight of material removed: 195 tons

Stormwater Pollution Prevention Plan (SWPPP)

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

Number of site inspections completed: 0

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

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:	Nathan A. Collins, PE	Title:	Assistant Town Engineer
Signature:		Date:	

[Signatory may be a duly authorized representative]