Town of Maynard

Stormwater Management Program

For Coverage Under The

National Pollutant Discharge Elimination System (NPDES)
General Permit for Municipal Separate Storm Sewer Systems (MS4)

November 2022

Town of Maynard
195 Main St
Maynard, MA 01754

EPA NPDES Permit Number W-035581

Contents

Appendices

Certification

Authorized Representative: The Town of Maynard's Select Board has designated Gregory W. Johnson, Town Administrator, as an authorized representative to sign MS4 reports. Gregory W. Johnson is designated as an authorized person for signing all reports including but not limited to the stormwater management plan, stormwater pollution prevention plans, inspection reports, annual reports, monitoring reports, reports on training, and other information required by the MS4 Permit. The authorization letter, dated March 27, 2019, is provided in Appendix A.

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

Gregory W. Johnson, Town Administrator

Signature:  Date: December 16, 2022

Background

Regulatory Context

Under the Clean Water Act, the United States Environmental Protection Agency (EPA) promulgated the Stormwater Phase II Final Rule in 1999 as part of its efforts to preserve, protect, and improve the Nation's water resources from polluted stormwater runoff. Under the Phase II rule, operators of Municipal Separate Storm Sewer Systems (MS4s) with stormwater discharges from census-designated Urbanized Area are required to seek permit coverage for those stormwater discharges.

On May 1, 2003, EPA Region 1 issued Massachusetts' first General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (2003 MS4 Permit), consistent with the Phase II rule. This Permit remained in effect until operators became authorized under the 2016 MS4 Permit, which became effective on July 1, 2018.

Maynard has been implementing a Stormwater Management Program (SWMP) since receiving Authorization to Discharge under the 2003 MS4 Permit. Maynard has prepared this updated SWMP to comply with requirements within the 2016 MS4 Permit and to reflect improvements that Maynard has made to its program over the past several years.

Town of Maynard MS4

Maynard is a small suburban town in Middlesex County, bordering the towns of Acton, Concord, Stow, and Sudbury. With a population of approximately 10,750, according to the 2020 U.S. Census Bureau, Maynard is a diverse community with a mix of residential and commercial land uses and an abundance of open spaces, including local parks, Maynard Golf Course, the Assabet River National Wildlife Refuge, and historic Glenwood Cemetery. The Assabet River flows through Maynard and has shaped much of the Town's development.

Stormwater runoff in Maynard flows through the Town's storm drains to the Assabet River, Taylor Brook, Second Division Brook, Pratt's Brook, and Puffer's Pond, along with upstream wetlands. The land and water bodies of Maynard, combined with the land and water bodies from surrounding towns, make up the Sudbury-Assabet-Concord Watershed, or SuAsCo for short. The SuAsCo Watershed consists of a large network of tributaries that flow into the Merrimack River. The three major rivers that flow through the watershed – the Sudbury, the Assabet, and the Concord – have been recognized for their outstanding ecological, historical, and recreational values.

Several Town departments and boards participate in maintaining and protecting the Town's storm drainage system, also known as the Municipal Separate Storm Sewer System (MS4). The Maynard Department of Public Works (DPW) manages the Town's MS4. DPW consists of several divisions: Highway, Water and Sewer, Cemetery and Grounds, and the Waste Water Treatment Plant. Together, all divisions maintain the roadways, parks, cemetery, and water and sewer infrastructure throughout the Town. Maynard's Conservation Commission and Conservation Division work to protect the natural resources of Maynard by administering the Massachusetts Wetlands Protection Act, Maynard Wetlands Administration Bylaw, Maynard Wetlands Administration Regulations, Maynard Stormwater Management Bylaw, and Maynard Stormwater Management Regulations. The Planning Division supports the Planning Board and Zoning Board of Appeals with enforcement of Maynard Zoning By-Laws, and leads community planning, preservation, and economic development initiatives.

Requirements in the MS4 Permit apply to Maynard's municipal storm drain system, including catch basins, stormwater pipes, swales, ditches, and stormwater treatment structures (also known as best management practices or BMPs), as well as Town-owned roads and properties where stormwater runoff and pollutants are generated. The MS4 Permit applies only to areas categorized as "urbanized", based on the 2010 census, which for Maynard is the entire Town. Maynard's MS4 Regulated Area map is provided in Appendix B and shows that under the previous 2003 MS4 Permit, the Assabet River National Wildlife Refuge was not considered "urbanized."

Stormwater Management Program (SWMP)

The SWMP describes the activities and measures, or best management practices (BMPs), that Maynard will implement to meet the terms and conditions of the permit. The SWMP is intended to be a "living document", which Maynard will update and/or modify during the permit term as new information is developed or Maynard's activities are modified, changed, or updated to meet permit conditions. Maynard will assess the need for SWMP updates as part of the Annual Evaluation to be completed, along with the Annual Report, by the end of September each year. Permit years referenced in the SWMP correspond to fiscal years, beginning with fiscal year 2019 (permit year 1).

The SWMP is organized by minimum control measures (MCMs) and additional BMPs for discharges to water quality limited waterbodies.

MCM 1: A public education program aiming to affect public behavior causing stormwater pollution,

MCM 2: An opportunity for the public to participate and provide comments on the stormwater program,

MCM 3: A program to effectively find and eliminate illicit discharges within the MS4,

MCM 4: A program to effectively control construction site stormwater discharges to the MS4,

MCM 5: A program to ensure that stormwater from development projects entering the MS4 is adequately controlled by the construction of stormwater controls, and

MCM 6: A good housekeeping program to ensure that stormwater pollution sources on municipal properties and from municipal operations are minimized.

TMDLs and Water Quality Impairments: Enhanced and additional BMPs to reduce pollutants of concern discharging to waterbodies with water quality impairments and Total Maximum Daily Loads (TMDLs) related to urban stormwater runoff.

Small MS4 Authorization

Maynard submitted its Notice of Intent (NOI) on September 26, 2018. EPA granted Authorization to Discharge on June 4, 2019. Maynard's NOI and Authorization Letter can be found at the following web address:

https://www.epa.gov/npdes-permits/regulated-ms4-massachusetts-communities

Stormwater Management Program Team

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Receiving Waters

The following table lists all receiving waters, impairments, and number of outfalls discharging to each waterbody segment. A map of Maynard's outfalls and receiving water bodies is provided at https://www.townofmaynard-ma.gov/wp-content/uploads/2018/09/ms4-outfall-map-20180920.pdf.

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
Assabet River (MA82B-05) and upstream wetlands	74			✓			✓		✓		Debris/Floatables/Trash, Excess Algal Growth, Fecal Coliform, Nutrient/Eutrophication Biological Indicators, Taste and Odor, Curly-leaf Pondweed, Eurasian Water Milfoil, Fanwort, Water Chestnut
Assabet River (MA82B-06) and upstream wetlands	21			✓							Curly-leaf Pondweed, Fanwort, Water Chestnut, Unspecified Metals in Sediment, Other Organics
Taylor Brook (MA82B-08) and upstream wetlands	11										N/A
Second Division Brook (MA82B-09) and upstream wetlands	2										N/A
Puffers Pond (MA82092) and upstream wetlands	11										Mercury in Fish Tissue
Pratts Brook and upstream wetlands	13										N/A

Eligibility: Endangered Species and Historic Properties

Endangered Species Act (ESA) Eligibility Determination

Maynard has completed the ESA eligibility process outlined in the MS4 Permit Appendix C. According to the U.S. Fish & Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool, Maynard contains potential habitat for the Northern Long-eared Bat, which is listed as a threatened species. The IPaC printout is provided in Appendix C.

Maynard has determined that the stormwater discharges and discharge related activities will have no effect on any federally threatened or endangered listed species or designated critical habitat under jurisdiction of the USFWS. If, during the course of the permit term, Maynard plans to install a structural BMP not identified in the NOI, Maynard will conduct an endangered species screening for the proposed site and will contact the USFWS if Maynard determines that the new activity "may affect" or is "not likely to adversely affect" listed species or critical habitat under jurisdiction of the USFWS.

In accordance with the ESA eligibility process outlined in the MS4 Permit Appendix C, Maynard certifies permit eligibility with the ESA under **Criterion C**.

USFWS Criterion C: *Using the best scientific and commercial data available, the effect of the stormwater discharge and discharge related activities on listed species and critical habitat have been evaluated. Based on those evaluations, a determination is made by EPA, or by the applicant and affirmed by EPA, that the stormwater discharges and discharge related activities will have "no effect" on any federally threatened or endangered listed species or designated critical habitat under the jurisdiction of the USFWS.*

National Historic Preservation Act (NHPA) Eligibility Determination

Maynard has completed the NHPA eligibility process outlined in the MS4 Permit Appendix D. Maynard is an existing facility authorized to discharge under the 2003 MS4 permit. Maynard's discharge and discharge-related activities do not have the potential to cause effects on historic properties.

In accordance with the NHPA eligibility process outlined in the MS4 Permit Appendix D, Maynard certifies permit eligibility with the ESA under **Criterion A**.

NHPA Criterion A: *The discharges do not have the potential to cause effects on historic properties.*

MCM 1 Public Education and Outreach

Permit Part 2.3.2

Objective

The objective of Maynard's public education and outreach program is to increase awareness and influence behavior of the public so that stormwater pollutants are reduced.

Program Overview

The MS4 Permit specifies that the public education program should include distribution of at least two educational messages to each target audience during the 5-year permit term. Additional messages are required for specific water quality impairments, as described in the TMDLs and Water Quality Limited Waters section of the SWMP. Maynard's educational messages focus on the pollutants most likely to be generated in Maynard and to impact Maynard's waterbodies:

- Trash,
- Sediment,
- Dog waste,
- Fertilizer,
- Leaf litter, and
- Grass clippings.

The MS4 Permit identifies four target audiences: residents, businesses, developers, and industrial facilities. Maynard does not contain industrial facilities; therefore, Maynard's public education program does not include messages to industrial facilities.

Maynard will distribute educational messages through a range of forums, selected to best reach each target audience. Each public education BMP has a measurable goal, which Maynard will assess annually to ensure that educational messages are reaching target audiences effectively. The following table summarizes the educational messages, target audiences, and distribution schedule.

BMP	Target Audience	Schedule by Permit Year (Fiscal Year)				
		1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)
1-1: Stormwater Management Webpage	Residents, Businesses, Developers	x	x	x	x	x
1-2: Think Blue Massachusetts Advertising Campaign	Residents, Businesses, Developers	x				
1-3: Stormwater Display and Handouts at Town Meeting	Residents	x				
1-4: Stormwater and LID Fact Sheets	Developers				x	x
1-5: Outreach to Maynard Business Alliance	Businesses					x
1-6: Septic System Fact Sheet	Residents/septic system owners		x	x	x	x
1-7: Dog Owner Education	Residents	x	x	x	x	x
1-8: Spring Message about Grass Clippings and Fertilizer	Residents, Businesses, Developers	x	x	x	x	x
1-9: Summer Message about Dog Waste Management	Residents	x	x	x	x	x
1-10: Fall Message about Leaf Litter	Residents	x	x	x	x	x

BMP 1-1: Stormwater Management Webpage

Description:

Maynard will create a Stormwater Management page on the Town's DPW website. The webpage will include information for the general public on the following topics:

- What is stormwater and why does it matter,
- Maynard's watershed and waterbodies,
- Maynard's stormwater management program,
- What the public can do to help.

DPW will update the webpage each year with newly developed educational materials. In addition, Conservation Division will add a redirect link to their webpage to better integrate efforts by the Conservation Commission and DPW to address stormwater concerns in the Town.

The website address is: https://www.townofmaynard-ma.gov/dpw/stormwater-management/

Targeted Audience(s):

- Residents, Businesses, Developers

Responsible Department/Parties:

- Public Works
- Conservation

Measurable Goal(s):

- Page views

BMP 1-2: Think Blue Massachusetts Advertising Campaign

Description:

Think Blue Massachusetts (https://www.thinkbluemassachusetts.org/) ran an advertising campaign on behalf of MS4 communities from May 31 to June 25, 2018. The "Fowl Water" advertisement, targeting MA urban residents, aimed to help viewers visualize stormwater pollution from motor oil, pet waste, and trash. Think Blue targeted outreach to Minuteman Advisory Group on Interlocal Coordination (MAGIC) stormwater coalition communities. Results of the advertising campaign can be found at: https://docs.wixstatic.com/ugd/e78125_9f2d25e33d5b47c299a5edacdce6f23a.docx?dn=TOC-TBM-Minuteman-Regional-Campaign-Report-06252018.docx.

Maynard will amplify the "Fowl Water" message by adding Think Blue Massachusetts links on Maynard DPW's stormwater management webpage (BMP 1-1).

Targeted Audience(s):

- Residents, Businesses, Developers

Responsible Department/Parties:

- Massachusetts Statewide Stormwater Coalition

Measurable Goal(s):

- Views in MAGIC region

BMP 1-3: Stormwater Display and Handouts at Town Meeting

Description:

During Permit Year 1, Maynard will display a stormwater education poster and will distribute Think Blue brochures at the spring Town Meeting. The goal of outreach to Town Meeting members is to raise general awareness about the MS4 permit and stormwater pollution prevention.

Targeted Audience(s):

- Residents

Responsible Department/Parties:

- Conservation

Measurable Goal(s):

- Number of pamphlets distributed at Town Meeting

BMP 1-4: Stormwater and LID Fact Sheets

Description:

Starting in Permit Year 4, Maynard Planning Division will distribute stormwater management and low-impact development (LID) fact sheets at pre-application review meetings.

Targeted Audience(s):

- Developers

Responsible Department/Parties:

- Planning

Measurable Goal(s):

- Number of pre-application review meetings at which fact sheets were distributed

BMP 1-5: Outreach to Maynard Business Alliance

Description:

In Permit Year 5, Maynard Planning and Conservation Divisions will send fact sheets to the Maynard Business Alliance mailing list to educate business owners about stormwater management and pollution prevention.

Targeted Audience:

- Businesses

Responsible Department/Parties:

- Planning
- Conservation

Measurable Goal(s):

- Number of business owners reached

BMP 1-6: Septic System Maintenance Fact Sheet

Description:

During Permit Year 1, Maynard Board of Health and DPW will develop a list of properties in Maynard that use septic systems. In Permit Year 2, Maynard Board of Health will mail a fact sheet about septic system maintenance to each property owner on that list.

Targeted Audience:

- Residents/Septic system owners

Responsible Department/Parties:

- Health
- Public Works

Measurable Goal(s):

- Number of septic system owners contacted

BMP 1-7: Dog Owner Education

Description:

All dogs over 6 months of age must be licensed in Maynard. Starting in Permit Year 1, the Town Clerk will distribute a fact sheet about pet waste management to dog owners seeking or renewing dog licenses.

Targeted Audience:

- Residents/dog owners

Responsible Department/Parties:

- Town Clerk

Measurable Goal(s):

- Number of fact sheets distributed

BMP 1-8: Spring Message about Grass Clippings and Fertilizer

Description:

DPW will post educational information on social media and/or on the Town Administrator Blog about best practices for grass clippings and fertilizer. This notice will be posted in spring, when the Town collects yard waste. The Town will also utilize their reverse 911 system to notify residents about yard waste pickup dates.

Targeted Audience(s):

- Residents

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Dates of reverse 911 calls
- Page views (for website posts)
- Shares, likes, and comments for social media posts

BMP 1-9: Summer Message about Dog Waste Management

Description:

DPW will post a dog waste management message on social media and/or on the Town Administrator Blog in the late spring or early summer each year. In addition, DPW will reach out to MayDog, Maynard's dog owners' group, to educate members about dog waste management and stormwater pollution prevention.

Targeted Audience(s):

- Residents

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Page views for website posts
- Shares, likes, and comments for social media posts
- Date and number of participants for MayDog outreach

BMP 1-10: Fall Message about Leaf Litter

Description:

DPW will post educational information on social media and/or on the Town Administrator Blog about best practices for leaf litter management. This notice will be posted in fall, when the Town collects yard waste. The notice will include information on the dates of yard waste pickup. The Town will also utilize their reverse 911 system to notify residents about yard waste pickup dates.

Targeted Audience(s):

- Residents

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Dates of reverse 911 calls
- Page views for website posts
- Shares, likes, and comments for social media posts

MCM 2 Public Involvement and Participation

Permit Part 2.3.3

Objective

Maynard's objective for its Public Involvement and Participation program is to engage the public in review and implementation of the SWMP and in environmental stewardship opportunities.

Program Overview

The following table summarizes the public involvement and participation BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)				
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)
2-1: Public Review of SWMP	x	x	x	x	x
2-2: Assabet River Cleanups	x	x	x	x	x
2-3: Litter League Cleanups	x	x	x	x	x
2-4: Household Hazardous Waste Collection	x	x	x	x	x

BMP 2-1: Public Review of Stormwater Management Program

Description:

Maynard will post its SWMP online to allow for ongoing public review. When a new version of the SWMP becomes available, Maynard will post on social media and/or Town Administrator blog to notify the public that the SWMP is available for review. Maynard will provide an email link on the website to allow the public to submit their comments. The SWMP will be posted at: https://www.townofmaynard-ma.gov/dpw/stormwater-management/

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Post SWMP online

BMP 2-2: Maynard Fest

Description:

The Maynard Conservation Division will set up a booth each year at Maynard Fest, an annual festival organized by the Assabet Valley Chamber of Commerce, to educate the public about the SWMP, water quality, and what residents can do to prevent stormwater pollution. The booth will have displays and handouts for residents to take home. Staff will be present to answer questions.

Responsible Department/Parties:

- Conservation

Measurable Goal(s):

- Event dates and number of participants

BMP 2-3: Litter League Cleanups

Description:

DPW will continue to provide trash removal for Maynard Litter League, Green Maynard, and Scouts cleanup events.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Event date and number of participants

BMP 2-4: Household Hazardous Waste Collection

Description:

DPW will continue to provide a household hazardous waste collection day annually and provide information to residents about other hazardous waste collections. In addition to the Maynard event, Maynard residents may bring their household hazardous waste to collection events in neighboring towns or directly to the Minuteman Hazardous Products Regional Facility in Lexington. More information is available at: https://www.townofmaynard-ma.gov/dpw/household-hazardous-waste-disposal/

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Event date and number of participants
- Information posted on DPW website

MCM 3 Illicit Discharge Detection and Elimination (IDDE) Program

Permit Part 2.3.4

Objective

Maynard's objective for the IDDE program to systematically find and eliminate illicit sources of non-stormwater discharges to its MS4 and to prevent such discharges.

Program Overview

The following table summarizes Maynard's IDDE BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)				
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)
3-1: Illicit Discharge Bylaw	x	x	x	x	x
3-2: Written IDDE Program	Complete written document	x	x	x	x
3-3: Sanitary Sewer Overflow Inventory	Initial inventory	x	x	x	x
3-4: Storm Sewer System Mapping	x	Complete Phase I map	x	x	x
3-5: Employee Training	x	x	x	x	x
3-6: Dry Weather Outfall Screening		x	x	x	
3-7: Catchment Investigation				x	x
3-8: Wet Weather Screening				x	x
3-9: Ongoing Screening (beyond permit term)					

BMP 3-1: Illicit Discharge Bylaw

Description:

DPW will continue to enforce the Storm Drain System Bylaw, which prohibits illicit discharges to Maynard's MS4 and establishes notification and enforcement procedures.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Track enforcement actions

BMP 3-2: Written IDDE Program

Description:

Maynard will develop a written IDDE program, building upon its existing IDDE procedures and bylaw. The plan will include:

- Maynard's illicit discharge bylaw
- Roles and responsibilities
- Sanitary sewer overflow (SSO) inventory
- Assessment and priority ranking of outfalls/interconnections
- Dry weather outfall screening and sampling procedures
- Catchment investigation procedures
- Wet weather sampling procedures
- Training
- Reporting

Maynard will complete initial outfall assessment and ranking during Permit Year 1, using available data, and will update the ranking annually as new data become available through GIS mapping, outfall inspections, and catchment investigations. Outfalls will be categorized as Problem, High Priority, Low Priority, or Excluded, as defined in the MS4 Permit at Part 2.3.4.7. Outfalls discharging to waterbodies impaired for or with a TMDL for bacteria or pathogens, as described in the TMDL/Impairment section of the SWMP, will be categorized as Problem or High Priority.

Maynard will update the IDDE Program annually and will post the IDDE Program at: https://www.townofmaynard-ma.gov/dpw/stormwater-management/

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete within 1 year of permit effective date (by June 30, 2019) and update annually

BMP 3-3: Sanitary Sewer Overflow Inventory

Description:

During Permit Year 1, Maynard will develop an inventory of sanitary sewer overflows (SSOs) that have occurred in Maynard over the past 5 years. An SSO is a discharge of untreated sanitary wastewater from a municipal sanitary sewer. Maynard will update the SSO inventory annually and will include the SSO inventory in the written IDDE program (BMP 3-2).

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete within 1 year of permit effective date (by June 30, 2019) and update annually thereafter

BMP 3-4: Storm Sewer System Map

Description:

Maynard will incrementally build upon and refine GIS mapping of its stormwater system during IDDE program implementation. The map will be included in Maynard's written IDDE program (BMP 3-2).

The Phase I map, scheduled to be completed by June 30, 2020, will include:

- Outfalls
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Town-owned stormwater treatment structures (e.g., detention basins, infiltration systems, bioretention areas, water quality swales, gross particle separators, oil/grit separators)
- Waterbodies identified by name and indication of all use impairments as identified on the most recent EPA-approved Massachusetts Integrated List of Waters report
- Initial catchment delineations. A catchment is the area that drains to an individual outfall or interconnection.
- Surface public drinking water supplies, watersheds, and protection zones

The Phase II map, scheduled to be completed by June 30, 2028, will include:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations. Catchment delineations will be updated to reflect information collected during catchment investigations
- Municipal sanitary sewer system
- Municipal combined sewer system (if applicable)

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete the Phase I map by the end of Permit Year 2 (by June 30, 2020). Update of Phase II map within 10 years of permit effective date (by June 30, 2028).

BMP 3-5: Employee Training

Description:

Maynard will train DPW employees annually on the IDDE Program, including how to recognize and respond to illicit discharges and SSOs. During Permit Year 1, Maynard will conduct a training workshop to educate DPW field crews on stormwater basics, MS4 permit, what is an illicit discharge, and municipal pollution prevention. In future permit years, the IDDE training may focus in more detail on more specific topics.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Date, type, and number of attendees for annual training

BMP 3-6: Dry Weather Outfall Screening

Description:

Maynard has conducted dry weather screening in accordance with outfall screening procedures and permit conditions to identify illicit contributions to the system. Procedures for and findings from dry weather outfall screening are documented in the written IDDE Program (BMP 3-2). Maynard completed dry weather screening of all currently mapped outfalls included in the IDDE program in early Permit Year 4. If new outfalls are discovered or installed, Maynard will complete dry weather screening of these outfalls.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete within 3 years of permit effective date (by June 30, 2021)

BMP 3-7: Catchment Investigation

Description:

Maynard will implement catchment investigations according to program and permit conditions. Procedures for and findings from catchment investigations will be documented in the written IDDE Program (BMP 3-2). Maynard will complete catchment investigations by June 30, 2028.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete within 10 years of permit effective date (by June 30, 2028)

BMP 3-8: Wet Weather Screening

Description:

Maynard will conduct wet weather screening in accordance with outfall screening procedures and permit conditions to identify illicit discharges to its MS4. Procedures for and findings from wet weather screening will be documented in the written IDDE Program (BMP 3-2). Maynard will complete wet weather screening by June 30, 2028.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete within 10 years of permit effective date (by June 30, 2028)

BMP 3-9: Ongoing Screening

Description:

After completion of BMPs 3-6, 3-7, and 3-8, Maynard will continue dry weather and wet weather screening as necessary to identify and eliminate illicit discharges. Each outfall and interconnection will be re-prioritized for screening and scheduled for ongoing screening once every five (5) years upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary).

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Continue ongoing outfall screening upon completion of IDDE program

MCM 4 Construction Site Stormwater Runoff Control

Permit Part 2.3.5

Objective

Maynard's objective for its construction stormwater runoff control program is to minimize or eliminate erosion and maintain sediment on site so that it is not transported in stormwater and allowed to discharge to a water of the U.S. through Maynard's MS4.

Program Overview

The following table summarizes Construction Site Stormwater Runoff Control BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)				
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)
4-1: Construction Stormwater Management Bylaw	x	x	x	x	x
4-2: Site Inspection and Enforcement Procedures	x				
4-3: Site Plan Review	x				

BMP 4-1: Construction Stormwater Management Bylaw

Description:

Maynard has updated and will continue to enforce the Stormwater Management Bylaw and Regulations, requiring an erosion and sediment control plan and construction waste management on projects disturbing 10,000 square feet or more of land. The Bylaw and Regulations are available on Maynard Conservation Division's website at: https://www.townofmaynard-ma.gov/municipal-services/conservation/.

Maynard's Stormwater Management Regulations currently require stormwater management practices that meet the standards of the Massachusetts Stormwater Management Policy and Massachusetts Stormwater Management Handbook Volumes I and II. With references to these standards and local site conditions, the regulations specify that applicants must develop and implement a plan to control construction-related impacts including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan). The Plan must also include measures to properly manage on-site construction and waste materials, which include "excess or discarded building or site materials, including but not limited to concrete truck washout, chemicals, litter and sanitary waste at a construction site that may adversely impact water quality." Maynard will continue to require and enforce these requirements.

Responsible Department/Parties:

- Conservation

Measurable Goal(s):

- Continue to implement Stormwater Management Bylaw

BMP 4-2: Site Inspection and Enforcement Procedures

Description:

Maynard's Stormwater Management Bylaw and Regulations include requirements and enforcement provisions for construction-site inspections, as follows:

> Permittee Erosion and Sediment Control Inspections. The Applicant or his/her agent shall conduct and document inspections of all [erosion and sediment] control measures no less than weekly or as specified in the Permit, and prior to and following anticipated storm events. The purpose of such inspections will be to determine the overall effectiveness of the Erosion and Sediment Control Plan. The Applicant or his/her agent shall submit monthly reports to the Commission or designated agent in a format approved by the Commission.

The regulations also allow for enforcement by Maynard including the following:

> 7N. Enforcement. The Commission or its designated agent shall enforce these regulations, orders, violation notices, and enforcement orders, and may pursue all civil and criminal remedies for such violations.
>
> 1. Civil Relief. If a person violates the provisions of these regulations, a Stormwater Management Permit, notices, or Orders issued thereunder, the Commission may seek injunctive relief in a court of competent jurisdiction restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation.
>
> 2. Enforcement Orders. The Commission may issue a written order to enforce the provisions of these regulations, which may include requirements to:
>
> a. Cease and desist from construction or land disturbing activity until there is compliance with these regulations and the Stormwater Management Permit;
> b. Repair, maintain, or replace the stormwater management system or portions thereof in accordance with the operation and maintenance plan;
> c. Maintain, install or perform additional erosion and sediment control measures;
> d. Perform monitoring, analyses, and reporting;
> e. Remediate adverse impact resulting directly or indirectly from malfunction of the stormwater management system or erosion and sediment control system;
> f. Eliminate illicit connections and/or discharges to the MS4;
> g. Cease and desist from unlawful discharges, practices, or operations; and/or,
> h. Remediate contamination in connection therewith.

Maynard will continue to require and enforce construction-site stormwater management and site inspections. In addition, the Conservation Division will improve its database for tracking stormwater permits, enforcement, and inspections.

Responsible Department/Parties:

- Conservation

Measurable Goal(s):

- Continue to require and enforce construction-site stormwater management and site inspections
- Complete improvements to tracking database for permits, enforcement, and inspections

BMP 4-3: Site Plan Review

Description:

Maynard has updated written procedures for site plan review. Maynard's Planning Board Rules and Regulations require site plan review, and Maynard's Stormwater Management Regulations require a Stormwater Management Site Plan. These regulations meet MS4 Permit requirements for "pre-construction review by the permittee of the site design, the planned operations at the construction site, planned BMPs during the construction phase, and the planned BMPs to be used to manage runoff created after development" and "procedures for the consideration of potential water quality impacts." Planning Board and Conservation Commission meetings provide means for public input and information to be received. These regulations also include inspections by the Conservation Division and Public Works or its agent during and after construction, as well as self-inspection by the developer.

Responsible Department/Parties:

- Planning
- Conservation
- Public Works

Measurable Goal(s):

- Continue to require site plan review

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

Permit Part 2.3.6

Objective

Maynard's objective for its post-construction stormwater management program is to reduce the discharge of stormwater pollutants to its MS4 and receiving waterbodies. This is accomplished by retaining or treating stormwater runoff after construction on new or redeveloped sites, and by ensuring proper maintenance of installed stormwater controls.

Program Overview

The following table summarizes Post-Construction Stormwater Management BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)					
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)	6 (FY24)
5-1: Post-Construction Stormwater Management Bylaw	x	Revisions	x	x	x	
5-2: As-Built Plans	x	x	x	x	x	
5-2: Target Properties to Reduce Impervious Areas				x	x	
5-3: Allow Green Infrastructure				x	x	
5-4: Street Design and Parking Lot Guidelines				x	x	
5-5: Demonstration Project Installation						x

BMP 5-1: Post-Construction Stormwater Management Bylaw

Description:

Maynard has updated and will continue to enforce the Stormwater Management Bylaw and Regulations, requiring post-construction stormwater management on projects disturbing 10,000 square feet or more of land.

The updated Bylaw and Regulations include a requirement that new development and redevelopment stormwater management BMPs be optimized for phosphorus removal.

The Bylaw and Regulations are available on Maynard Conservation Division's website at: https://www.townofmaynard-ma.gov/municipal-services/conservation/

Responsible Department/Parties:

- Conservation

Measurable Goal(s):

- Continue to implement Stormwater Management Bylaw

BMP 5-2: As-Built Plans for On-Site Stormwater Control

Description:

Maynard's Stormwater Management Bylaw regulations specify that the permittee must submit as-built record drawings of the Stormwater Management System upon project completion. Maynard will continue to collect as-built drawings as required of projects that receive a Stormwater Permit under the Stormwater Management Bylaw.

Responsible Department/Parties:

- Conservation

Measurable Goal(s):

- Continue to require as-built drawings

BMP 5-3: Target Properties to Reduce Impervious Areas

Description:

Maynard will identify at least five (5) Town-owned properties that could be modified or retrofitted with stormwater BMPs to reduce the frequency, volume, and pollutant loads of stormwater discharges to and from its MS4 through the reduction of impervious area. Maynard will prioritize properties with significant impervious cover that fall within areas discharging to waterbodies with phosphorus impairments and will optimize selected retrofits to remove phosphorus, as applicable. In determining the potential for modifying or retrofitting particular properties, Maynard will consider factors such as maintenance access; subsurface conditions; proximity to water supply, swimming beaches, and shellfish growing areas; and opportunities for public education.

Maynard will compile the list of potential retrofits, with five (5) prioritized sites, by the end of Permit Year 4. Beginning with the fifth annual report and in each subsequent annual report, Maynard will identify additional sites that could be retrofitted, to maintain a minimum of five (5) sites in the inventory. Maynard will report on all properties that have been modified or retrofitted with BMPs in each annual report. Appendix D contains this list of properties.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete within 4 years of permit effective date (by June 30, 2022) and report annually on retrofitted properties

---

BMP 5-4: Allow Green Infrastructure

Description:

Maynard will develop a report assessing existing local regulations to determine the feasibility of making, at a minimum, the following green infrastructure practices allowable when appropriate site conditions exist:

- Green roofs;
- Infiltration practices such as rain gardens, curb extensions, planter gardens, permeable pavements, and other designs to manage stormwater using landscaping and structured or augmented soils; and
- Water harvesting devices such as rain barrels and cisterns, and the use of stormwater for non-potable uses.

The report will indicate if the practices are allowed in Maynard and under what circumstances. If the practices are not

allowed, Maynard will determine what hinders the use of these practices, what changes in local regulations may be made to make them allowable, and a schedule for implementation of recommendations. Maynard will implement the recommended changes and will report in each annual report on its findings and progress towards making the practices allowable.

Responsible Department/Parties:

- Planning
- Engineering

Measurable Goal(s):

- Complete assessment within 4 years of permit effective date (by June 30, 2022) and implement recommendations of report

---

BMP 5-5: Street Design and Parking Lot Guidelines

Description:

Maynard will review local street and parking lot design standards and other design guidelines that affect the creation of impervious cover. The assessment will help determine if changes to design standards can be made to support low impact design options, such as permeable paving and minimizing impervious surface. If the assessment indicates that changes can be made, the report will include recommendations and proposed schedules to incorporate policies and standards into relevant documents and procedures to minimize impervious cover attributable to parking areas and street designs. Maynard will implement recommendations, in accordance with the schedules contained in the assessment. Maynard will report in each annual report on the status of this assessment including any planned or completed changes to local regulations and guidelines.

Responsible Department/Parties:

- Planning
- Engineering

Measurable Goal(s):

- Complete assessment within 4 years of permit effective date (by June 30, 2022) and implement recommendations of report

---

BMP 5-6: Demonstration Project Installation

Description:

Maynard will design and install a minimum of one structural BMP from the list identified in the Nutrient Source Identification Report (BMP 6-9). This structural BMP will be installed in a catchment with high nutrient load.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete within six years of permit effective date (by June 30, 2024)

MCM 6 Good Housekeeping and Pollution Prevention for Permittee Owned Operations

Permit Part 2.3.7

Objective

The objective of Maynard's Good Housekeeping program is to prevent or reduce pollutant runoff from Town facilities and operations.

Program Overview

The following table summarizes Good Housekeeping BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)				
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)
6-1: Facilities Inventory		x			
6-2: Written Facilities O&M Plan		x			
6-3: Written MS4 O&M Plan		x			
6-4: DPW Yard SWPPP		x			
6-5: Catch Basin Inspection and Cleaning	x	x	x	x	x
6-6: Street and Parking Lot Sweeping	x	x	x	x	x
6-7: Winter Road Maintenance	x	x	x	x	x
6-8: Stormwater Treatment Facility Inspections	x	x	x	x	x
6-9: Nutrient Source Identification Report				x	x

BMP 6-1: Facilities Inventory

Description:

Maynard has developed and plans to maintain inventories of Town-owned parks and open spaces, buildings and facilities, and vehicle and equipment storage and maintenance areas.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete inventory within 2 years of permit effective date (by June 30, 2020) and update annually

BMP 6-2: Written Facilities & Equipment O&M Plan

Description:

Maynard has developed and will continue to implement written O&M procedures for parks and open spaces, buildings and facilities, and vehicle and equipment storage and maintenance. The O&M Plan includes pollution prevention practices specific to each category, as listed below, as well as measures to address phosphorus and bacteria loading to impaired waterbodies.

1) Parks and Open Space:
    - Use, storage, and disposal of pesticides, herbicides, and fertilizers
    - Lawn maintenance and landscaping
    - Pet waste collection and disposal location and signage
    - Waterfowl management
    - Trash container placement and cleanings
    - Erosion control and vegetative cover
2) Buildings and facilities where pollutants are exposed to stormwater runoff:
    - Use, storage, and disposal of petroleum products and other potential stormwater pollutants
    - Employee training
    - Spill prevention plans, if applicable
    - Management of dumpsters and other waste management equipment
    - Sweeping and cleaning around facilities
    - Septic system maintenance, where applicable
3) Vehicles and equipment
    - Vehicle storage
    - Management of vehicles with fluid leaks
    - Fueling areas
    - Vehicle wash waters

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete and implement within 2 years of permit effective date (by June 30, 2020)

BMP 6-3: Written MS4 O&M Plan

Description:

Maynard has developed and will continue to implement a written program detailing the activities and procedures for maintenance of MS4 infrastructure so that the discharge of pollutants from the MS4 is minimized. The written O&M program includes catch basin cleaning (BMP 6-5), street and parking lot sweeping (BMP 6-6), winter road maintenance (BMP 6-7), and stormwater treatment system inspection (BMP 6-8).

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete within 2 years of permit effective date (by June 30, 2020)

BMP 6-4: DPW Yard Stormwater Pollution Prevention Plan (SWPPP)

Description:

Maynard has developed and will continue to implement a facility Stormwater Pollution Prevention Plan (SWPPP) for the Maynard DPW Yard (Highway Garage). The SWPPP includes the following elements:

- Pollution prevention team

- Description of the facility and identification of potential pollutant sources
- Identification of stormwater controls
- Management practices to minimize or prevent exposure and clean exposed areas
- Preventative maintenance
- Spill prevention and response
- Erosion and sediment control
- Management of runoff
- Enclosure of salt storage piles or piles containing salt
- Employee training
- Maintenance of control measures
- Site inspections schedule and documentation

Maynard will develop the SWPPP by the end of Permit Year 2 and will maintain all records associated with the SWPPP.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete and implement within 2 years of permit effective date (by June 30, 2020)

BMP 6-5: Catch Basin Inspection and Cleaning

Description:

Maynard has established a schedule for catch basin cleaning such that each catch basin is no more than 50% full and plans to clean catch basins according to that schedule. Catch basin inspection and cleaning procedures are included in the written MS4 O&M Plan (BMP 6-3). In summer of 2021, Maynard began the process of using mobile data collection to record information about catch basin inspections such as volume of material removed during cleaning. As part of the catch basin inspections, the contractor documents the amount of sediment accumulation within catch basin sump as less than half full, sump half full, sump full, or structure completely full. During Permit Year 4, Maynard will complete an optimization analysis to schedule routine inspections, cleaning, and maintenance of catch basins such that the following conditions are met:

- Prioritize inspection and maintenance for catch basins located near construction activities. Clean catch basins in such areas more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings.
- Establish a schedule with a goal that the frequency of routine cleaning will ensure that no catch basin at any time will be more than 50 percent full.
- If a catch basin sump is more than 50 percent full during two consecutive routine inspections/cleaning events, document that finding, investigate the contributing drainage area for sources of excessive sediment loading, and to the extent practicable, abate contributing sources. Describe any actions taken in annual report.

Maynard will report in each annual report the total number of catch basins, number inspected, number cleaned, and the total volume or mass of material removed from all catch basins.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Clean catch basins on established schedule and report the number of catch basins inspected and cleaned, and the volume or mass of material removed annually

BMP 6-6: Street and Parking Lot Sweeping

Description:

Maynard will sweep all Town-owned streets and parking lots a minimum of twice per year (fall and spring). Maynard will also sweep more frequently in areas with land uses that generate higher sediment loading and/or where catch basin inspections indicate higher loading rates. Street sweeping procedures are included in the written MS4 O&M Plan (BMP 6-3).

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Sweep all streets and Town-owned parking lots twice per year

BMP 6-7: Road Salt Use Optimization Program

Description:

Maynard will implement written procedures for winter road maintenance, including the use and storage of salt and sand. These procedures are included in the written MS4 O&M Program (BMP 6-3). Maynard will minimize the use of sodium chloride and other salts and will evaluate opportunities for use of alternative materials. Maynard will also ensure that snow disposal activities do not result in disposal of snow into waterbodies or wetlands.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Implement salt use optimization during deicing season

BMP 6-8: Inspection and Maintenance of Stormwater Treatment Structures

Description:

Maynard will implement inspection and maintenance procedures of stormwater treatment units such as water quality swales, detention basins, infiltration structures, and proprietary treatment devices. These procedures are included in the written MS4 O&M Plan (BMP 6-3). Maynard will inspect all Town-owned stormwater treatment units (excluding catch basins) annually at a minimum.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Report on compliance with inspection and maintenance of treatment structures per established schedule

BMP 6-9: Nutrient Source Identification Report

Description:

Maynard will develop a Nutrient Source Identification Report for the entire Town, which drains to the phosphorus-impaired Merrimack River via the Assabet River. Maynard will develop the Report within four years of the permit effective date (by June 30, 2022), and will submit the Report as part of the Year 4 Annual Report. Appendix E contains this report.

The Nutrient Source Identification Report due in Year 4 will include the following elements, outlined in the MS4 Permit's Appendix H, Part II.1.b.i:

1. Calculation of total MS4 area draining to the water quality limited water segments or their tributaries, incorporating updated mapping of the MS4 and catchment delineations produced pursuant to the MS4 Permit part 2.3.4.6
2. All screening and monitoring results pursuant to the MS4 Permit's part 2.3.4.7.d., targeting the receiving water segment(s)
3. Impervious area and directly connected impervious area (DCIA) for the target catchment
4. Identification, delineation and prioritization of potential catchments with high nutrient loading
5. Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment

In Year 5, Maynard will expand on the Nutrient Source Identification Report to include the following elements:

1. Evaluation of all permittee-owned properties identified as presenting retrofit opportunities or areas for structural BMP installation under the MS4 Permit part 2.3.6.d. or identified in the Phosphorus Source Identification Report that are within the drainage area of the water quality limited water or its tributaries. The evaluation shall include:
    - The next planned infrastructure, resurfacing or redevelopment activity planned for the property (if applicable) OR planned retrofit date;
    - The estimated cost of redevelopment or retrofit BMPs; and
    - The engineering and regulatory feasibility of redevelopment or retrofit BMPs.

2. The permittee shall provide a listing of planned structural BMPs and a plan and schedule for implementation in the year 5 annual report. The permittee shall plan and install a minimum of one structural BMP as a demonstration project within the drainage area of the water quality limited water or its tributaries within six years of the permit effective date. The demonstration project shall be installed targeting a catchment with high phosphorus load potential. The permittee shall install the remainder of the structural BMPs in accordance with the plan and schedule provided in the year 5 annual report.

3. Any structural BMPs 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 3 to Appendix F. The permittee shall 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 annual report.

Responsible Department/Parties:

- Public Works

Measurable Goal(s):

- Complete Nutrient Source Identification Report within four years of permit effective date (June 30, 2022)
- Complete additional requirements within five years of permit effective date (June 30, 2023)

TMDLs and Water Quality Limited Waters

The MS4 Permit at Part 2.2 describes additional requirements for MS4s that discharge to waters that are subject to Total Maximum Daily Loads (TMDLs) and/or that discharge to certain water quality limited waters. Specific requirements are detailed in the MS4 Permit Appendix F (for TMDLs) and Appendix H (for impaired waters).

This section identifies Maynard's receiving waterbodies that are impaired or are subject to TMDLs. This section also describes the BMPs that Maynard will implement to meet the MS4 Permit requirements at Part 2.2 and Appendices F and H.

Bacteria/Pathogens

Applicable Waterbodies

The following receiving waters are water quality limited due to bacteria or pathogens. Discharges to these waterbodies are subject to the provisions of MS4 Permit Appendix H Part III.

Receiving Waterbody	Segment ID
Assabet River	MA82B-05

Enhanced BMPs

The following table summarizes the Enhanced BMPs, as described in the SWMP above, that Maynard will implement to meet Appendix H requirements for discharge to bacteria/pathogen impaired waterbodies.

Requirements	Enhanced BMPs
Supplement public education program with an annual message encouraging the proper management of pet waste, including noting any existing bylaws where appropriate.	BMP 1-9: Summer Message about Dog Waste Management
Disseminate educational materials to dog owners at the time of issuance or renewal of a dog license, or other appropriate time. Education materials shall describe the detrimental impacts of improper management of pet waste, requirements for waste collection and disposal, and penalties for non-compliance.	BMP 1-7: Dog Owner Education
Provide information to owners of septic systems about proper maintenance in any catchment that discharges to a water body impaired for bacteria or pathogens.	BMP 1-6: Septic System Maintenance Fact Sheet
Designate catchments draining to any waterbody impaired for bacteria/pathogens as either Problem Catchments or High Priority in implementation of the IDDE Program.	BMP 3-2: Written IDDE Program

Assabet River Phosphorus TMDL

Applicable Waterbodies

The following receiving waters are covered under the Assabet River phosphorus TMDL. EPA approved the *Assabet River Total Maximum Daily Load for Total Phosphorus* on September 23, 2004. Discharges to these waterbodies are subject to the provisions of MS4 Permit Appendix F at Part B.II.

Applicable Receiving Waterbody	Segment ID	TMDL Name
Assabet River	MA82B-05	Assabet River Total Maximum Daily Load for Total Phosphorus

Enhanced BMPs

The following table summarizes the Enhanced BMPs, as described in the SWMP above, that Maynard will implement to meet Appendix F requirements for Assabet River TMDL.

Requirements	Enhanced BMPs
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.	BMP 1-8: Spring Message about Grass Clippings and Fertilizer
Distribute an annual message in the summer (June/July) encouraging the proper management of pet waste, including noting any existing ordinances where appropriate.	BMP 1-9: Summer Message about Dog Waste Management
Distribute an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter.	BMP 1-10: Fall Message about Leaf Litter
For post-development stormwater management, include a requirement that new development and redevelopment stormwater management BMPs be optimized for phosphorus removal.	BMP 5-1: Post-Construction Stormwater Management Bylaw • The updated Stormwater Management Bylaw and Regulations include a requirement that new development and redevelopment stormwater management BMPs must be optimized for phosphorus removal.
For retrofit inventory and priority ranking, include consideration of BMPs to reduce phosphorus discharges.	BMP 5-3: Target Properties to Reduce Impervious Areas • Maynard will prioritize properties with significant impervious cover that fall within areas discharging to waterbodies with phosphorus impairments and will optimize selected retrofits to remove phosphorus, as applicable.
Establish procedures to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces.	BMP 6-2: Written O&M Procedures • The O&M Plan details procedures for grass cutting and leaf litter management to reduce phosphorus loading to impaired waterbodies.
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).	BMP 6-6: Street and Parking Lot Sweeping • Maynard will sweep all Town-owned streets and parking lots a minimum of twice per year (fall and spring).
Write report to identify and take advantage of opportunities for mitigating high phosphorus loading.	BMP 6-9: Nutrient Source Identification Report

Annual Evaluation

This section will be updated annually as annual reports are completed.

Year 1 Annual Report
Document Name and/or Web Address:
https://www3.epa.gov/region1/npdes/stormwater/ma/reports/2019/maynard-ma-ar19.pdf

Year 2 Annual Report
Document Name and/or Web Address:
https://www3.epa.gov/region1/npdes/stormwater/ma/reports/2020/maynard-ma-ar20.pdf

Year 3 Annual Report
Document Name and/or Web Address:
https://www3.epa.gov/region1/npdes/stormwater/ma/reports/2021/MAYNARD_MA_AR21.pdf

Year 4 Annual Report
Document Name and/or Web Address:

Year 5 Annual Report
Document Name and/or Web Address:

Appendix A – Delegation of Authority

OFFICE OF THE
BOARD OF SELECTMEN
TOWN OF MAYNARD
MUNICIPAL BUILDING
195 MAIN STREET
MAYNARD, MASSACHUSETTS 01754
Tel: 978-897-1301 Fax: 978-897-8457

March 27, 2019

MEMO TO FILE

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

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

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

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

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

[SIGNATORY per Part B.11 of Appendix B]

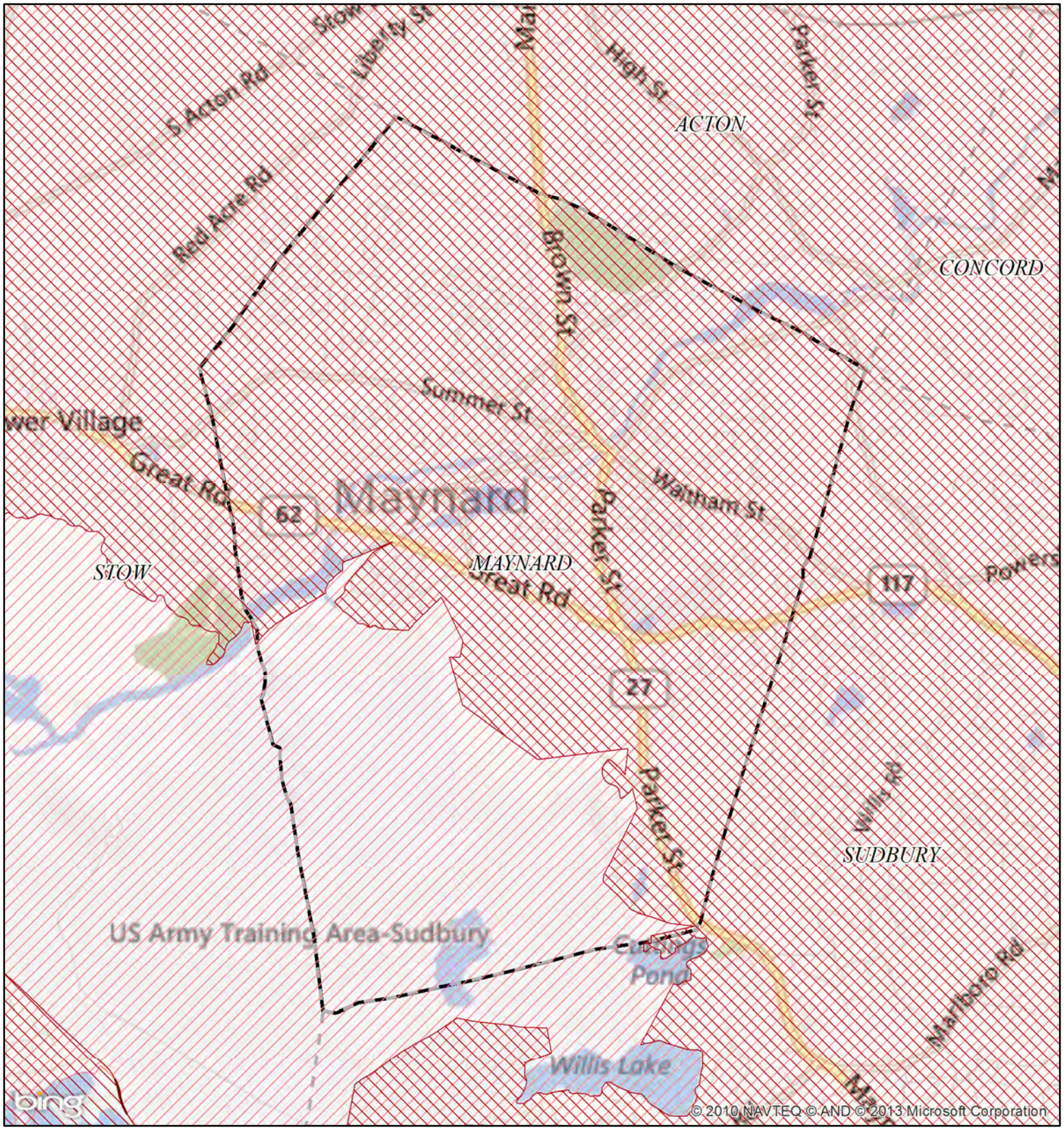
Signature

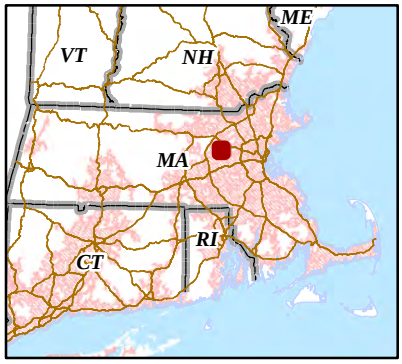
4-2-19
Date

Christopher DiSilva
Name

Selectman - Chair
Title

Appendix B – MS4 Regulated Area Map





NPDES Phase II Stormwater Program
Automatically Designated MS4 Areas
Maynard MA

Regulated Area:

UA Based on 2000 Census | UA Based on 2010 Census

0 1 2 Kilometers

0 1 Miles

Town Population: 10108

Regulated Population: 10108

(Populations estimated from 2010 Census)

EPA

Urbanized Areas, Town Boundaries:
US Census (2000, 2010)
Base map © 2013 Microsoft Corporation
and its data suppliers

US EPA Region 1 GIS Center Map #8824, 8/9/2013

Appendix C – IPaC Resource List

IPaC **U.S. Fish & Wildlife Service**

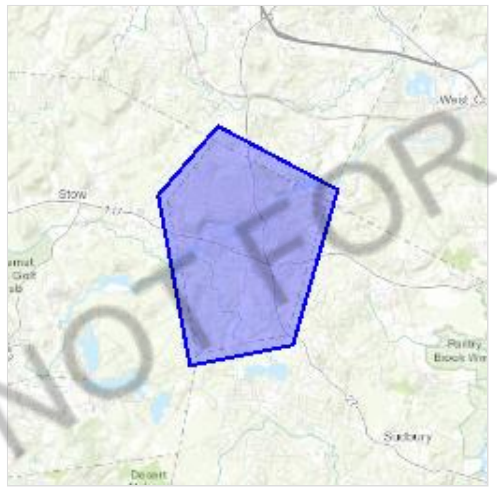
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Middlesex County, Massachusetts



Local office

New England Ecological Services Field Office

(603) 223-2541
(603) 223-0104

70 Commercial Street, Suite 300
Concord, NH 03301-5094

http://www.fws.gov/newengland

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

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

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Buff-breasted Sandpiper *Calidris subruficollis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9488	Breeds elsewhere
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Cerulean Warbler *Dendroica cerulea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 29 to Jul 20

Dunlin Calidris alpina arcticola — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Eastern Whip-poor-will Antrostomus vociferus — Breeds May 1 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Evening Grosbeak Coccothraustes vespertinus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle Aquila chrysaetos — Breeds elsewhere
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Kentucky Warbler Oporornis formosus — Breeds Apr 20 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

King Rail Rallus elegans — Breeds May 1 to Sep 5
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8936

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Nelson's Sparrow Ammodramus nelsoni — Breeds May 15 to Sep 5
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prairie Warbler Dendroica discolor — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prothonotary Warbler Protonotaria citrea — Breeds Apr 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Red-throated Loon Gavia stellata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Ruddy Turnstone Arenaria interpres morinella This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Rusty Blackbird Euphagus carolinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Semipalmated Sandpiper Calidris pusilla This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Short-billed Dowitcher Limnodromus griseus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Snowy Owl Bubo scandiacus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Willet Tringa semipalmata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 5
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

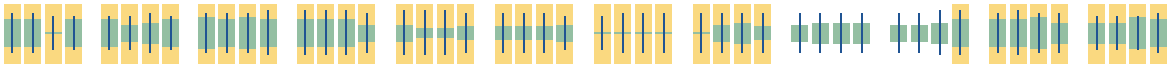
No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

▪ probability of presence ▪ breeding season | survey effort – no data

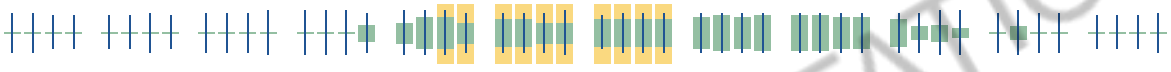
SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Bald Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



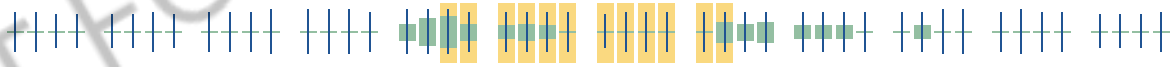
Black-billed Cuckoo
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Bobolink
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Buff-breasted Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

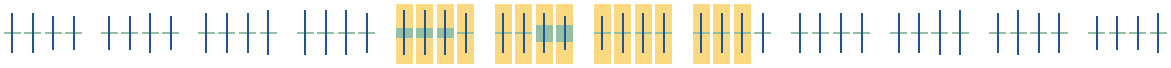
Canada Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Cerulean Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Dunlin
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

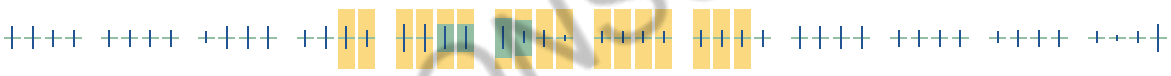
Eastern Whip-poor-will
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



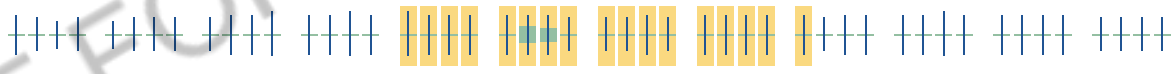
Evening Grosbeak
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Golden Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)

Kentucky Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



King Rail
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

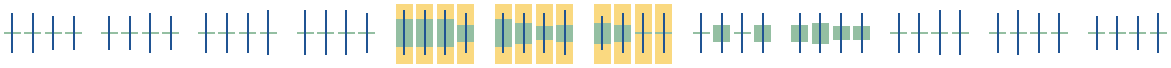


SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

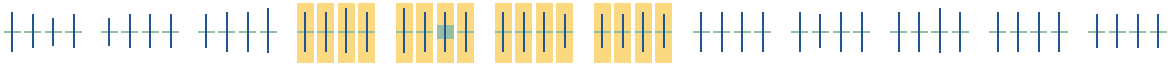
Lesser Yellowlegs
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Nelson's Sparrow
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

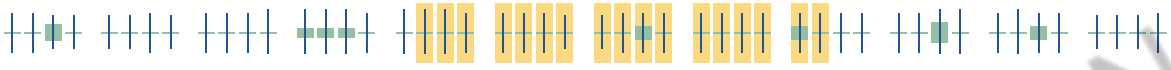
Prairie Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Prothonotary Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Red-headed Woodpecker
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Red-throated Loon
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Ruddy Turnstone
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Rusty Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Semipalmated Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuge lands:

LAND	ACRES
Assabet River National Wildlife Refuge	2,229.83 acres

(978) 443-4661
(978) 443-2898

680 Hudson Road
Sudbury, MA 01776-1971

https://www.fws.gov/refuges/profiles/index.cfm?id=53513

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

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

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

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1Ed
- PEM1E
- PEM1/5E
- PEM1Eh
- PEM1F
- PEM1C

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1E
- PFO1Ed
- PSS1E
- PFO1/4E
- PFO4E
- PSS1/3Ba
- PSS1Ed
- PSS1C
- PFO1B
- PFO1C

FRESHWATER POND

- PUBHx
- PUBHh
- PUBH

LAKE

- L1UBH

RIVERINE

- R2UBH
- R2UBHx
- R4SBCx
- R4SBC
- R5UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

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

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

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

Data exclusions

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

Data precautions

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

Appendix D – Town-owned Properties for Stormwater Retrofit

Memorandum

To: Justin DeMarco, Maynard DPW

From: Sarah Nalven & Wayne Amico, VHB

Date: October 25, 2022

Re: Retrofit Opportunities for Stormwater Improvement (Project 12293.56)

The MS4 Permit requires the Town of Maynard to "identify a minimum of 5 permittee-owned properties that could potentially be modified or retrofitted with BMPs [and/or through the reduction of impervious cover] to reduce the frequency, volume, and pollutant loads of stormwater discharges to and from [Maynard's] MS4" (p. 47). This requirement was due in Permit Year 4, i.e. June 30, 2022. The Town complied with this requirement with a memo issued by VHB on March 1, 2022. In each annual report submitted thereafter, the Town must report the properties where retrofits have been completed and add to the list of properties so an inventory of at least 5 BMPs is maintained "until such a time as when the permittee has less than 5 sites remaining" (p. 48). This memo constitutes the Permit Year 5 update.

Below is Maynard's inventory of properties that could be retrofitted for stormwater quality and quantity improvement. Properties are listed in order of priority. This memo will likely be updated in future years as projects are completed and new opportunities are identified.

1. **River Street Municipal Parking Lot Retrofit**, *23 River Street*
    - Take advantage of planned improvements to parking lot to install a filter trench to treat stormwater runoff from the parking lot

2. **Main Street at Sudbury Street Flooding & Water Quality Improvements**, *189 Main Street*
    - Reconfigure drainage infrastructure in this area to mitigate localized flooding issues behind 187-189 Main Street and to provide stormwater treatment to catchment with no current treatment
    - Current plan is to route drainage further west on Main Street then north on Riverbank Road, providing a stormwater treatment structure at the bottom of the catchment between Riverbank Road and the Assabet River
    - In addition, the striped islands on Main Street could be converted to rain gardens where some drainage could be routed
    - Received funding to complete this project through ARPA
    - Main Street rain gardens would provide highly visible educational opportunity

3. **Dept. of Public Works Labor Yard (Highway Garage) Renovation/ Reconstruction**, *38 Winter Street*
    - Almost entirely impervious area
    - Needs improvements to grading to direct additional drainage into BMPs

- Possible state funding for feasibility study investigating retrofit of existing or construction of new Public Works Labor Yard meeting or exceeding current stormwater standards

4. **Green Meadow Elementary School Renovation/ Reconstruction**, *5 Tiger Drive*
    - Planned renovation of existing building or construction of new building which would meet or exceed current stormwater standards
    - This is an elementary school, so there is an educational opportunity with BMP installation

5. **Nason Street Rain Garden Installation**, *12 Nason Street*
    - Rain garden already designed for sidewalk
    - Submitted MVP grant to fund rain garden but was denied, will pursue additional funding opportunities

6. **Main Street Rain Garden Installation**, *105 Main Street*
    - Rain garden already designed for sidewalk
    - Will pursue funding opportunities

7. **Veterans Memorial Park Parking Lot Retrofit**, *2-18 Summer Street*
    - Parking lot islands could become rain gardens/infiltration areas with grading improvements and curb cuts
    - Wait until parking lot needs to be repaved

8. **ArtSpace Parking Lot Impervious Cover Reduction**, *63 Summer Street*
    - Large parking lot that is underutilized
    - Plan is to remove some pavement/parking and add BMP to treat what's left
    - New space could be used to expand existing pollinator garden

Appendix E – Phosphorus Source Identification Report for the Merrimack River Watershed

Phosphorus Source Identification Report (PSIR) for Maynard's Discharge to the Merrimack River

For compliance with the National Pollutant Discharge Elimination System General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts

PREPARED FOR

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JUNE 2022

Table of Contents

List of Tables

1

Introduction

This Phosphorus Source Identification Report (PSIR) was developed in accordance with the *2016 Massachusetts National Pollutant Discharge Elimination System General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems* (MS4 Permit), Appendix H, Part II b. It was developed for Maynard's MS4-regulated area that discharges to the Merrimack River (segment MA84A-04) and its tributaries. The purpose of this report is to identify parts of Maynard's MS4 contributing to the Merrimack River's phosphorus impairment and to devise an effective approach for reducing this contribution.

This PSIR describes Maynard's MS4 area draining to the Merrimack River and its tributaries and prioritizes catchments for nutrient load reduction based on estimated existing nutrient loading and potential for retrofit opportunities. Appendix A provides the methods used to produce this PSIR.

Results discussed throughout this report are presented in the Maynard PSIR Web App which can be found at the following link: https://vhb.maps.arcgis.com/apps/webappviewer/index.html?id=4b056058ab0d4e0e9533a93081052eaa.

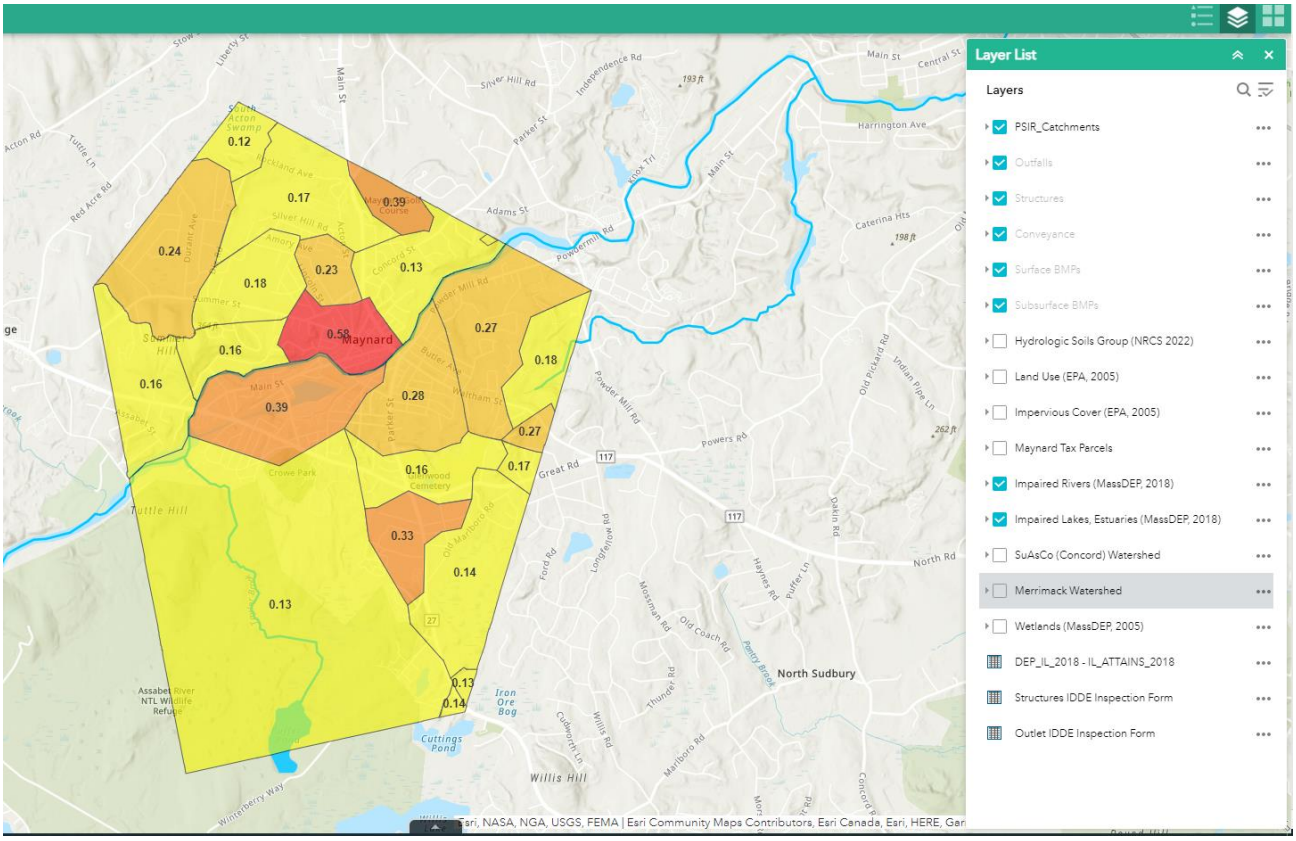
Table 1 includes metadata for each layer presented in the web app.

Table 1. PSIR Web App Metadata

Layer Name	Description
PSIR Catchments	Catchments used to generate this PSIR. Color-coded based on estimated phosphorus load per acre.
Outfalls	Culvert outlets and stormwater outfalls
Structures	Inlets, manholes, and catch basins
Conveyance	Culverts, open conveyances, and storm pipes
Surface BMPs	Surface structural stormwater best management practices (BMPs)
Subsurface BMPs	Subsurface BMPs
Hydrologic Soil Group (NRCS 2022)*	Hydrologic soil group within Maynard municipal boundary
Land Use (EPA, 2005)*	Land use within Maynard municipal boundary corresponding to Land Use Categories in Table 3-1 of Appendix F to the Massachusetts MS4 Permit
Impervious Cover (EPA, 2005)*	Impervious cover within Maynard municipal boundary
Maynard Tax Parcels	Municipal tax parcels
PSIR waterbody segment	The phosphorus-impaired waterbody segments subject to this report
PSIR watershed	Watersheds of PSIR waterbody segments
Wetlands (MassDEP, 2005)*	Wetlands located in Maynard
Structures IDDE Inspection Form	Structure inspection forms completed as part of dry weather illicit discharge detection and elimination (IDDE) work
Outlet IDDE Inspection Form	Outlet inspection forms completed as part of dry weather IDDE work

*See Appendix A for references for these layers.

The image below shows a high-level overview of the Maynard PSIR Web App and the layers contained in the web app.



2

Waterbodies Subject to this Report

The Merrimack River's segments MA84A-02, MA84A-03 and MA84A-04 are water quality limited for phosphorus based on the Massachusetts Department of Environmental Protection's Final 2016 Integrated List of Waters[1] and do not have an approved Total Maximum Daily Load (TMDL). Therefore, under Appendix H of the MS4 Permit, Maynard is required to develop a PSIR to address phosphorus load in stormwater discharges from its MS4 to these water body segments. The PSIR Web App shows that Merrimack River segments MA84A-02 and MA84A-03 are upstream of MA84A-04, and that the entirety of Maynard falls within the watersheds of these segments. Therefore Maynard has chosen to meet requirements for these three waterbodies within one PSIR. Table 2 provides a list of all nutrient-limited waterbodies addressed by this report.

Table 2. Waterbodies Subject to this Report

Water Body Name	Water Body ID
Merrimack River	MA84A-02
Merrimack River	MA84A-03
Merrimack River	MA84A-04

1 Massachusetts Year 2016 Integrated List of Waters (MassDEP 2019): https://www.epa.gov/sites/default/files/2020-01/documents/2016-ma-303d-list-report.pdf

3

Regulated MS4 Area

3.1 Total MS4 Regulated Area

(Meets Appendix H. Part II.1.b.i.1)

Maynard's total area is approximately **3,440 acres.** Maynard's MS4-regulated area discharging to the Merrimack River (including its tributaries) is **3,440 acres,** representing 100% of the total municipal area. Appendix A includes the methods for determination of Maynard's MS4-regulated area.

3.2 Impervious & Directly Connected Impervious Area

(Meets Appendix H. Part II.1.b.i.3)

Impervious area statistics within Maynard's MS4-regulated area in the watershed include:

- Total impervious area is **614 acres**
- Total directly connected impervious area is **104 acres**

Appendix A includes the methods for calculation of total impervious area and directly connected impervious area (DCIA). Total impervious area and DCIA for each catchment is included within the PSIR Catchment layer in the PSIR Web App.

3.3 Monitoring Results

(Meets Appendix H. Part II.1.b.i.2)

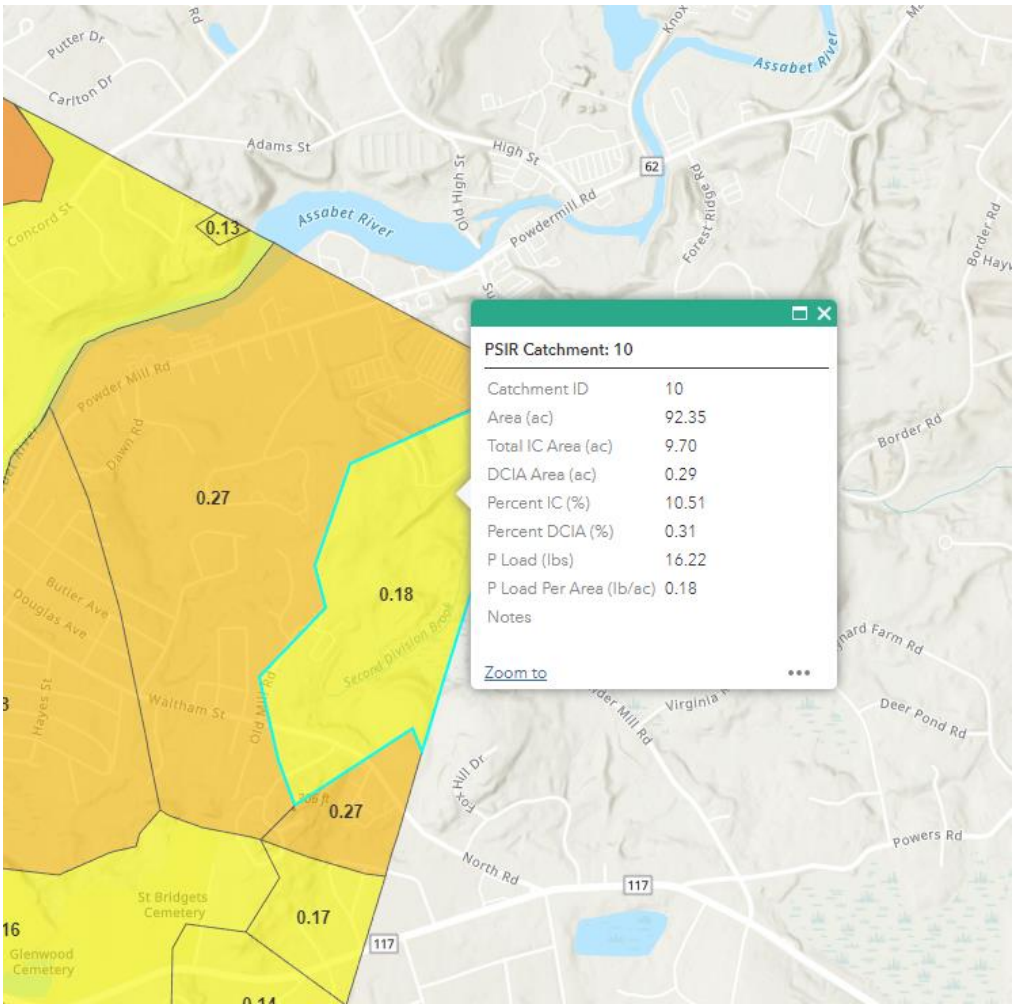
Results from dry and wet weather screening and sampling of Maynard's outfalls and interconnections in this watershed, collected as part of illicit discharge detection and elimination (IDDE) investigations, are included in the PSIR Web App. However, phosphorus concentrations measured during IDDE monitoring come from one-time grab samples and are not indicative of annual loads; therefore these results were not considered when prioritizing catchments for load reduction. Outfalls that are found to have dry or wet weather flow with sewer input indicators will be mitigated under the IDDE program, supporting the phosphorus load reduction goals of this PSIR.

3.4 Phosphorus Loading Analysis

(Meets Appendix H. Part II.1.b.i.4)

A GIS desktop analysis was performed to estimate loading rates and prioritize catchments with high phosphorus loading. This analysis accounted for land use, land cover, and soil type, and is described in more detail in Appendix A.

The PSIR Web App displays the results of this analysis in a layer called PSIR Catchments that is colored based on the catchment's phosphorus load per area. Catchment color ranges from red to yellow, with the highest priority (and highest load per area) catchments in dark red and lowest priority in yellow. Pop-ups display estimated loading rates when an individual catchment is clicked. The image below shows a sample pop-up for a catchment in the Maynard PSIR Web App.



4

Load Reduction Planning

(Meets Appendix H. Part II.1.b.5)

4.1 Approach for Potential Retrofit or Redevelopment Opportunities

Maynard can implement stormwater treatment via 1) stand-alone stormwater retrofit projects or 2) incorporation of structural best management practices (BMPs) into planned construction projects. To identify the best opportunities for stand-alone retrofit projects, Maynard has prioritized catchments based on estimated pollutant loading (Section 3.4). This helps identify areas where implementing stormwater treatment would result in the largest impact. From there, Maynard examines catchments with the best retrofit opportunities, which generally occur under the following conditions:

- Impervious area can be disconnected
- Impervious area is already disconnected but can be established formally as a BMP (increasing the likelihood of maintained functionality over time)
- Existing BMP can be altered to increase treatment performance
- Significant amount of impervious surface can be collected and processed through a BMP
- Available space exists for an above-ground BMP (which is easier to construct and maintain than a below-ground BMP)
- Location is easy to access for construction, inspection, and maintenance activities

Although the above conditions represent the most ideal scenarios for retrofit opportunities, Maynard is open to creative designs, underground measures, and small-scale controls as well.

Maynard also understands that redevelopment projects are cost-effective opportunities to implement additional stormwater treatment, and even more so for the Town if they are funded by a private entity. Therefore, as part of the MS4 post-construction program, Maynard has implemented a Stormwater Management Bylaw and associated regulations that require stormwater treatment during redevelopment projects that cause land disturbance of 10,000 square feet or greater. Further, the Maynard Department of Public Works tries to incorporate BMPs during maintenance projects, even if

these projects are exempt from the Town's post-construction treatment standards. In general, Maynard's approach includes prioritizing infiltration over other structural treatment measures when possible due to infiltration's superior nutrient load reduction capabilities.

As part of MS4 Permit Year 5 work, Maynard will continue to evaluate catchments with high pollutant load to identify specific locations for retrofits or installation of BMPs during redevelopment. In accordance with the MS4 Permit, Maynard will also identify at least one catchment for a demonstration BMP and install this BMP by Permit Year 6.

4.2 Catchment Prioritization Results

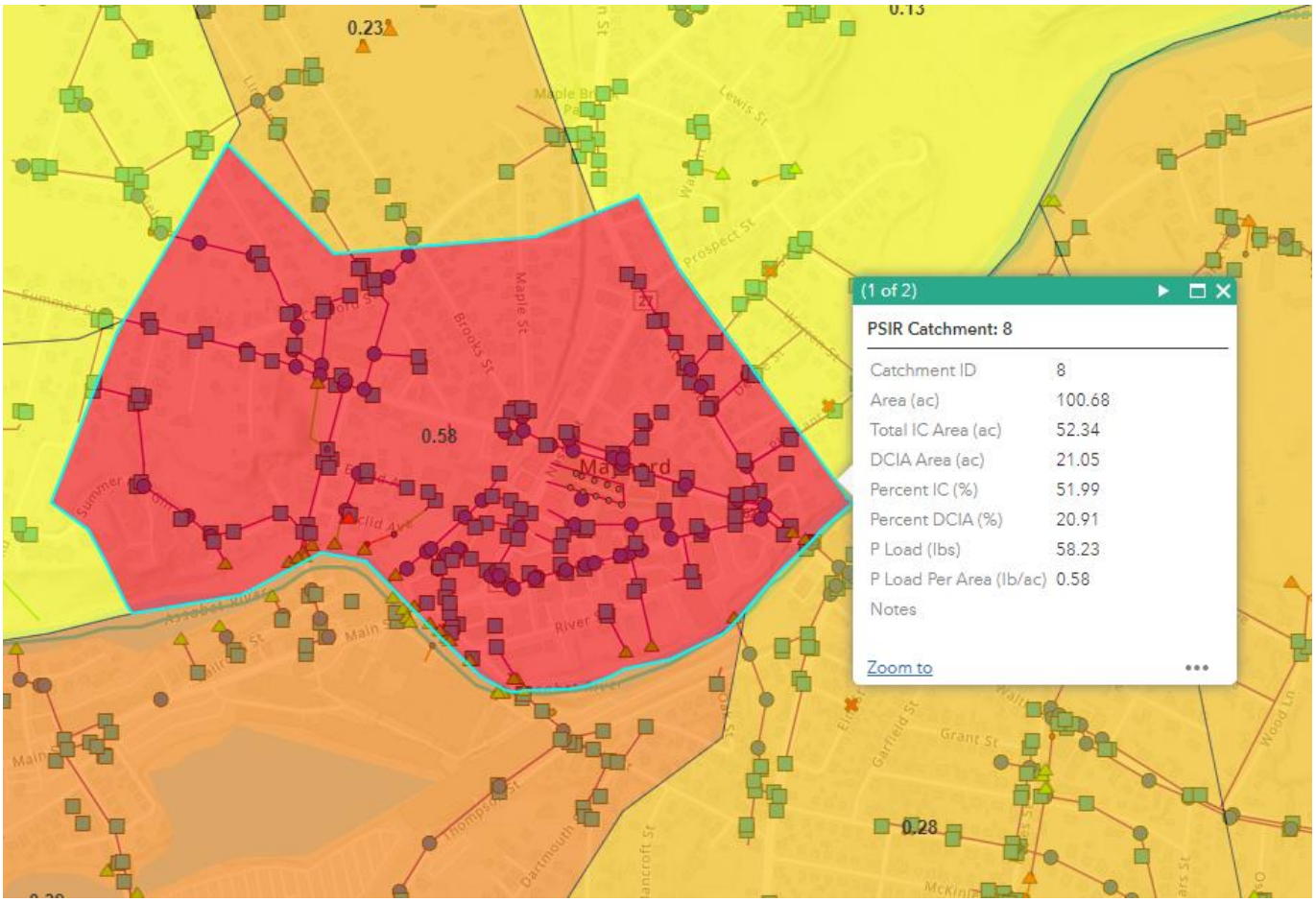
Using the results of the phosphorus loading analysis, catchments were prioritized for phosphorus load mitigation based on their estimated pollutant loading and their opportunity for stormwater treatment. If redevelopment projects had already been planned in the location of the catchment, the catchment was automatically considered a high priority catchment since stormwater retrofits can be incorporated into the redevelopment project. First, catchments with the highest estimated phosphorus load per area based were prioritized. These catchments were then examined for potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment based on conditions described in the previous section.

The catchments in Table 3 have been identified as the top five highest priority opportunities for stormwater treatment for Maynard. Each catchment is also described below.

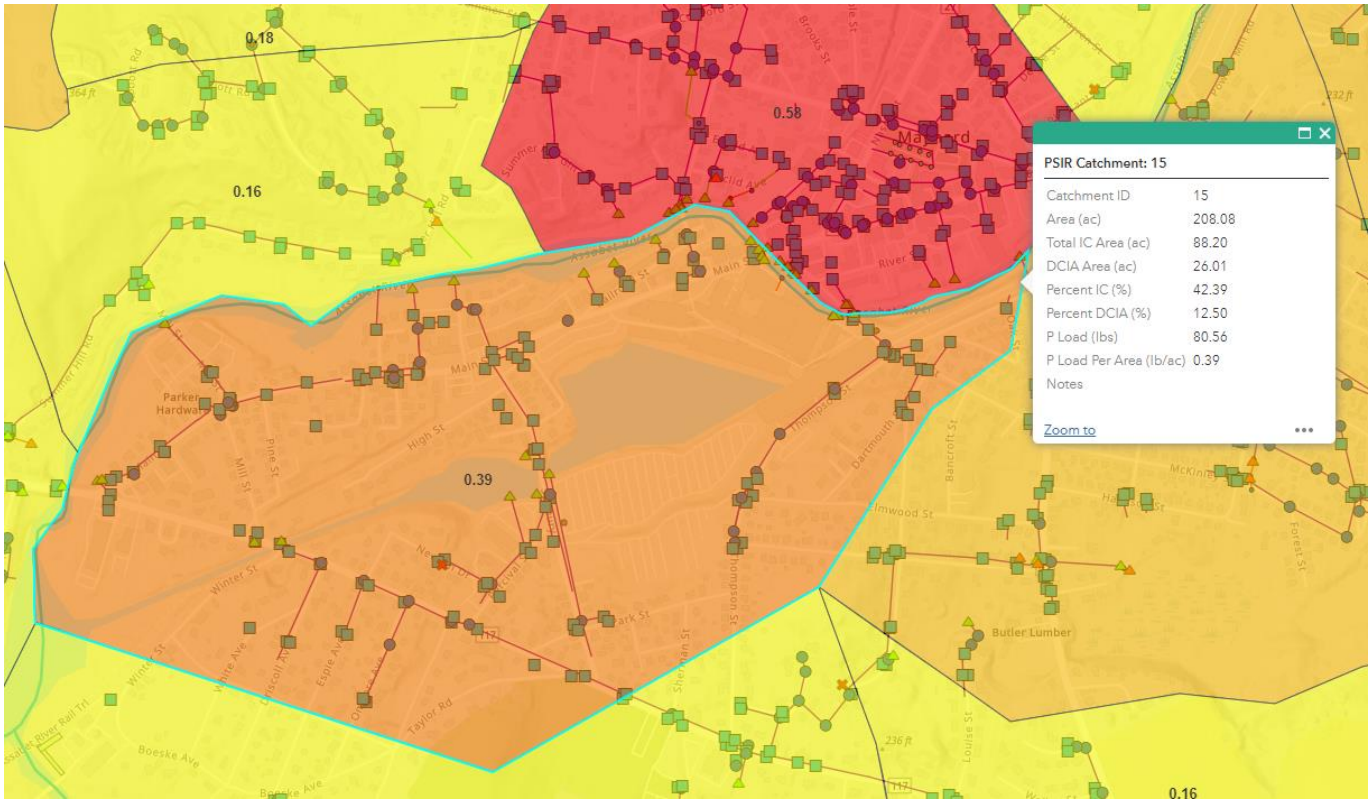
Table 3. Priority Catchments

Priority Rank	Catchment ID	P Load (lbs/ac/yr)
1	8	0.58
2	15	0.39
3	7	0.39
4	13	0.28
5	11	0.24

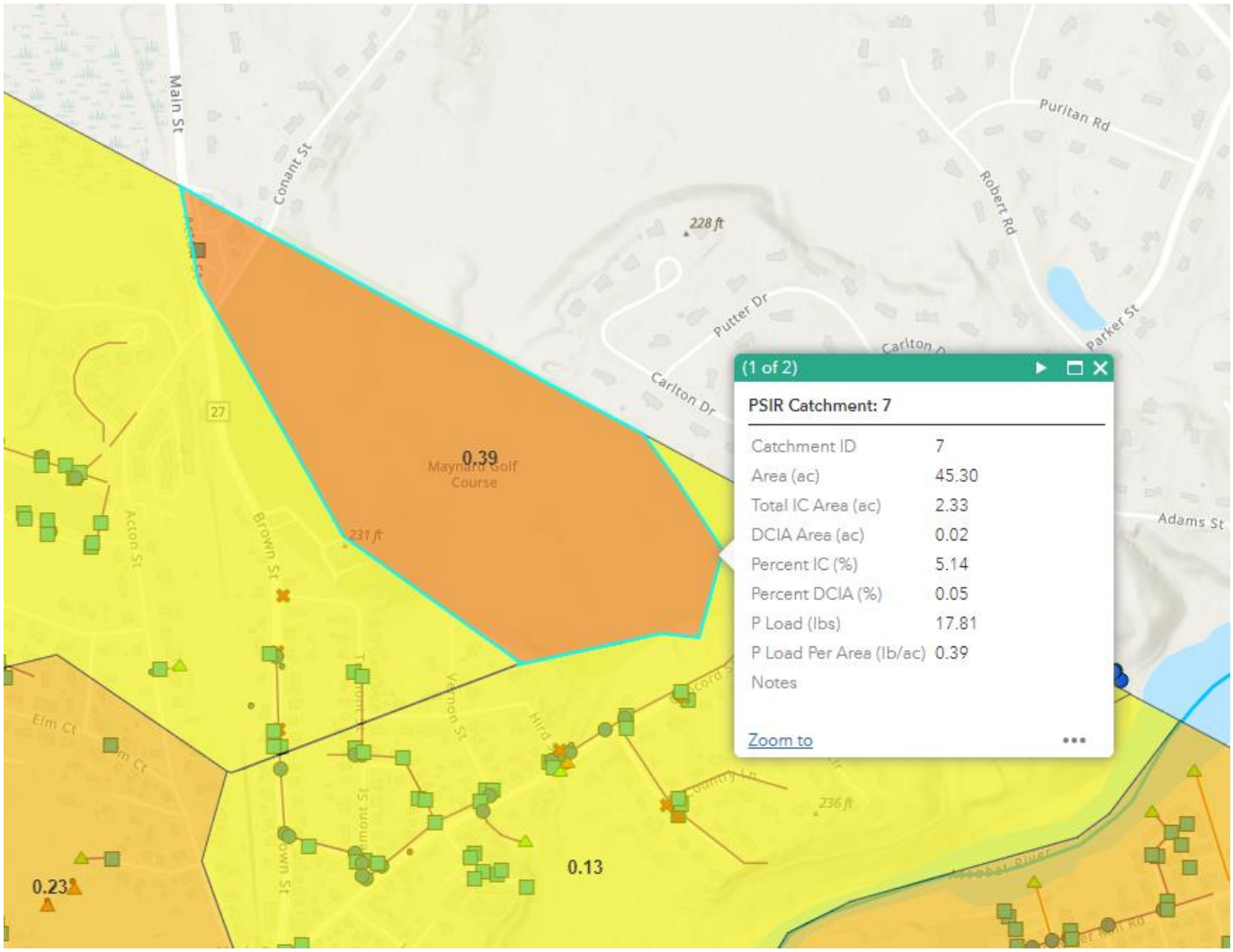
1. **Catchment 8** includes mostly residential and commercial land. There are currently no structural stormwater BMPs within this catchment. This catchment is greater than 50% impervious, but there is still adequate space for surface structural stormwater BMPs. There is a small wetland located on the western side, which would preclude the construction of a potential BMP in this area of the catchment. All stormwater infrastructure within the catchment drains directly to the Assabet River. The construction of a structural stormwater BMP would likely require some reconfiguration of the existing drainage network since all discharge points are currently directly to the Assabet River. Maynard is planning an intersection reconfiguration project in this catchment in the upcoming years which will involve the construction of structural stormwater BMPs. Given the high estimated phosphorus load per area, the upcoming capital improvement projects, the availability of space to construct a structural stormwater BMP and the existing stormwater infrastructure configuration, this catchment was chosen as highest priority.



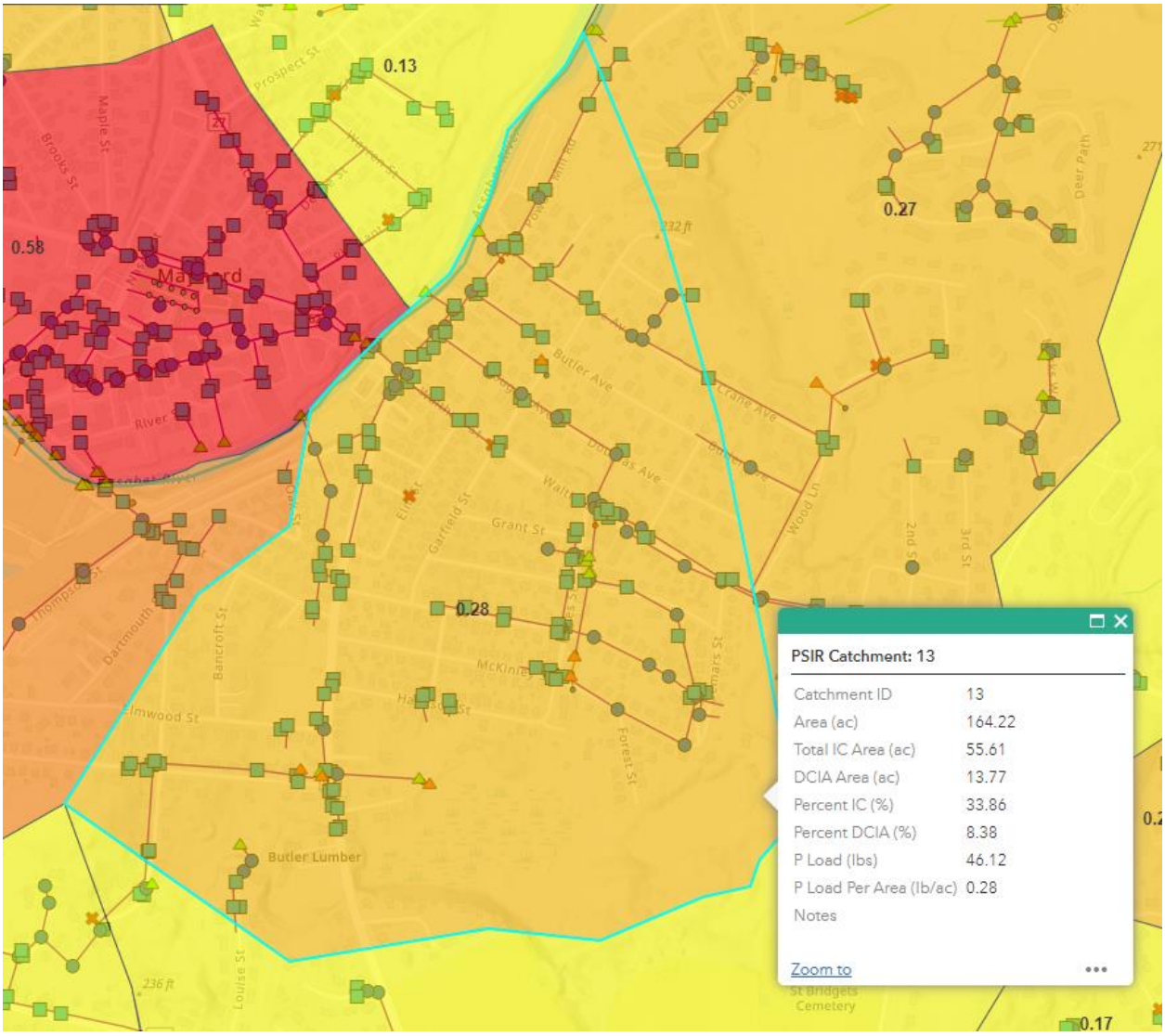
2. **Catchment 15** includes mostly commercial and residential land. There are currently three hydrodynamic separators within this catchment which primarily provide removal of suspended solids. This catchment is greater than 40% impervious, but there is adequate open space for surface structural stormwater BMPs. All existing stormwater infrastructure within this catchment drains directly to the Assabet River. The construction of a structural stormwater BMP would likely require some reconfiguration of the existing drainage network since all discharge points are currently directly to the Assabet River. Given the high estimated phosphorus load, the availability of space to construct a structural stormwater BMP, and the existing stormwater infrastructure configuration, this catchment was chosen as the second highest priority.



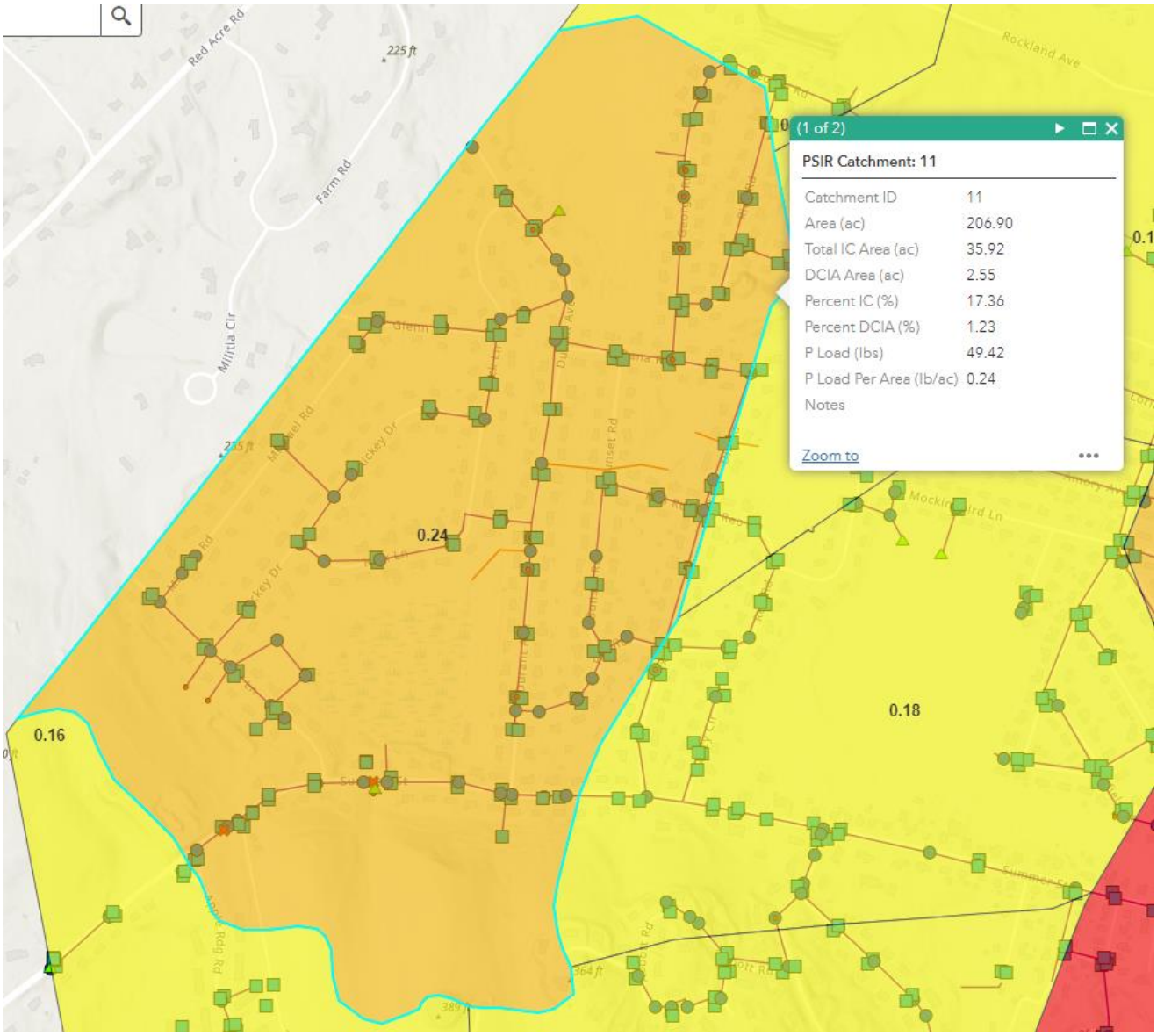
3. **Catchment 7**'s land use is almost exclusively agricultural because most of it is a golf course. This area is categorized as agricultural land due to similarities with golf courses in terms of pollutant loading. Agricultural land typically has nutrient-dense fertilizers applied which contribute to the high estimated phosphorus load for this catchment. This catchment contains a large amount of open space where a structural BMP could be constructed. Although there is no Maynard-owned stormwater infrastructure within this catchment, Maynard owns the land and could likely construct a BMP within this catchment in the available space and enter a maintenance agreement with the company that runs the golf-course. Alternatively, non-structural controls such as low phosphorus fertilizer could be promoted in this catchment in order to reduce the overall phosphorus load.



4. **Catchment 13** includes mostly residential land. There are currently no structural stormwater BMPs within this catchment. This catchment is 33% impervious, with significant open space for potential structural BMPs. Existing drainage infrastructure discharges to either wetlands (where structural BMPs would not be permitted), a culverted stream which discharges to the Assabet River, or to wooded areas. These wooded areas would be ideal sites for stormwater BMP retrofits to discharge to since they would not require significant reconfiguration of existing drainage infrastructure, although they would require some vegetation removal.



5. **Catchment 11** includes primarily low-density residential and forested land. There are currently no structural stormwater BMPs in this catchment. Existing stormwater infrastructure in this catchment discharges either to Durant Pond (a wetland) or a large wooded area. Similar to catchment 13, the wooded area would be an ideal site for a stormwater BMP retrofit to discharge to since it would require minimal reconfiguration of the existing drainage network, although it would require some vegetation removal. Although this catchment is only 17% impervious, it still has a high estimated phosphorus load rate, leading to the high priority ranking.



5

Conclusions and Next Steps

The catchments identified in this PSIR represent the areas within Maynard where stormwater BMPs should be prioritized to reduce the phosphorus load to the receiving water bodies. These areas will be refined in upcoming permit years, and priorities may change as development continues to occur in Maynard. In the upcoming permit years, Maynard will further evaluate retrofit opportunities in these priority catchments and across the entire town and develop a schedule for BMP implementation. As these BMPs are installed, the load reduction from these BMPs will be calculated and used to track progress towards meeting water quality goals.

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A

Phosphorus Source Identification Report Methodology

NPDES MS4 Impaired Waters Compliance

Methods for Developing a Phosphorus Source Identification Report

PREPARED FOR TOWN OF MAYNARD

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JUNE 2022

Table of Contents

1

Introduction

This document describes the approach to Maynard's development of Phosphorus Source Identification Reports in accordance with their National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit Appendix H.

Appendix H of the MS4 permit details requirements for MS4 permittees that discharge to waters that are impaired for phosphorus and do not have a total maximum daily load (TMDL). Specifically, permittees are required to develop Phosphorus Source Identification Reports (PSIRs). This document discusses how Maynard interpreted permit requirements related to PSIRs and how the Town performed calculations and analysis to support the development of their required PSIR for segments of the Merrimack River. This document includes the following chapters:

NSIRs are required for discharges to water quality limited waterbodies and their tributaries where phosphorus is the cause of the impairment and no TMDL is in place.

2. Watershed Evaluation – Discusses the methods used to determine the geographical scope of PSIRs.
3. Analysis – Discusses the approaches used to perform the catchment, load and directly connected impervious area analysis for MS4 areas within watersheds of waterbodies requiring PSIRs.
4. Structural Stormwater Best Management Practices (BMPs) – Discusses the approaches used to identify and credit BMPs, including next steps.

2

Watershed Evaluation

This chapter discusses the methods used to determine the scope of the PSIRs.

According to Section I and II of Appendix H of the MS4 Permit, PSIRs are required for discharges to water quality limited waterbodies and their tributaries where phosphorus is the cause of the impairment and no TMDL is in place. This could mean that the phosphorus impaired waterbody is downstream of the municipal discharge and outside of the municipal boundary. Therefore, the first step in the PSIR Methodology was to identify waterbodies requiring a PSIR and their watersheds.

This section first discusses identification of waterbodies requiring a PSIR and then the development of watershed areas used to identify MS4 areas that discharge to a waterbody requiring a PSIR.

2.1 Determination of Relevant Waterbodies

Waterbodies requiring PSIRs are covered in Section II of Appendix H (in-state phosphorus impaired waters without TMDLs) and Part B Section II of Appendix F (out-of-state approved phosphorus TMDLs).

In-state phosphorus impaired waters (without TMDLs) were identified by reviewing the 2016 integrated list of waters for impairments of "total phosphorus." Review did not include other

"nutrient-related" impairments, as clarified in EPA's response to comments 204 and 1099.[2] The out-of-state nutrient TMDL waterbodies include the Long Island Sound with a nitrogen TMDL and eight Rhode Island waterbodies with phosphorus TMDLs which are listed with their RI Integrated List segment ID in Appendix F Table F-12.

2.2 Defining Watersheds

In order to determine whether Maynard's MS4 discharges stormwater to any of these waterbodies, the watersheds of these waterbodies were delineated. EPA and MassDEP do not currently provide a watershed layer that is segmented by impaired waters (303d list) segmentation.

To define watershed boundaries for waterbodies that require PSIRs, we are required to consider discharges to the waterbody itself "or its tributaries" as cited in the MS4 Permit Section 2.2.1. EPA clarified in response to comment 209 that tributaries are included within the PSIR scope because "discharges of nutrients in stormwater not only affect the point at which the discharge enters the receiving waterbody, but also affect downstream waterbodies".

2.2.1 Watershed Boundary Delineations

There is no current publicly available watershed layer that divides watershed boundaries along the Integrated List waterbody segmentation divides. Therefore geospatial watershed boundaries were developed for the specific waterbody segments requiring a PSIR in order to determine if Maynard discharges to these waterbodies.

Delineations were based on the following data sources for the initial delineation and then adjusted, as necessary, to align with the Integrated List segmentation and known flow patterns.

- Massachusetts Department of Watershed Management 2016 Integrated List[3]
- National Hydrography Dataset Watershed Boundary Dataset Hydrologic Unit Code 12 (WBD HUC12)[4]
- USGS Massachusetts Nested Subbasins (Data Series 451)[5]

[2] EPA MA MS4 General Permit Response to Comments. April 4, 2016. https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/rtc-2016-ma-sms4-gp.pdf Response to Comment 204 on Page 101. Response to Comment 1099 on Page 473.

[3] MassGIS Data: MassDEP 2018/2020 Integrated List of Waters (305(b)/303(d)): (https://www.mass.gov/info-details/massgis-data-massdep-20182020-integrated-list-of-waters-305b303d)

[4] MassGIS Data: NRCS HUC Basins (8, 10, 12): https://www.mass.gov/info-details/massgis-data-nrcs-huc-basins-81012

[5] USGS Massachusetts Nested Subbasins: https://water.usgs.gov/GIS/metadata/usgswrd/XML/ds451_subbasins.xml

3

Analysis

This chapter discusses the approaches used to further analyze catchments within watersheds of waterbodies requiring PSIRs.

Appendix H requires the determination of total MS4 discharging areas, delineated catchments, identification of catchments with higher nutrient sources and catchment totals of impervious and directly connected impervious area (DCIA).

To address these permit requirements for PSIR areas, we delineated catchments and performed land cover analysis and loading calculations for those catchments.

The following sections describe these approaches.

3.1 PSIR Catchment Delineations

In order to prioritize areas for potential treatment, catchments were delineated. The National Hydrography Dataset Watershed Boundary Dataset Hydrologic Unit Code 12 (WBD HUC12) watersheds were used as a starting point for delineating the catchments created for PSIRs (PSIR catchments). The WBD HUC12 watersheds were subdivided into sub-watersheds draining to waterbodies (regardless of impairment status), wetlands and/or other low points based on topography. These sub-watersheds were further refined using aerial imagery and aligned with the PSIR watershed boundary to become the PSIR catchments. Neither drainage infrastructure nor development was taken into account when delineating the PSIR catchments since they are intended

to be high level to help prioritize areas of high pollutant loading. Catchments were not developed for areas outside of the Maynard municipal boundary or areas not within the EPA Urbanized Area.

The PSIR catchments do not necessarily align with the catchments used for illicit discharge detection and elimination (IDDE) analysis (IDDE catchments). The IDDE catchments are focused on specific drainage infrastructure networks connected to identified outfalls, whereas the PSIR catchments were delineated using overall drainage patterns based on topography. This approach creates catchments that are better suited to identify pollutant loading hot-spots and prioritizing areas for future treatment.

3.2 Total MS4 Area Calculation

Appendix H of the MS4 Permit requires calculation of the total MS4 area draining to the phosphorus impaired water segments or their tributaries as part of the PSIR development. For the development of the PSIR, Maynard has defined total MS4 area draining to the subject waterbody as the sum of PSIR catchments that fall within the subject watershed.

Delineation of MS4 catchments is described above in Section 3.1 of this appendix. Areas that do not fall within the MS4 regulated area,[6] as defined by EPA as the Urbanized Area in either the 2000 or 2010 Decennial Census by the Bureau of Census, were not included within the total MS4 area for the PSIR.

PSIR catchments were intersected with the EPA defined MS4 regulated area (GIS layer provided by EPA) and the subject watershed boundary to calculate the total MS4 areas.

3.3 DCIA Estimates

Appendix H of the MS4 Permit requires the estimation of directly connected impervious area (DCIA) within PSIR watersheds. Sutherland Equations were used to calculate DCIA, which empirically estimate directly connected impervious area based on total impervious area and land use, as presented in EPA's Methodology to Calculate Baselines Estimates of Impervious Area (IA) and Directly Connected Impervious Area for Massachusetts Communities.[7] Land use (MassGIS 2005)[8] and impervious cover (MassGIS 2005)[9] were intersected using a geoprocessing model for each PSIR catchment to determine the total DCIA for each catchment. This same geoprocessing model also determined the total IC for each catchment. This estimation of DCIA was used to calculate the load for each PSIR catchment.

[6] US EPA Massachusetts NPDES Phase II Stormwater Program Automatically Designed MS4 Areas, https://www3.epa.gov/region1/npdes/stormwater/ma/AutoDesignatedMS4AreasMA.pdf

[7] EPA's Methodology to Calculate Baselines Estimates of Impervious Area (IA) and Directly Connected Impervious Area for Massachusetts Communities: https://www3.epa.gov/region1/npdes/stormwater/ma/IA-DCIA-Calculation-Methodology.pdf

[8] MassGIS Data: Land Use (2005): https://www.mass.gov/info-details/massgis-data-land-use-2005

[9] MassGIS Data: Impervious Surface (2005): https://www.mass.gov/info-details/massgis-data-impervious-surface-2005

3.4 Load Estimates

Pollutant loading estimates were generated for each catchment to identify pollutant loading hot spots and catchment prioritization for PSIRs. For all PSIR catchments, pollutant loading export rates based on land use, land cover, and hydrologic soil group (HSG) (where applicable) from the following sources were used:

- Phosphorus: Appendix F, Attachment 1, Table 1-2

Phosphorus loads were calculated for catchments within phosphorus impaired PSIR areas.

PSIR baseline loads were calculated using Appendix F, Attachment 1, Table 1-2 (vs. Table 1-1) to be consistent with the loading rates used for tracking and crediting of land alterations and structural stormwater best management practice (BMP) treatment.

For load estimate calculations, impervious pollutant loading export rates were applied to the DCIA area for each catchment and pervious pollutant loading export rates were applied to the pervious and remaining IC (e.g., not DCIA) areas for each catchment.

The spatial datasets used for these calculations include:

- Impervious cover (Mass GIS 2005)[10]
- Land use (MassGIS 2005)[11]
- Hydrologic Soil Group (NRCS, 2022)[12]
- Aerial imagery (ESRI, 2019)[13]

The impervious cover and land use datasets were spot-checked for accuracy by comparing them to the aerial imagery and adjusted as necessary. Documentation of any changes to these datasets are noted within Maynard's database.

Spatial data layers for land use, impervious cover, and HSG were overlayed with the regulated catchment boundaries to develop polygons with unique values and assigned loading rates based on EPA's phosphorus load export rates categories taking DCIA into account as appropriate. Load was then calculated for each catchment by multiplying the applied loading rate by the area of the unique polygon. Loads were then re-summed at the catchment level.

[10] MassGIS Data: Impervious Surface (2005): https://www.mass.gov/info-details/massgis-data-impervious-surface-2005

[11] MassGIS Data: Land Use (2005): https://www.mass.gov/info-details/massgis-data-land-use-2005

[12] USDA NRCS Web Soil Survey (2022): https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

[13] USGS Digital Orthophotos (2019): https://tiles.arcgis.com/tiles/hGdibHYSPO59RG1h/arcgis/rest/services/USGS_Orthos_2019/MapServer

4

Structural Stormwater Best Management Practices (BMPs)

This chapter will be further developed as the planning phase of the PSIR work continues in Permit Year 5.