NPDES Stormwater Management Plan for MassDOT Owned and Operated Highways

EPA Permit Number: MAR043025

Transmittal Number: W040919

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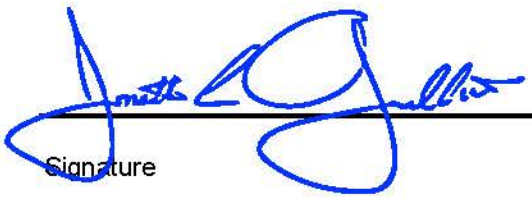
Revision 5: April 2024

Certification

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

Jonathan Gulliver, Administrator
MassDOT, Highway Division



4-10-2024

Signature Date

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1.0 Introduction

A primary objective of state and municipal transportation departments throughout the Commonwealth is to provide a safe, efficient, and cost-effective highway system. The development and maintenance of a transportation system, providing mobility and access to major geographic areas, is necessary to the economic well-being of Massachusetts. Likewise, quality of life and economic prosperity also require protection and enhancement of our natural resources. Therefore, construction and operation of our highway system must balance the public goals of environmental protection, such as stormwater management, with those of safety, access, and mobility.

1.1 NPDES Phase II Stormwater Regulations

The U.S. Environmental Protection Agency (EPA) published the regulation entitled "National Pollutant Discharge Elimination System – Regulations for Revision of the Water Pollution Control Program Addressing Stormwater Discharges; Final Rule" on December 8, 1999 in the Federal Register. This program is often referred to as the National Pollutant Discharge Elimination System (NPDES) Phase II program. Under the Phase II regulations [40 CFR Parts 9, 122, 123, and 124], portions of the highway drainage system owned and operated by MassDOT meet the definition of regulated Municipal Separate Storm Sewer Systems (MS4s). According to 40 CFR 122.26(b)(8), "*municipal separate storm sewer" is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):*

(i) *"Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) including special districts under State law such as asewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States;*

(ii) *Designed or used for collecting or conveying stormwater;*

(iii) *Which is not a combined sewer; and*

(iv) *Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2."*

Federal and State-operated small MS4s can include universities, prisons, hospitals, roads (i.e., departments of transportation), military bases (e.g., State Army National Guard), parks and office buildings/complexes. Therefore, MassDOT Highway Division is considered a regulated MS4. Operators of regulated small MS4s are required to:

- Apply for National Pollutant Discharge Elimination System (NPDES) permit coverage by submitting a Notice of Intent (NOI);
- Develop a stormwater management program which includes the six minimum control measures;
- Implement the stormwater management program using appropriate stormwater management controls, or "best management practices" (BMPs), by the end of the permit term;
- Develop measurable goals for the program; and
- Periodically evaluate effectiveness of the program.

EPA Region 1 developed the "NPDES General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4)" for the New England region and the permit was issued in the Federal Register on May 1, 2003. In Massachusetts, the general MS4 Permit was issued jointly by EPA and Massachusetts Department of Environmental Protection (DEP). The permit was issued as a NPDES permit under the Federal Clean Water Act by EPA and as a state Section 401 Water Quality Certification for MassDEP. In recognition of the differences between federal or state- operated MS4 and their municipal counterparts, the general permit includes separate requirements for Massachusetts Small MS4s, New Hampshire Small MS4s (including Indian Lands in MA, CT and RI), Non-Traditional MS4s (e.g., schools, prisons, hospitals) and Transportation MS4s.

The NOI which serves as the application to be authorized to discharge stormwater under the general permit was due no later than July 30, 2003. MassDOT Highway Division submitted an NOI and Stormwater Management Plan (SWMP) in 2003 and received authorization in April 2007, following comment resolution with EPA. All of MassDOT's versions of the SWMP, including this most current revision, have been prepared to comply with the overall general permit, including Part V - Transportation MS4 Stormwater Management Program. It also addresses public and EPA comments received during the permit term and will continue to be updated when necessary, as the program and regulations evolve. This authorization only covers MassDOT Highway Division properties. Other MassDOT Divisions are responsible for their own permit coverage, if applicable.

While EPA and MassDEP issued a new MS4 Permit in 2016, Section 1.1 of the new permit indicates "*This permit covers small municipal separate storm sewer systems (MS4s) located in the Commonwealth of Massachusetts:*

- *Traditional Cities and Towns*
- *State, federal, county and other publicly owned properties (non-traditional)*
- *State transportation agencies (except for MassDOT – Highway Division)".*

As discussed with EPA and DEP, MassDOT requested that EPA issue a Transportation Separate Storm Sewer Systems (TS4) permit to reflect the nuances of a transportation agency system instead of being covered by the 2016 MS4 permit. Until the TS4 Permit is issued and authorization received, MassDOT is still authorized to discharge stormwater in the MS4 regulated area under the 2003 MS4 Permit.

This SWMP is intended to be a living document, updated as the agency's programs change and to periodically evaluate effectiveness of the program. Updates to the SWMP must continue to meet the permit requirements. After a revised version of the SWMP is released, the upcoming year's annual report will follow the new SWMP BMPs and measurable goals. See Section 3.2 for more details on SWMP updates.

1.2 Urbanized Areas

The 2003 MS4 permit required that the SWMP must include all separate storm sewer systems within Urbanized Area (UA) owned and operated by MassDOT Highway Division. At the time of release of the 2003 permit, UA was defined as a land area comprising one or more places —central place(s) — and the adjacent densely settled surrounding area — urban fringe — that together have a residential population of at least 50,000 and an overall population density of at least 1,000 people per square mile. The UA designation is based on the results of the latest census. However, it should be noted that the Census Bureau stopped using the phrase UA in the 2020 census. In December 2022, EPA clarified that stormwater regulations UA reference will be replaced with "urban areas with a population of at least 50,000 people," to mimic the Census Bureau's longstanding definition of the UA term and is consistent with the 2003 MS4 permit's use of UA.

1.3 MassDOT Jurisdiction

It is important to note that not all major roadways or numbered routes are under the jurisdiction of the MassDOT Highway Division. A portion of these roadways and routes are under the jurisdiction of other state agencies, such as the Department of Conservation and Recreation (DCR), and a large number of roadway segments, including numbered routes, are under the jurisdiction of the municipalities. Interactive maps that illustrate the roads owned and operated by MassDOT is available at https://massdot.maps.arcgis.com/apps/mapviewer/index.html?layers=cf682637fa954b70b4e08dcaae27439a.

1.4 Stormwater Management Unit

MassDOT has a Stormwater Management Unit that are the contacts for the SWMP and work to lend their expertise and experience in stormwater-related topics to implement the MassDOT Stormwater Program. The Stormwater Unit is responsible for:

- Annual evaluation of the continued applicability of the measurable goals for each of the six minimum control measures with input from the MassDOT section/division(s) responsible for the measurable goal. Based on this evaluation, the annual report may include a recommendation for revising, adding, or deleting measurable goals from the SWMP.
- Preparation and submittal of annual reports to EPA. Annual reports will include a narrative and/or numerical summary of how MassDOT has met the measurable goals for each of the six minimum controls over the last year, and an evaluation of current BMPs and measurable goals.

Implementation and coordination of each of the measures described in the SWMP will be the responsibility of the Section/Division(s) indicated in the SWMP.

1.5 SWMP Certification

According to Part 1.E.1.i of the permit, the following certification must be signed by MassDOT:

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

A signed certification of this SWMP is found immediately following the title page of this document.

1.6 Stormwater Management Program

The remainder of the document describes MassDOT's Stormwater Management Program. MassDOT currently implements many practices, policies, guidelines and programs that relate to pollution prevention and stormwater management. This plan outlines each of these ongoing activities and discusses future activities. The program covers the division's highways, roadways, bridges, rest areas, weigh stations and maintenance facilities, including construction and stormwater system maintenance related to these sites within the urbanized areas.

2.0 Minimum Control Measures

The following section describes control measures MassDOT will implement to satisfy conditions of the 2003 NPDES Phase II MS4 general permit requirements for transportation MS4s. EPA requires compliance with six minimum control measures including:

1. Public education and outreach,
2. Public involvement/participation,
3. Illicit discharge detection and elimination,
4. Construction site runoff controls,
5. Post-construction runoff controls, and
6. Pollution prevention/good housekeeping.

The permit requires that the permittee identify for each minimum control measure:

- The person(s) or department responsible for the minimum control measure.
- Best Management Practices (BMPs) for the minimum control measure. Timelines and milestones for implementation of BMPs.
- Measurable goals for each BMP and, if appropriate, an overall goal for each measure.

The BMPs and measurable goals for each control measure are addressed in detail within this section.

2.1 Public Education and Outreach

EPA Minimum Control Requirement: According to the NPDES 2003 MS4 permit Part V, in order to meet the Public Education and Outreach minimum control requirement, the operator of the transportation MS4:

"…must implement a public education program to distribute educational material to the community. For the purposes of this permit, a community consists of the people who use the facility. For a transportation agency, this would include employees, contractors, and general public. The public education program must provide information concerning the impact of stormwater discharges on water bodies. It must address steps and/or activities that the community can take to reduce the pollutants in stormwater runoff.

The following should be included in education and outreach efforts:

(a) *Information regarding activities that occur within the facility, including illegal dumping into storm drains.*

(b) *Coordinate activities with local groups (i.e., watershed associations, or schools).*

(c) *Materials for outreach/education may include, but are not limited to, pamphlets; fact sheets; brochures; public service announcements; storm drain stenciling and newspaper advertisements.*

(d) *Encourage cooperative efforts with neighboring municipalities, watershed associations and others."*

MassDOT Programs: Public education efforts implemented or supported by MassDOT may reduce pollutant loads discharged via MassDOT storm drains. MassDOT participates in programs that provide stormwater related education to staff, stormwater operations and maintenance contractors, municipal DPWs, and the general public which targets the audiences required by the permit. MassDOT plans to comply with the public education and outreach minimum control measure by continuing the current programs and by implementing additional programs during the permit term including those listed below.

BMP 1A – Annual Winter Environmental Training

MassDOT provides an annual environmental training to each District. Attendees may include Resident Engineers (REs), inspectors, and other relevant district staff. This training covers topics such as good housekeeping practices, illicit discharge awareness, and stormwater management.

Measurable Goal: MassDOT will facilitate one training per year, per District.

Responsible Party: Environmental

BMP 1B – Environmental Awareness Education

Educational materials regarding good housekeeping practices, spill prevention, and illicit discharge awareness are provided to MassDOT maintenance facility personnel. Related training of staff and subcontractors is performed as needed (e.g. staff take on new roles, are hired, or practices change at the facility).

Measurable Goal: Provide educational materials and training to MassDOT maintenance facility personnel and subcontractors as needed.

Responsible Party: Environmental

BMP 1C – Snow and Ice Program Training

MassDOT snow and ice program supervisors and subcontractors are required to participate in annual training through video training modules that provide guidance on the latest techniques, equipment, and material available for snow and ice removal. These video modules are provided by various snow and ice practitioner organizations including the Clear Roads Program. MassDOT also provides separate “tailgate” training sessions at various depots in each District for both state personnel and hired contractors to provide updates on any new MassDOT policies and reemphasize the use of current BMPs.

Measurable Goal: Provide annual training to MassDOT supervisors and subcontractors on the latest on snow and ice removal.

Responsible Party: Highway Operations

BMP 1D – Baystate Roads Program

MassDOT funds training programs through the MassDOT Baystate Roads Program (Baystate Roads). This program provides training to the general public, including municipal DPW and MassDOT staff, and includes workshops and seminars addressing stormwater management, pollution prevention, hazardous waste, and related issues.

Measurable Goal: Baystate Roads will provide one training program related to stormwater and/or related topics (e.g., pollution prevention, hazardous waste).

Responsible Party: Baystate Roads

BMP 1E – MassDOT Stormwater Management Unit Webpage

MassDOT Stormwater Management Unit currently maintains a page on MassDOT's webpage that provides interested parties with information regarding MassDOT's stormwater management program, including stormwater design guidance, the Impaired Waters Program (IWP), the Illicit Discharge Detection and Elimination (IDDE) Program, construction site runoff controls, and MassDOT's drainage infrastructure inventory. The webpage includes links to relevant stormwater resources and is used to solicit public input and publicize stormwater related initiatives. Emails received are reviewed and directed to the appropriate group for follow-up.

Measurable Goals: 1) Maintain a link for contacting the Highway Division via e-mail. Review and direct emails received to the appropriate group. 2) Evaluate the MassDOT Stormwater Management Unit webpage annually and revise as necessary.

Responsible Party: IT/Environmental

BMP 1F – Post Contact Names for Municipal Drainage Concerns on MassDOT Webpage

MassDOT has posted District Highway Director (DHD) contact information on the MassDOT webpage as a contact point for drainage issues.

Measurable Goals: Post and maintain DHD contact information for each District on the MassDOT webpage.

Responsible Party: IT/Environmental

BMP 1G – Coordination with Local Groups

MassDOT will coordinate with local groups (i.e., watershed associations, stormwater coalitions, schools, neighboring communities, etc.) through participation in conferences, panels, and forums to educate the public on MassDOT's stormwater program and drainage infrastructure, as well as environmental stewardship measures. MassDOT will collaborate with local groups and share information to work toward common stormwater goals.

Measurable Goal: Report on the coordination activities and collaboration efforts with local groups related to stormwater.

Responsible Party: Environmental

2.2 Public Involvement and Participation

EPA Minimum Control Requirement: According to the MS4 general permit Part V:

"All public involvement activities must comply with state public notice requirement.

(a) *The permittee must provide opportunity for the public to participate in the development, implementation and review of the stormwater management program. In Massachusetts, the public notice requirements are at Chapter 39, Section 23B."*

MassDOT Programs: MassDOT posts all stormwater MS4 compliance documents on its stormwater webpage (https://www.mass.gov/info-details/stormwater-management-unit) for public access including the SWMP and annual reports. In addition, as part of transportation planning and project review, state and local public notice requirements allow for significant public involvement opportunities. MassDOT also encourages public involvement in pollution reduction activities sponsored by the division, since the public is an important part of both source reduction and clean up. The current and proposed programs or activities, which address the public participation/involvement minimum requirement, are listed below.

BMP 2A – SWMP Posting

The MassDOT stormwater webpage provides the public with access to MassDOT's SWMP and other stormwater program related documents. The webpage includes contact information which can be used by the public to provide comments on the SWMP and other information on the webpage.

Measurable Goals: 1) Post the latest version of the SWMP on the MassDOT stormwater webpage. 2) Provide contact information for public feedback.

Responsible Party: IT/Environmental

BMP 2B – Annual Report Posting

The MassDOT stormwater webpage includes the most recent annual report for public access. The webpage includes contact information which can be used by the public to provide comments on the annual report.

Measurable Goals: 1) Post the latest annual report on the MassDOT stormwater webpage. 2) Provide contact information for public feedback.

Responsible Party: IT/Environmental

2.3 Illicit Discharge Detection and Elimination

EPA Minimum Control Requirement: According to the MS4 general permit Part V:

"The permittee must develop, implement and enforce a program to detect and eliminate illicit discharges. An illicit discharge is any discharge to a municipal separate storm sewer system (MS4) that is not composed entirely of stormwater. Exceptions are discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal sewer system), allowable non-storm water discharges described at Part I.F. and discharges resulting from firefighting activities.

(a) If not already existing, the permittee must develop a storm sewer system map. At a minimum, the map must show the location of all outfalls and the names of all waters that receive discharges from those outfalls. Due to the magnitude of a transportation agency's drainage system, identification of outfalls may be done on a district basis, and as part of construction and redevelopment projects.

Additional elements may be included on the map, such as, location of catch basins, location of manholes, and location of pipes within the system. Initial mapping should be based on all existing information available to the permittee including project plans, agency records, city records and drainage maps. Field surveys may be necessary to verify existing records and locate all outfalls.

(b) To the extent allowable under state law, the permittee must effectively prohibit, through a regulatory mechanism, non-stormwater discharges into the system and implement appropriate enforcement procedures and actions. If a regulatory mechanism does not exist, development and adoption of such a

mechanism must be included as part of the storm water management program. The permittee should evaluate existing procedures, policies and authorities pertaining to connections to its separate storm sewer system.

If an illicit discharger fails to comply with procedures or policies established by the agency, the permittee seek assistance from EPA or the state environmental agency in enforcing this provision of the permit.

(c) The permittee must develop and implement a plan to detect and address non-storm water discharges, including illegal dumping, into the system.

The illicit discharge plan must contain the following elements:

i. Procedures to identify priority areas. This includes areas suspected of having illicit discharges, for example: older areas of a city, areas of high public complaints, and areas of high recreational value or high environmental value such as beaches and drinking water sources.

ii. Procedures for locating illicit discharges (i.e. visual screening of outfalls for dry weather discharges, dye or smoke testing).

iii. Procedures for locating the source of the discharge and procedures for the removal of the source.

iv. Procedures for documenting actions and evaluating the impact on the storm sewer system subsequent to the removal.

(d) The permittee must inform users of the system and the general public of hazards associated with illegal discharges and improper waste disposal. The permittee must train field inspectors to recognize illicit discharges.

(e) The non storm water discharges listed in Part I.F. must be addressed if they are identified as being significant contributors of pollutants."

Allowable non-stormwater discharges per Permit Part 1.F. are listed in Table 1.

Table 1. EPA Allowable Non-Stormwater Discharges Per Permit Part 1.F.*

- Water line flushing;
- Landscape irrigation;
- Diverted stream flows;
- Rising groundwaters;
- Uncontaminated groundwater infiltration (e.g., highway subdrains);
- Uncontaminated pumped groundwater;
- Discharges from potable water sources;
- Foundation drains;
- Irrigation water;
- Springs;
- Water from crawl space pumps;
- Footing drains;
- Lawn watering;
- Individual resident car washing;
- Flows from riparian habitats and wetlands;
- Dechlorinated swimming pool discharges;
- Street wash water; and

- Air conditioning condensation;
- Residential building wash waters, without detergents.

* *MassDOT requirements may be more restrictive*.

Discharges or flows from firefighting activities occur during emergency situations. The permit does not require that firefighting discharges be evaluated with regard to pollutant contributions. They are authorized as non-stormwater discharges by the permit unless identified by EPA as significant sources of pollutant to Waters of the United States.

MassDOT Programs: MassDOT's IDDE Program has evolved over the years from a statewide program of dry weather screening of outfalls in priority areas (e.g., environmentally sensitive receiving waters, waters impaired for bacteria) to a more targeted approach at screening for and following up on potential illicit discharges. MassDOT trains maintenance staff to be looking for signs of potential illicit discharges to the MassDOT drainage system during cleaning and maintenance of drainage infrastructure. MassDOT also encourages the public to report on potential illicit discharges. Each MassDOT district reports the potential illicit discharges to the MassDOT Stormwater Management Unit who then follow up, investigate the catchment, and potentially require the discharger to submit for a MassDOT Drainage Connection Permit. The Drainage Connection permit, authorized through MassDOT's non-vehicular access permit program, requires that applicants document that flow entering MassDOT's drainage system is only comprised of stormwater, or MassDOT must otherwise develop a plan to remove confirmed illicit discharges and resolve the issue.

The following programs are in place to meet this minimum control measure on IDDE. In addition to the BMPs listed below, BMPs included under other minimum control requirements, as listed at the end of Section 2.3, also further satisfy the requirements of the public participation and involvement minimum control measure.

BMP 3A – Storm Sewer System Map

MassDOT completed mapping outfalls within MS4 regulated areas as part of the drainage system inventory completed in Permit Year 5 (June 2008). Mapping of outfalls consisted of digitizing points from drainage plans or locating them in the field with Global Positioning System (GPS).

MassDOT continues to map other stormwater system components (e.g., catch basins, stormwater control measures (SCMs), manholes, pipes, interconnections to other MS4s) and maintains a statewide stormwater assets geodatabase. The stormwater assets geodatabase is publicly available on GeoDOT.

> *Measurable Goal: 1) Develop a storm sewer map which shows the location of all regulated outfalls. 2) Summarize status actions taken that year of storm sewer system mapping in annual report.*
>
> *Responsible Party:* Environmental/Asset Management

BMP 3B – Illicit Discharge Detection and Elimination Plan

MassDOT has developed and implemented an IDDE Plan (included as **Appendix E** to this SWMP) which documents how MassDOT will detect and address non-storm water discharges, including illegal dumping, into our drainage system. The plan includes:

- Procedures to identify priority areas including areas suspected of having illicit discharges.
- Procedures for locating illicit discharges including visual screening of outfalls for dry weather discharges, dye, or smoke testing.

- Procedures for locating the source of the discharge and procedures for the removal of the source.
- Procedures for documenting actions and evaluating the impact on the storm sewer system subsequent to the removal.

Illicit discharge detection measures are also covered under a portion of BMPs included in the other minimum controls measures, including:

- BMP 1A – Annual Winter Environmental Training
- BMP 1E – MassDOT Stormwater Management Unit Webpage

Measurable Goals: 1) Develop IDDE plan. 2) Post plan to MassDOT stormwater webpage.

Responsible Party: Environmental/Districts

BMP 3C – Outfall Review for Potential IDDE

MassDOT will review potential illicit discharges in compliance with the protocols in the IDDE plan.

Measurable Goals: 1) Perform field review of complaints/potential illicit discharges. 2) Maintain tracking database of IDDE suspect flows in annual report.

Responsible Party: Environmental/Districts

BMP 3D – Potential Illicit Discharges Follow Up Actions

If potential illicit discharges are identified, MassDOT will develop a follow up action plan and schedule in accordance with the protocols in the IDDE Plan including locating the source of the discharge and procedures for the removal of the source, visual screening of outfalls for dry weather discharges, dye, or smoke testing. MassDOT will document actions and evaluate the impact on the storm sewer system subsequent to the removal.

Measurable Goals: 1) Perform follow up actions and maintain schedule of potential illicit discharges. 2) Maintain tracking database of follow up actions and summarize in annual report.

Responsible Party: Environmental/Districts

BMP 3E – Drainage Connection Policy Directive No. P-06-002

In order to provide a mechanism for MassDOT to prohibit non-stormwater discharges from MassDOT's system, MassDOT adopted Policy Directive No. P-06-002 on June 26, 2006 (whereas municipalities can develop ordinances). Under this policy, no connections are allowed unless a permit has been granted pursuant to the provisions of Massachusetts General Laws, Chapter 81, section 21, which provides for fines and/or civil penalties of up to one thousand dollars per day for each violation. The policy states that MassDOT will not issue a Non-vehicular Access Permit for connections that do not meet MS4 general permit conditions to be added to, or remain connected to, its drainage system. This approach will be enforced through referrals to the Attorney General for enforcement of Chapter 81, Section 21 orders and/or to enjoin a trespass which such unpermitted flows would constitute.

Measurable Goals: 1) Issue Drainage Connection Policy Directive. 2) Post copy of policy on MassDOT webpage. 3) Enforce the provisions through referrals to the Attorney General. 4) Summarize enforcement actions taken in annual report.

Responsible Party: Environmental/Districts

BMP 3F – Connection or Discharge to any MassDOT Drainage System Standard Operating Practice (SOP)

To provide guidance on the acceptable connections to MassDOT drainage system and to assist with determining existing connections which should not be approved for continuing connection, MassDOT developed a Standard Operating Practice (SOP). The SOP restates the prohibition of non-stormwater discharges, except as allowed in the NPDES MS4 general permit, that is included in the Drainage Connection Policy Directive No. P-06-002. The SOP includes discharges from existing sites and construction sites which disturb more than one acre of land. If proposed discharges meet the SOP requirements, MassDOT can issue a Non-vehicular Access Permit for the discharge.

Measurable Goals: 1) Issue SOP for Connections or Discharges to MassDOT Drainage System. 2) Administer the SOP at the district level.

Responsible Party: Environmental/Legal

2.4 Construction Site Stormwater Runoff Controls

EPA Minimum Control Requirement: According to the MS4 general permit Part V:

"*The permittee must develop, implement, and enforce a program to reduce pollutants in any stormwater runoff to the MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. The permittee must include disturbances of less than one acre if they are part of a larger common plan."*

"At a minimum, the program must include:

(a) *To the extent allowable under state law, a regulatory mechanism to require sediment and erosion control at construction sites. If such a mechanism does not exist, development and adoption of a mechanism must be part of the program. If attempts to enforce this part of their program are ineffective, the permittee may seek assistance from EPA or the state agency for enforcement of this provision.*

(b) *Sanctions to ensure compliance with the program. Sanctions may include either monetary or non-monetary penalties. The transportation agency can consider withholding payment to contractors who fail to implement appropriate sediment and erosion control plans.*

(c) *Requirements for construction site operators to implement a sediment and erosion control program that includes best management practices that are appropriate for the conditions at the construction site. The Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas may be used as a tool to implement this provision.*

(d) *Requirements for the control of wastes, including but not limited to, discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes.*

(e) *Procedures for site plan review including procedures which incorporate consideration of potential water quality impacts. The site plan review should include procedures for pre-construction review.*

(f) *Procedures for receipt and consideration of information submitted by the public. This may include the opportunities for public comment during the project development process.*

(g) *Procedures for inspections and enforcement of control measures at construction sites."*

MassDOT Programs: MassDOT is responsible for the construction of state highways but may also provide construction oversight and fund the design and construction on roadways owned by others if the projects are eligible for certain federal and/or state funds. All of these "MassDOT-executed" projects should follow the BMPs presented under this minimum control measure. During construction, MassDOT is considered the site operator and files for construction permits including the NPDES Construction General Permit (CGP), if applicable. After construction is complete, these roadways become sole responsibility of the owner whether that is MassDOT or a municipality.

The following programs address construction site runoff in MassDOT projects including highways, roadways, bridges, rest areas, weigh stations, and maintenance facilities.

BMP 4A – Site Plan Review Procedure

MassDOT's site plan review includes procedures for reviewing the need for stormwater controls and potential water quality impacts at multiple stages of the design. Stormwater measures are incorporated into designs by the project designer, and MassDOT performs site plan reviews at prescribed design milestones and provides comments on the plans for the designer to address.

Measurable Goal: MassDOT will implement and maintain the site plan review procedure and discuss any changes or updates to the procedure in the annual report.

Responsible Party: Environmental

BMP 4B – NPDES SWPPP Specification (Item 756)

MassDOT includes Item 756 NPDES Stormwater Pollution Prevention Plan (SWPPP) specification and appropriate erosion control bid items in bid packages for projects that meet the CGP definition of regulated sites that disturb one acre or more (or are part of a larger common plan that disturbs one or more acres). MassDOT verifies that the SWPPP item is included in the contract bid package during design reviews. EPA encourages multiple operators at a construction site to develop a comprehensive SWPPP that includes procedures for inspections and enforcement of control measures at construction sites with clearly defined responsibilities. EPA provides a SWPPP template and other guidance documents on their website that contractors can use to meet the CGP requirements.

Measurable Goal: 1) Include Item 756 SWPPP specification and erosion control items in bid packages for projects which meet CGP requirements. 2) Report on updates to the specification in the annual report.

Responsible Party: Construction

BMP 4C – MassDOT Standard Specifications for Highways and Bridges – Prevention of Water Pollution

All projects advertised for construction by MassDOT require the Contractor to follow the Standard Specifications for Highways and Bridges. Section 7.0 of the Specifications, entitled "Legal Relations and Responsibility to the Public" establishes general requirements for erosion control and protection of water quality. For all construction projects conducted by outside contractors, a project-specific, binding legal contract between the Commonwealth and the Contractor is in place. In addition to special provisions established in the contract for the particular project, the contract also states that the MassDOT Standard Provisions and Standard Special Provisions apply to all work.

Subsection 7.02, entitled "Prevention of Water Pollution," establishes general standards and authorizes the MassDOT Engineer to order specific actions to control erosion and prevent pollution of water resources from the construction activities. Enforceability provisions included in this subsection consist primarily of withholding payments until work is in compliance with regulations and the Engineer's directives. Standard Provisions, Division I, Section 7.02 – Prevention of Water Pollution – states in part:

> *"The work shall also consist of temporary control measures ordered by the Engineer during the life of the Contract to control water pollution, through the use of berms, dikes, dams, sediment basins, crushed stone, gravel, mulches, grasses, waterways, and other erosion control devices or methods. If, in the judgment of the Engineer the surface area of erodible earth material exposed has the potential for causing water pollution, the Engineer shall direct the Contractor to cease the applicable operations until satisfactory temporary or permanent erosion control measures are taken. In the event of conflict between these requirements and pollution control laws, rules or regulations of other federal, State or local agencies, the more restrictive laws, rules or regulations shall apply. Standard Provisions, Division I, Section 9.04 addresses payment for work under a contract, stating "The Engineer shall biweekly make an estimate of the total amount of work done from one estimate to the next…No such estimates or payment shall be made when, in the Engineer's judgment, the work is not proceeding in accordance with the provisions of the Contract,...."*

MassDOT's standard practice for inspection and enforcement of construction control measures includes making REs responsible for tracking the Contractor's compliance with erosion and sedimentation control measure inspections and follow up on corrective actions to address issues identified in compliance with the NPDES CGP. If REs determine that the Contractor is not complying with the CGP inspection and correction action requirements, including documentation, the RE can discuss the issues with the Contractor and, if determined necessary, use the standard provisions above to withhold payment until the problems are rectified. Payment discussion or other enforcement measures are discussed with the MassDOT District leaders and the Construction Unit in Headquarters.

> *Measurable Goals: Include standard specifications, including Prevention of Water Pollution, in all construction contracts.*
>
> *Responsible Party:* Environmental/Construction/Project Management

<u>BMP 4D – Preconstruction Kickoff Meeting</u>

Once a project is awarded, MassDOT holds a preconstruction kickoff meeting. As part of this meeting, District staff discuss permit requirements including the CGP and reinforce that the Contractor is responsible for filing the NPDES CGP NOI ahead of the start of construction; will meet all of the CGP requirements including inspections, documentation, and identifying/rectifying corrective actions; and will file a Notice of Termination (NOT) upon completion of the project.

> *Measurable Goal: Hold kickoff meetings for projects once awarded and include discussion of CGP requirements on each relevant project.*
>
> *Responsible Party:* Construction

<u>BMP 4E – File and Track NPDES CGP Notice of Intents</u>

In order to file for coverage to discharge stormwater from a construction site under the NPDES CGP, MassDOT and the Contractor each file an NOI with EPA for projects that are advertised for construction by MassDOT and that disturb one acre or more (or are part of a larger common plan that disturbs one or more acres). NOIs filed by MassDOT under the NPDES CGP are filed and tracked at the District level.

Measurable Goal: 1) MassDOT will document the number of projects where the Contractor has filed an NOI for authorization to discharge under the CGP as the site operator each permit year in the annual report. 2) MassDOT will document the number of projects which MassDOT has filed for coverage under CGP as the owner each permit year in the annual report.

Responsible Party: Construction

BMP 4F – Submittal and Review of NPDES CGP SWPPP

As required by Item 756, the Contractor must submit a SWPPP, including relevant plans to District personnel. The SWPPP includes the planned operations and erosion and sedimentation control measures the Contractor will implement during the construction phase and a copy of the filed NOI. The SWPPP also includes procedures for pollution prevention measures such as control of wastes at construction sites, including discarded building materials, concrete truck wash out, chemicals, litter, and sanitary wastes, as applicable to the project. As part of the SWPPP, the Contractor must identify a qualified individual who will perform site inspections and include proof of completion (i.e., Erosion & Sediment (E&S) Control training certificate) of an EPA approved qualified inspector course that meets CGP requirements when submitting the SWPPP.

MassDOT district personnel review the SWPPP and accompanying plans for compliance with the CGP and MassDOT guidance before construction starts, provides comments/ needed revisions back to the Contractor, and provides written approval once comments are addressed.

Measurable Goal: MassDOT will document the projects that filed for CGP coverage and have submitted SWPPPs for review by District personnel during each permit year in the annual report.

Responsible Party: Construction

BMP 4G – Contractor Inspector Training

Item 756 requires that all proposed qualified inspectors must take an EPA training course or other EPA approved erosion control inspector training as defined in the CGP. MassDOT requires proof of the completion of the course before approving the qualified inspector.

Measurable Goal: Continue to maintain the SWPPP Item to require proof of completion of a sedimentation and erosion control training class current to the requirements of the latest CGP.

Responsible Party: Construction

BMP 4H – NPDES CGP SWPPP Inspections

MassDOT's Item 756 requires Contractors to include inspections and corrective actions as necessary to comply with the CGP, SWPPP, and federal and state environmental permit requirements issued to the project. The Contractor's qualified individual performs the required inspections. The Contractor keeps the inspection and corrective action logs on site and submits monthly summary reports (including a summary of construction activities undertaken during the reporting period, general site conditions, erosion control maintenance and corrective actions taken, the anticipated schedule of construction activities for the next reporting period, any SWPPP amendments, and representative photographs) to the RE. The Contractor performs necessary improvements in accordance with deadlines written in the SWPPP, as required by the CGP.

The Contractor is responsible for any amendments to the SWPPP required by site conditions, schedule changes, revised work, and/or construction methodologies. SWPPP amendments will require the approval of MassDOT district personnel prior to implementation.

The MassDOT RE, or designated field staff, performs erosion control inspections and also reviews the Contractor's SWPPP inspection logs. The RE's erosion control inspections are documented in the RE's daily report. The RE follows up with the Contractor to ensure corrective actions are installed in accordance with the deadlines in the SWPPP.

Upon completion of a project but prior to submission of the RE's final estimate, the RE reviews the site to verify that the Contractor has completed final stabilization, as well as removal and proper disposal of all construction materials and waste. Once considered complete, the RE files a Contract Completion Report to the District.

> *Measurable Goal: 1) MassDOT REs will perform erosion control inspections and document findings in daily reports. 2) The MassDOT RE will review the Contractor's SWPPP inspection logs and follow up on the Contractor performing corrective actions in accordance with the SWPPP timelines.*
>
> *Responsible Party:* Construction/Contracts

BMP 4I – File and Track NPDES CGP Notice of Termination

Coverage under the CGP is closed out by filing a Notice of Termination (NOT) with EPA when final stabilization has been achieved.

> *Measurable Goal: 1) Summarize the number of projects that include the CGP and SWPPP Specification (Item 756) and that the Contractor has filed an NOT for, during each permit year in annual report. 2) Summarize the number of these projects that MassDOT has filed an NOT for as owner.*
>
> *Responsible Party:* Construction

BMP 4J – Annual Erosion Prevention/ Sediment Control Training

MassDOT conducts annual erosion prevention/sediment control training for MassDOT Construction personnel. Each winter, as projects shut down or work is limited, workshops are provided to construction personnel on various topics of concern. These include technical and engineering topics as well as regulatory information. Workshops provided covered water quality regulatory programs, including NPDES, and information on proper erosion control techniques.

> *Measurable Goals: 1) Conduct annual erosion prevention/sediment control training for MassDOT construction personnel. 2) Summarize the number of trainings and topics covered in the annual report.*
>
> *Responsible Party:* Environmental

BMP 4K – Project Related Public Notice and Public Participation Requirements

As a public agency, MassDOT complies with state public notice requirements. Public notice and participation also are an integral part of the requirements of the Massachusetts Wetlands Protection Act (WPA), Clean Water Act (CWA) Water Quality Certification (401 permit), United States Army Corps of Engineers (USACE) 404 permit, Massachusetts Environmental Policy Act (MEPA), and National Environmental Policy Act (NEPA). Many MassDOT projects are subject to at least one of these regulations. Notices of public hearings are posted on the MassDOT webpage.

Measurable Goals: Continue compliance with federal and state notification requirements including, but not limited to, Wetlands Protection Act, Clean Water Act 401 Water Quality Certification, Army Corps of Engineers 404 Permit, and MEPA/NEPA.

Responsible Party: Environmental/Districts

2.5 Post-Construction Stormwater Management in New Development and Redevelopments

EPA Minimum Control Requirement: According to the MS4 general permit Part V:

"*The permittee must develop, implement and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than one acre and discharge into the MS4. The program must include projects less than one acre if the project is part of a larger common plan of development."*

The post construction program must include:

(a) *To the extent allowable under state law, a regulatory mechanism to address post construction runoff from new development and redevelopment. If such a mechanism does not exist, development and adoption of a mechanism must be part of the program. If attempts to enforce this provision of the program are ineffective, the permittee may seek assistance from EPA or the state agency in enforcing this provision.*

(b) *Procedures to ensure adequate long-term operation and maintenance of best management practices.*

(c) *Procedures to ensure that any controls that are in place will prevent or minimize impacts to water quality.*

(d) *The Massachusetts Highway Department may use the approved Storm Water Handbook as a tool to implement this provision."*

MassDOT Programs: Construction within MassDOT property including projects associated with highways, roadways, bridges, rest areas, weigh stations, and maintenance facilities are subject to the following programs addressing post-construction runoff controls. Projects that are "MassDOT-executed" (i.e., where MassDOT funds and/or constructs municipal projects) should follow the BMPs presented under this minimum control measure.

<u>BMP 5A – MassDOT Stormwater Design Guide</u>

In 2002, MassDOT (then known as MassHighway) released an extensive Storm Water Handbook for roadway designers, public works personnel, and other persons involved in the design, permitting, review, and implementation of highway and bridge improvement projects in Massachusetts. The Handbook was ratified by MassDEP on May 7, 2004. The objective of this handbook was to provide guidance in the development of cost-effective stormwater management strategies for highway projects to comply with the MassDEP Stormwater Policy. It also contained guidance pertinent to meeting the requirements of the NPDES MS4 program.

In 2023, MassDOT released the Stormwater Design Guide (SDG), which replaced the Storm Water Handbook and provides an update to the latest regulatory requirements and guidance, including the

MassDEP Stormwater Standards and EPA BMP Performance Curves. The SDG presents MassDOT policies and provides guidance on developing stormwater designs that best comply with state and federal regulations, especially considering the site constraints found along highway corridors, intersections, and bridges.

Measurable Goal: 1) Post the 2023 MassDOT SDG on its webpage. 2) Implement and maintain the MassDOT SDG.

Responsible Party: Environmental/Construction/Project Management

BMP 5B – MassDOT Project Development and Design Guide

MassDOT uses the Project Development and Design Guide (PDDG) to provide guidance on how to advance a MassDOT project from planning to construction. The purpose of the PDDG is to provide designers and decision-makers with a framework for incorporating context sensitive design and multi-modal elements into transportation improvement projects. Context sensitive design involves a collaborative, interdisciplinary approach that includes careful consideration of environmental resources including water quality, in addition to other parameters affecting highway design development. The guide is available at https://www.mass.gov/lists/design-guides-and-manuals. Chapter 8 of the PDDG provides guidance on closed drainage design and erosion and sediment controls, which aid in preventing or minimizing impacts to water quality.

Measurable Goal: Continue to implement and maintain the content of Chapter 8 of the PDDG to provide guidance on design of drainage systems and erosion and sediment controls for MassDOT roadways.

Responsible Party: Environmental/Construction/Project Management

Post-construction runoff control measures are also covered under a portion of BMPs included in the other minimum controls measures, including:

- BMP 6C – Programmatic Operations and Maintenance Plan

2.6 Pollution Prevention and Good Housekeeping in Community/Facility Operations

EPA Minimum Control Requirement: According to the MS4 general permit Part V:

In recognition of the benefits of pollution prevention practices, the NPDES Phase II permit requires an operator of a regulated transportation MS4 to:

(a) *Develop and implement a program with a goal of preventing and/or reducing pollutant runoff from transportation facility operations. The program must include an employee-training component.*

(b) *Include, at a minimum, maintenance activities for the following: rest areas along interstates; weigh stations; material storage yards; new construction and land disturbance; roadway drainage system maintenance, and stormwater system maintenance.*

(c) *Develop schedules for maintenance activities described in paragraph (b) above.*

(d) *Develop inspection procedures and schedules for long term structural controls.*

MassDOT Programs: The various programs below collectively meet the pollution prevention/ good housekeeping requirements of the permit, within the context of MassDOT's highway drainage system, and the development of an overall program as outlined in Part (a) of the EPA minimum control requirement above. Part (b) and (c) are met by individual BMPs dependent on the MassDOT facility type. Therefore, we have identified the relevant maintenance BMP for each type of facility in the matrix below. MassDOT will also develop inspection procedures and schedules for the long-term controls at all regulated facilities.

Maintenance Programs by Facility Type

MCM 6 BMP addressing maintenance activities and schedule	MassDOT Facility Type		
	Rest Areas along Interstates, Weigh Stations, Roadway Drainage System, Stormwater System	**Maintenance Facility/ Material Storage Yards**	**New Construction and Land Disturbance**
BMP 6A Maintenance/ Material Storage Yards - Maintenance Programs		X	
BMP 6B Road and Roadway Facility - Maintenance Programs	X		
BMP 6C Programmatic Operations and Maintenance Plan	X	X	
BMP 6D Snow and Ice Operations	X	X	
BMP 6E Snow and Ice Control Program Environmental Status and Planning Report Review	X	X	
BMP 6F Annual Snow and Ice Summary Report	X	X	
BMP 4B NPDES Construction General Permit and SWPPP Specification			X
BMP 4C MassDOT Standard Specifications for Highways and Bridges – Prevention of Water Pollution			X

BMP 6A – Maintenance/Material Storage Yards - Maintenance Programs

Starting in 1994, MassDOT began to develop and implement several Management System Improvement and Implementation Plans for MassDOT maintenance facilities (including material storage yards). Together these plans outlined the programs and funding needed to achieve and maintain environmental compliance at the facilities. Compliance programs include:

- Hazardous Waste,
- Wetlands,
- Hazardous Materials,
- Underground Storage Tanks,
- Water Quality,
- Solid Waste, and
- Asbestos.

The Water Quality portion of the program addresses water quality concerns during facility improvements such as septic system upgrades/ installation, sewer connections, floor drain upgrades and the installation of wash water recycling systems.

To support these initiatives, MassDOT prepared and published a Facility Environmental Handbook for use at its material storage/maintenance yards. This Handbook is a reference document that provides guidance on conducting operations in compliance with environmental requirements. It contains SOPs and Facility Maps to identify, among other things, water quality and drainage structures and environmentally sensitive areas such as wetlands and waterway buffer zones.

Maintenance activities at the maintenance facilities include mowing, sweeping impervious areas, inspecting structural treatment SCMs, and cleaning and repairing measures based on inspection results. The schedule for performing these activities is based on district knowledge and practices. Maintenance facility staff are responsible for performing inspections and implementing measures determined necessary.

> *Measurable Goal: Continue to use the developed protocols to perform maintenance activities at maintenance/material storage yards to maintain environmental compliance.*
>
> *Responsible Party:* Districts

MassDOT conducts a significant amount of training for its staff through a series of programs. Pollution prevention/good housekeeping control measures are included in BMPs under other minimum controls measures, including:

- BMP 1A – Annual Winter Environmental Training
- BMP 1B – Environmental Awareness Education
- BMP 1C – Snow and Ice Program Training
- BMP 1D – Baystate Roads Program

<u>BMP 6B – Road and Roadway Facility – Maintenance Programs</u>

MassDOT is responsible for maintenance on roads and facilities owned and operated by MassDOT. Drainage system operations and maintenance efforts are currently led by District Maintenance staff and maintenance schedules are prioritized based on district knowledge. Highway maintenance programs typically include:

- Maintenance of road surfaces (repaving/pothole repair)
- Correction of drainage problems
- Correction of safety problems
- Repair or replacement of failed or malfunctioning drainage outlets
- SCM maintenance
- Catch basin cleaning
- Street sweeping

Maintenance activities for roadways and roadway related facilities (e.g. rest areas along interstates, weigh stations) include mowing, sweeping impervious areas, inspecting structural treatment SCMs, and cleaning

and repairing measures based on inspection results. Based on district knowledge and practices, District's staff focus on known problem areas that impact safety and set standard reoccurring schedules for overall district inspection and cleaning by contractors

Measurable Goal: Continue District-based maintenance schedules and inspection procedures.

Responsible Party: Districts

BMP 6C – Programmatic Operations and Maintenance Plan

MassDOT is in the process of developing a Programmatic Operations and Maintenance Plan (POMP) for MassDOT-owned drainage assets including roadways and MassDOT roadway related facilities. The goal of the POMP is to create a customized approach for drainage Operations and Maintenance (O&M) that is focused on the performance of its drainage assets and is realistic and attainable, while also being environmentally protective. The POMP will include standardized schedules and procedures for operation and maintenance of drainage assets, including but not limited to catch basins and SCMs. The POMP will be implemented by the Stormwater Management Unit and District Maintenance staff. MassDOT and contractors will use GeoDOT to assign, record, and track inspection and cleaning of drainage infrastructure.

Measurable Goal: 1) Develop the POMP. 2) Once the POMP is developed, implement maintenance as outlined in POMP. 3) Provide summary of progress of implementation of POMP. 4) Continue to track and record inspection and cleaning data.

Responsible Party: Environmental/Districts

BMP 6D – Snow and Ice Operations

MassDOT conducts snow and ice operations during winter storm events to maintain reasonable safe travel conditions on its roads and adjacent roadway facilities throughout the state. MassDOT seeks to balance the needs of public safety, vehicle mobility, and the economy of the commonwealth with the costs in terms of environmental consequences and fiscal expenditure.

Snow and ice activities are weather dependent and performed as necessary to maintain safe travel conditions. MassDOT relies heavily on hired contractors to provide sufficient equipment and workforce resources needed to cover its extensive roadway network during winter weather events. Through its contractor vendor agreements, that are updated and executed prior to each season, MassDOT specifies the types of efficiency measures related to material applications and plowing that contractors must have in order to be called in for service. MassDOT also provides generous stipends as financial incentives to encourage contractors to attend annual training sessions provided by district personnel in the respective service area. Contractors also must have their equipment inspected by district personnel and provide equipment calibration documentation prior to each season. These measures and specifications are discussed in greater detail in MassDOT's latest Snow and Ice Control Environmental Status and Planning Report (ESPR) discussed below in BMP 6E.

Measurable Goal: Continue to monitor trends in annual statewide salt usage relative to the winter weather severity as reported in the 5-year ESPR and related annual reports discussed below.

Responsible Party: Highway Operations/Districts

BMP 6E – Snow and Ice Control Program Environmental Status and Planning Report (ESPR) Review

MassDOT conducts an assessment of its Snow and Ice Control Program and the potential environmental issues related to this program through an ESPR prepared every 5 years as part of MEPA. MassDOT's most recent ESPR was posted on March 2023 in the Energy and Environmental Affairs (EEA) Environmental Monitor portal: MassDOT's 2022 Snow and Ice Control ESPR

The 2022 ESPR includes a discussion of MassDOT's procedures for winter road maintenance, a description of the latest tools and technologies used by MassDOT to enhance the efficiency and effectiveness of salt use, a detailed comparison of annual salt usage on a statewide and district basis relative to the winter weather severity, a trend analysis of sodium and chloride levels as reported by public drinking water supplies across the state, a summary of recent salt remediation cases, a summary of the various BMPs that MassDOT is evaluating for future consideration, and a summary of findings from other relevant environmental studies.

As discussed in greater detail in the 2022 ESPR, MassDOT has been monitoring annual salt usage for the last 22+ years relative to the severity of winter weather and has found that it has used approximately 26% less salt on an average annual tons per lane basis over the last 12 years compared to what was used in the previous 10 years (2001-10) while accounting for differences in winter weather severity conditions. In the last 5 years, the average annual salt usage was approximately 30% less than that used in the 2001-10 period. These reductions are attributed to the various efficiency measures including the use of liquid deicers to pretreat roads, when weather conditions allow, and to prewet salt to increase its effectiveness. The use of enhanced weather and road condition monitoring technologies have also helped to minimize salt use. These technologies, equipment upgrades, and other revised procedures are discussed further in the ESPR.

> *Measurable Goal: Continue to monitor trends in annual salt usage relative to winter weather severity and previous usage which are reported in the ESPR and intervening annual reports, which are posted in the EEA Environmental Monitor portal every 5 years or at the end of each year, respectively.*
>
> *Responsible Party:* Environmental/Districts

BMP 6F – Annual Snow and Ice Summary Report

In the intervening years between ESPR submittals, MassDOT prepares a brief annual summary report to provide status updates on annual salt usage for the past winter as well as progress made on new BMPs or program initiatives included as recommendations in the ESPR. The most recent Annual Snow and Ice Summary Reports are publicly available through the EEA Environmental Monitor portal: https://eeaonline.eea.state.ma.us/EEA/MEPA-eMonitor/home

> *Measurable Goal: 1) Continue to monitor trends in annual salt usage relative to winter weather severity and previous usage which are reported in the ESPR and intervening annual reports 2) Monitor progress and identify the latest technologies and best practices used in the snow and ice control program as discussed in the annual Snow and Ice Summary Report.*
>
> *Responsible Party:* Environmental/Districts

Pollution prevention/good housekeeping measures are also covered under a portion of BMPs included in the other minimum controls measures, including:

- BMP 4A – NPDES Construction General Permit and SWPPP Specification (Item 756)
- BMP 4G – MassDOT Standard Specifications for Highways and Bridges – Prevention of Water Pollution

2.7 Water Quality Impaired Waterbodies Including Total Maximum Daily Loads (TMDLs)

2.7.1 Discharges to Water Quality Impaired Waters

General Permit Requirement: According to the MS4 general permit Part I.C of the permit indicates that if a discharge from the MS4 is within the watershed of a 303(d) listed water body, MassDOT must evaluate the discharge for a series of additional requirements including the following:

1. *The permittee must determine whether stormwater discharges from any part of the MS4 contribute; either directly or indirectly, to a 303(d) listed water body.*

2. *The stormwater management program must include a section describing how the program will control the discharge of the pollutants of concern and ensure that the discharges will not cause an instream exceedance of the water quality standards. This discussion must specifically identify control measures and BMPs that will collectively control the discharge of the pollutant(s) of concern. Pollutant(s) of concern refer to the pollutant identified as causing the impairment.*

Waters listed on the 303(d) list have been determined by MassDEP to be impaired based on monitoring data.

MassDOT Programs: MassDOT developed the IWP to address roadway stormwater runoff discharging to impaired waters across the state as part of the commitment to improving the quality of stormwater runoff from our highways, compliance with the MS4 Permit, and commitments in the EPA enforcement order letter to MassDOT dated April 22, 2010.

MassDOT's IWP is a statewide approach to address roadway stormwater runoff that discharges to impaired waters, including those waters with TMDLs. This robust program involves:

- Identifying impaired waterbodies (TMDL and non-TMDL) that may receive stormwater discharges from MassDOT facilities or roads through desktop GIS analysis.
- Development of assessment protocols for addressing the stormwater outfalls. (BMP 7R and 7U)
- Develop Impaired Waters Assessment Reports to review impaired watersheds and determine if the watersheds include MassDOT roadways/regulated outfalls and if the pollutant(s) of concern is related to MassDOT runoff.
- Design and construction of prioritized SCMs identified as needed in assessments to address MassDOT runoff.
- Tracking of SCMs constructed through the Water Quality Data Form (WQDF) Reference Map found here: https://massdot.maps.arcgis.com/apps/webappviewer/index.html?id=46b8552ac03e47da9b8feaf5a4df7002.

The IWP also involves constructing SCMs as part of comprehensive programmed MassDOT projects, design of stormwater treatment in accordance with the MassDOT SDG, and designers following stormwater treatment recommendations as directed by the WQDF. Projects require submission of the WQDF which provides stormwater treatment guidance based on the impairment status (including TMDL) and pollutant of concern for the project's receiving water bodies.

These measures, in combination with the other BMPs in this SWMP, are a significant step towards ensuring that discharges of stormwater from MassDOT properties are not leading to the impairment of

Massachusetts waterbodies and that MassDOT is doing its part to improve the quality of our receiving waters in impaired watersheds as required by this section of the permit and other commitments by MassDOT. MassDOT provides a summary of the IWP and WQDF submissions in each annual report.

MassDOT has the following specific BMPs to meet the requirements of discharges to water quality impaired waters.

BMP 7A – Water Quality Data Form – WQDF

The WQDF is a spreadsheet-based tool that directs designers on stormwater treatment requirements based on the watershed's impairment status that the project is located within. Based on guidance from the WQDF, MassDOT and designers select appropriate SCMs for their project to ensure that discharges from projects do not contribute to water quality violations. The WQDF also collects proposed SCM data that MassDOT uses to load into its stormwater assets geodatabase. A WQDF is submitted no later than the 25% design stage and may also be submitted with the 75%, 100%, and Project, Specifications, and Estimates (PS&E) design stages, depending on the project.

> *Measurable Goal: 1) Continue to implement (and update as needed) the WQDF for designers to promote and incorporate proper stormwater management into prescribed design submissions. 2) Summarize the number of WQDFs received by MassDOT in annual report.*
>
> *Responsible Party:* Environmental

BMP 7B – Review of Specific Sites for Water Quality Exceedance in Response to Conservation Law Foundation et al. Lawsuit

In response to a civil action suit brought by the Conservation Law Foundation (CLF) et al. in 2006, MassDOT focused stormwater analysis and improvements on three sites identified as potential contributors to water quality (copper, lead, and zinc) exceedances experienced by the Charles and North Nashua Rivers. MassDOT's consultant analyzed the pollutant contributions to the sites and designed retrofit SCMs for each of the sites. Each of these retrofits have been constructed and a final summary of inspection and maintenance activities was submitted in 2011 to the court.

> *Measurable Goal: 1) Analyze each of the three sites identified in the CLF lawsuit (Charles River crossings in Bellingham and Milford; and North Nashua River crossing in Lancaster). Develop summary report with modeling methodology and summary of results. 2) For the sites which are determined to contribute to the exceedance of water quality at the stream crossing, construct SCMs to address MassDOT related exceedances. 3) Submit a remedial plan to the court.*
>
> *Responsible Party:* Environmental

BMP 7U – Water Quality Impaired Waters Assessment and Mitigation Plan

Starting in June 2010, MassDOT made a five-year commitment as part of the EPA enforcement order compliance to assess all impaired water body segments that receive stormwater runoff from MassDOT roadways located in the MS4 area. A water body assessment includes identifying if runoff from the MassDOT roadways drains to the water body, whether stormwater is contributing to the impairment, and whether existing SCMs effectively treat runoff from the roadways. The assessment then sets a pollutant removal target for the specific receiving water and, if the target is not currently met, MassDOT designs and constructs additional water quality SCMs where site conditions allow.

For some of these impaired water bodies, MassDEP has developed TMDLs that MassDOT used to assess the potential impact from MassDOT's stormwater discharges and determine if improvements were necessary to meet the TMDL's required reduction in pollutant loading. However, many Massachusetts water bodies are impaired but currently have no TMDL, and in these cases, MassDOT was left without quantitative guidance for assessing its discharges at the time the program was being developed in 2010. Therefore, MassDOT used EPA's Impervious Cover (IC) Method as a basis for developing an approach (BMP 7U IC Methodology) to assess the impacts of its stormwater systems on impaired receiving water bodies without TMDLs. This methodology was submitted to EPA for review as part of the quarterly progress reports required by the EPA enforcement letter.

MassDOT has completed the required assessments and met the submittals schedule.

> *Measurable Goals: 1) Assess all Appendix L-1 waters using the process developed by MassDOT as part of the IWP. 2) Assess at least 25 water bodies (both TMDL and non-TMDL waters) within the first quarter (June 8, 2010 – September 8, 2010) of the IWP. 3) Submit quarterly progress reports to EPA during the first year of the IWP (June 8, 2010 – June 8, 2011) and semi-annually thereafter (June 9, 2011 – June 8, 2015). 4.) Report on design and construction progress of SCMs prioritized during the review in annual reports.*
>
> *Responsible Party:* Environmental

Impaired waters measures are also covered by BMPs included in the other sections, including:

- BMP 6B – Road and Roadway Facility – Maintenance Programs
- BMP 6C – Programmatic Operations and Maintenance Plan
- BMP 7G – SCM Data within Stormwater Assets Geodatabase

2.7.2 Discharge to Waterbodies with an Approved TMDL

General Permit Requirement: According to the MS4 general permit Part I.D, if a discharge drains to a listed waterbody for which a TMDL has been developed and approved by EPA, the permittee must comply with the requirements below:

1. *Determine whether the approved TMDL is for a pollutant likely to be found in stormwater discharges from the MS4.*
2. *Determine whether the TMDL includes a pollutant waste load allocation (WLA), BMP recommendations or other performance requirements for stormwater discharges. This stormwater WLA may be expressed in the TMDL as a gross allotment for the impaired water body. Or, provided no specific WLA for the MS4 exists, determine if a Performance Agreement or Memorandum of Understanding has been established between the MS4, EPA, and MassDEP or NH DES which modifies the BMPs or performance standards of the TMDL. Such Memoranda are posted on the TMDL websites. The Massachusetts site is: https://www.mass.gov/total-maximum-daily-loads-tmdls.*
3. *If the MS4 is required to implement stormwater waste load allocation provisions of the TMDL, the permittee must assess whether the WLA is being met through implementation of existing stormwater control measures or if additional control measures are necessary. The permittee's*

assessment of whether the WLA is being met is expected to focus on the adequacy of the permittee's stormwater controls (implementation and maintenance), not on the response of the receiving water.

4. *Highlight in the stormwater management program and annual reports all control measures currently being implemented or planned to be implemented to control pollutants of concern identified in approved TMDLs. Also include a schedule of implementation for all planned controls. Document the assessment which demonstrates that the WLA will be met including any calculations, maintenance log books, or other appropriate controls.*

MassDOT Programs: MassDEP is responsible for creating a "pollution budget" designed to restore the health of the impaired waterbody in accordance with the Federal Clean Water Act. This pollution budget is also referred to as a TMDL budget and includes identifying the causes (types of pollutant) and source(s) (where the pollutants come from) of the pollutant from point and non-point source discharges. The TMDL determines the maximum pollutant load that can be discharged to a specific water body to meet water quality standards and the TMDL report presents a plan to meet that goal.

The 2003 MS4 permit did not include quantitative requirements for permittees with discharges within TMDL watersheds. Therefore, MassDOT developed a methodology of reviewing each of the TMDLs that had received Final Approval by EPA as of the date of the permit issuance. This review included a summary of the TMDL name, pollutant of concern, whether a waste load allocation was identified, and BMP recommendations from the report that may be related to MassDOT. For TMDL reports which included specific actions by MassDOT (referred to as MassHighway at that time) to meet the TMDL recommendations beyond actions which align with general MS4 stormwater program implementation, individual BMPs have been added to this section to describe the required follow up.

Originally (including in the 2009 SWMP), MassDOT had relied on a review of TMDL reports and identifying reports which specifically identified recommended actions by MassDOT to assist in meeting the TMDL recommendations to meet this section of the permit. The development of the more comprehensive IWP program, described in **Section 2.7.1,** and other MS4 programs meet the intent of many of the TMDL recommendations and therefore the BMPs in this section have been revised and updated.

BMP 7C – SCM Data within Stormwater Assets Geodatabase

MassDOT maintains a statewide drainage infrastructure database on GeoDOT including an SCM data layer. This data is used to track not only the location, type, and main characteristics of the SCM, but also the stormwater treatment the SCM provides, including phosphorus, nitrogen, and effective impervious cover reduction. On a watershed level, this data can be used to track progress towards meeting TMDL goals.

Measurable Goal: Continue to maintain SCM data within stormwater assets geodatabase and track stormwater treatment provided by SCMs.

Responsible Party: Environmental/Asset Management

BMP 7R – TMDL Watershed Review

Starting in June 2010 and as part of the IWP developed to meet the EPA enforcement order, MassDOT made a five-year commitment to perform a water body assessment of all impaired water body segments that receive stormwater runoff from MassDOT roadways located in the regulated MS4 area as of 2010. A water body assessment includes identifying if runoff from the MassDOT roadways drains to the water body, whether stormwater is contributing to the impairment, and whether existing BMPs effectively treat runoff from the roadways. The assessment then sets a pollutant removal target for the specific receiving water

and, if the target is not currently met, MassDOT designs and constructs additional water quality BMPs where site conditions allow.

For watersheds with TMDLs, the assessment included reviewing the TMDL recommendations and load allocations. MassDOT developed the TMDL Method (BMP 7R) exclusively for assessing discharges to impaired waterbodies with TMDLs for pollutants typically found in highway stormwater runoff as part of the IWP. These pollutants include, but are not limited to, total nitrogen (TN), total phosphorus (TP), total suspended solids (TSS), and zinc (Zn). MassDOT has developed additional procedures for assessing compliance with TMDLs for pathogens. These methodologies were submitted to EPA for review.

MassDOT assessed all applicable impaired waters bodies with TMDLs using MassDOT's TMDL Method.

> *Measurable Goal: 1) Develop prioritized list of TMDL watersheds to assess based on pollutants and MassHighway (now known as "MassDOT") drainage outfalls. 2) Assess 20% of applicable watersheds with TMDLs. Summarize assessment and outcome, including implementation schedules for SCMs if determined necessary, in each annual report. 3) Report on design and construction progress of SCMs prioritized during the TMDL assessment in annual reports.*
>
> *Responsible Party:* Environmental

Impaired waters measures are also covered by BMPs included in the other minimum controls measures, including:

- BMP 6B – Road and Roadway Facility – Maintenance Programs
- BMP 6C – Programmatic Operations and Maintenance Plan
- BMP 7A – Water Quality Data Form – WQDF
- BMP 7U – Water Quality Impaired Waters Assessment and Mitigation Plan

2.8 Additional Requirements

Parts I, V and IX of the General Permit include additional requirements beyond the minimum control measures and impaired waters requirements. The additional requirements include:

- Part I.B.2.(e) - Endangered Species Act,
- Part I.B.2.(e) - Essential Fish Habitat,
- Part I.B.2.(e) - National Register of Historic Places,
- Part V - Additional Resources, and
- Part IX.D - Resource Areas Required for Priority Consideration.

The following sections describe in greater detail each of the additional requirements and how MassDOT will comply with the requirements during the permit term. BMP 8A below supports all the additional requirements.

<u>BMP 8A – Environmental Review Checklist</u>

MassDOT projects are required to complete the MassDOT Environmental Review Checklist (ERC) at multiple points throughout the scoping and design process to identify permitting requirements and applicability early in the design. This process is designed to support compliance with the additional requirements of the permit beyond the minimum control measures (as presented in this section).

Measurable Goal: Continue to implement the MassDOT ERC as part of project submissions.

Responsible Party: Environmental

2.8.1 Endangered Species Act

General Permit Requirement: According to Part I.B.2(e), discharges or discharge related activities can only be covered by this permit if they meet the following requirements:

i. *Coverage under this permit is available only if the stormwater discharges, allowable non-stormwater discharges, and discharge related activities are not likely to jeopardize the continued existence of any species that are listed as endangered or threatened ("listed") under the ESA or result in the adverse modification or destruction of habitat that is designated as critical under the ESA ("critical habitat"). Submission of a signed NOI will be deemed to constitute certification of eligibility.*

ii. *"Discharge related activities" include: activities which cause, contribute to, or result in stormwater point source pollutant discharges; and measures to control stormwater discharges, including the siting, construction and operation of best management practices (BMPs) to control, reduce or prevent stormwater pollution.*

iii. *In order to demonstrate eligibility, the permittee must use the most recent Endangered and Threatened Species County-Species List available from EPA. Eligibility must be determined prior to submission of the NOI. The most current list is available at http://www.epa.gov/npdes/. The permittee must meet one or more of the criteria described below for the entire term of the permit. The information used to determine eligibility must be maintained as part of the Stormwater Management Program.*

- *Criterion A: No endangered or threatened species or critical habitat are in proximity to the MS4 or the point where authorized discharges reach the receiving waters; or*
- *Criterion B: In the course of a separate federal action involving the MS4, formal or informal consultation with the Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service (NMFS) under Section 7 of the ESA has been concluded and that consultation:*
    - *Addressed the effects of the MS4 stormwater discharges, allowable non-stormwater discharges, and discharge related activities on listed species and critical habitat; and*
    - *The consultation resulted in either a no jeopardy opinion or a written concurrence by FWS and/or NMFS on a finding that the stormwater discharges, allowable non-stormwater discharges, and discharge related activities are not likely to adversely affect listed species or critical habitat; or*
- *Criterion C: The activities are authorized under Section 10 of the ESA and that authorization addresses the effects of the stormwater discharges, allowable non-stormwater discharges, and discharge related activities on listed species and critical habitat; or*
- *Criterion D: Using best judgment and knowledge, the effects of the stormwater discharges, allowable non-stormwater discharges, and discharge related activities on*

listed species and critical habitat have been evaluated. Based on those evaluations, a determination is made by the permittee that there is no reason to believe that the stormwater discharges, allowable non-stormwater discharges, and discharge related activities will jeopardize the continued existence of any species or result in the adverse modification or destruction of critical habitat; or

- *Criterion E: The stormwater discharges, allowable non-stormwater discharges, and discharge related activities were already addressed in another operator's certification of eligibility which includes the MS4 activities. If certification is under this criterion, the permittee agrees to comply with any measures or controls upon which the other operator's certification was based.*

iv. *The permitting authority may require any permittee or applicant to provide documentation of the determination of eligibility for this permit where the EPA or the FWS and/or NMFS determines that there is a potential impact on listed species or critical habitat.*

v. *A discharge is not authorized if the discharge or discharge related activities cause a prohibited "take" of endangered or threatened species (as defined under Section 3 of the ESA and 50 CFR 17.3), unless such actions are authorized under sections 7 or 10 of the ESA.*

vi. *Discharges are not authorized where the discharge or discharge related activity are likely to jeopardize the continued existence of any species that are listed as endangered or threatened under the ESA or result in the adverse modification or destruction of habitat that is designated as critical under the ESA."*

In order to receive authorization to discharge under the 2003 MS4 Permit, MassDOT performed analyses and documented correspondence regarding endangered species. This requirement has been fulfilled and findings of the assessments were as follows:

- MassDOT has satisfied the ESA eligibility provisions under Criterion A (Small MS4 Permit, Addendum B) with regard to the dwarf wedge mussel and short nose sturgeon in all areas not tributary to the identified portions of the Connecticut and Merrimack River Basins.

- MassDOT has satisfied the eligibility criteria with regard to the short nose sturgeon in all areas which are tributary to its habitat in the identified portions of the Connecticut and Merrimack River Basins (See **Appendix A** for consultation correspondence with National Marine Fisheries Service).

- MassDOT has satisfied the ESA eligibility provision under Criterion D (Small MS4 Permit, Addendum B) with regard to the dwarf wedge mussel in all areas tributary to its habitat in the Connecticut River Basin (See **Appendix B** for consultation correspondence with U.S. Fish and Wildlife Service).

<u>BMP 8B – Wetlands Protection Act Compliance</u>

For MassDOT projects subject to the MassDEP Wetlands Protection Act (WPA), the MassDOT Environmental Section submits a Notice of Intent or Request for Determination of Applicability for review by the local Conservation Commission and MassDEP. Part of this submittal includes compliance with the Massachusetts Endangered Species Act (MESA), when applicable. MassDOT routinely contacts Massachusetts Natural Heritage and Endangered Species Program (NHESP) to review the projects if they are in the vicinity of regulated endangered species habitat in order to assess whether the project could potentially impact federal or state endangered species habitat. If a potential impact is identified, MassDOT works with the agency to design the project to minimize the impacts and conducts the appropriate rare species consultation process.

Measurable Goal: MassDOT projects will comply with the WPA and MESA, if applicable.

Responsible Party: Environmental

BMP 8C – 401 Water Quality Certification

Although there are some exceptions, MassDOT bridge projects are generally exempt from the WPA but are subject to the state 401 Water Quality Certification. As part of this certification application, MassDOT must review compliance with MESA. The projects are reviewed with Massachusetts NHESP and USFWS if endangered species habitat is mapped in the vicinity of the project. MassDOT consults with NMFS and National Oceanic and Atmospheric Administration (NOAA) relative to Section 7 of MESA and Essential Fish Habitat (EFH). If the agencies identify a potential impact, MassDOT works with the agencies to modify the project design to minimize the impacts.

Measurable Goal: MassDOT projects will comply with Massachusetts 401 Water Quality certification requirements (which include review of the project by NHESP and USFWS if endangered species habitat is mapped in the project vicinity) whenever they are applicable.

Responsible Party: Environmental

2.8.2 Essential Fish Habitat

General Permit Requirement: According to Part I.B.2(f), discharges whose direct or indirect impacts would jeopardize any Essential Fish Habitat will not be permitted.

MassDOT Program: According to EPA's Response to Comments to the 2003 NPDES MS4 Permit (dated May 16, 2003) document, EPA has determined that essential fish habitat is not jeopardized by discharges in Massachusetts. No further action is necessary by MassDOT to comply with this requirement.

BMPs included elsewhere in the section also address the requirements listed above, including:

- BMP 8B – Wetlands Protection Act Compliance
- BMP 8C – 401 Water Quality Certification

2.8.3 National Register of Historic Places

General Permit Requirement: According to Part I.B.2.(g), discharges, or implementation of a stormwater management program, which adversely effects properties listed or eligible to be listed on the National Register of Historic Places will not be authorized by this permit. Discharges may be eligible for coverage under this permit if the permittee is in compliance with requirements of the National Historic Preservation Act and has coordinated any necessary activities to avoid or minimize impacts. These requirements must be coordinated with the State Historic Preservation Officer. Information used to determine eligibility must be maintained as part of the Stormwater Management Program.

MassDOT Programs: As part of MassDOT's application for authorization to discharge under the 2003 MS4 Permit, MassDOT satisfied the eligibility criteria for protection of historic properties. MassDOT obtained concurrence from the Massachusetts Historical Commission (MHC) that when MS4 permit coverage was requested there were presently no known stormwater discharges from MassDOT regulated roadways causing adverse effects on historic properties (see **Appendix C**).

MassDOT has the following specific BMP to meet the requirements of projects with new discharges which discharge near historic places.

BMP 8D – Cultural Resources Review

As directed by the ERC, the Cultural Resources Unit (CRU) of the MassDOT Environmental Section reviews all projects for impacts to historic properties. If a potential impact is found, the CRU works with the designer (MassDOT or consultant) and MHC to alter the design to mitigate or prevent adverse effects. The CRU receives concurrence from Federal Highway Administration (FHWA), the State Historic Preservation Officer (SHPO), or USACE depending on the project funding type and effect on the Historic Place. MassDOT also has a programmatic agreement with FHWA where projects in the Federal Aid Highway Program don't require concurrence from the SHPO if MassDOT CRU determines there is No Adverse Effect.

Measurable Goal: Continue to review projects for impacts to historic and archaeological properties and work to avoid, minimize, and/or mitigate adverse effects.

Responsible Party: Environmental

2.8.4 Part V – Other Permit Priorities

Part V of the General Permit includes four requirements that will be addressed by MassDOT current or proposed programs outlined in this section.

Interconnections to Municipal Separated Storm Sewer Systems

Part V.A.7 of the permit indicates that *"Cooperation between interconnected municipal separate storm sewer systems is encouraged. The permittee should identify interconnections within the system. These interconnections include both those leaving the system and those entering the system. The permittee should attempt to work cooperatively with an interconnected municipality in instances of discharges impacting either system."*

Discharges to Coastal Waters with Public Swimming Beaches

Part V.A.8 of the permit indicates that *"MS4s which discharge to coastal waters with public swimming beaches should consider these waters a priority in implementation of the stormwater management program."*

Groundwater Recharge and Infiltration

Part V.A.9 of the permit indicates that *"the permittee should consider opportunities for groundwater recharge and infiltration in the implementation of the minimum control measures* [described in Section 3 of this report]. *The permittee must evaluate physical conditions, site design, and best management practices to promote groundwater recharge and infiltration where feasible in the implementation of the control measures described above. During the implementation of the stormwater management program, the permittee must address recharge and infiltration for the minimum control measures as well as any reasons for electing not to implement recharge and infiltration. Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable."*

Permittees in areas identified as "high" or "medium" in the most recent Massachusetts Water Resources Commission's Stressed Basins in Massachusetts report in effect at the time the permittee submits a Notice of Intent and accompanying stormwater management program, must minimize the loss of annual recharge to groundwater from new development and redevelopment, including but not limited to drainage improvements done in conjunction with road improvements, street drain improvement projects and flood mitigation projects, consistent with Standard 3 of the Stormwater Management Standards in areas both within and outside of the jurisdiction of the Massachusetts' Wetlands Protection Act.

Public Drinking Water Supplies

Part V.C of the permit indicates that:

1. *MS4s which discharge to public drinking water sources and their protection areas (Class A and B surface waters used for drinking water and well head protection areas) should consider these waters a priority in implementation of the stormwater management program.*

2. *Discharges to public drinking water supply sources and their protection areas (wellhead protection areas, Class A and Class B waters) should provide pretreatment and spill control capabilities to the extent practicable.*

3. *Discharges to Class A waters, Zone 1 wellhead protection areas, and the sanitary radius to supply wells should be avoided to the extent feasible.*

MassDOT Programs: BMPs included under other MCMs address this requirement, including:

- BMP 3A – Storm Sewer System Map
- BMP 4C – MassDOT Standard Specifications for Highways and Bridges – Prevention of Water Pollution
- BMP 5A – MassDOT Stormwater Design Guide
- BMP 7A – Water Quality Data Form – WQDF

2.8.5 Part IX – Resource Areas Required for Priority Consideration

MassDEP Requirement: According to Part IX – 401 Water Quality Certification Requirements Section D of the permit, the permittee shall identify discharges to the following resource areas as a priority and indicate in their stormwater management programs how stormwater controls will be implemented. Identified priority areas include:

- public water supplies,
- public swimming beaches,
- Outstanding Resource Waters (as designated in 314 CMR 4.00),
- shell fishing areas (open versus closed areas),
- rivers, ponds, lakes and coastal waters which are on the Department 303(d) list of impaired waters, and
- cold water fishery river segments as identified in 314 CMR 4.00.

MassDOT Programs: BMPs included under other MCMs address this requirement including:

- BMP 3A – Storm Sewer System Map
- BMP 4C – MassDOT Standard Specifications for Highways and Bridges – Prevention of Water Pollution
- BMP 5A – MassDOT Stormwater Design Guide

- BMP 7A – Water Quality Data Form – WQDF
- BMP 7R – TMDL Watershed Review

3.0 Evaluation and Assessment

This section describes procedures for evaluation, assessment of plan implementation, and effectiveness against the identified measurable goals. This section also describes reporting and record retention requirements, as required in the permit.

3.1 Plan Evaluation

MassDOT will evaluate program compliance with the required minimum control standards, the appropriateness of the identified BMPs, and progress towards achieving the identified measurable goals on an on-going basis as part of implementation of programs and during preparation of the annual report.

3.2 Plan Updates

If upon evaluation, improved, additional or different controls are deemed necessary to meet the required standards or provide a more effective program, MassDOT will update the SWMP, include a summary of revisions in the annual report, and post to the MassDOT webpage for public and EPA and MassDEP access. The submission will meet the following permit requirements:

(a) Changes adding (but not subtracting or replacing) components, controls or requirements to the SWMP may be made at any time upon written notification to EPA and MassDEP.

(b) Changes replacing an ineffective or unfeasible BMP specifically identified in the SWMP with an alternative BMP may be requested in writing to EPA and MassDEP at any time. Unless denied, changes proposed in accordance with the criteria below shall be deemed approved and may be implemented 60 days from submittal of the request. If the request is denied, EPA or MassDEP, as applicable, will send a written explanation of the denial.

(c) Modification requests, must include the following information:

an analysis of why the BMP is ineffective or infeasible (including cost prohibitive), expectations on the effectiveness of the replacement BMP, and an analysis of why the replacement BMP is expected to achieve the goals of the BMP to be replaced.

(d) Change requests or notifications will be in writing and signed in accordance with the signatory requirements of the permit.

The permit allows EPA or MassDEP to require changes to the SWMP as needed to:

(a) Address impacts on receiving water quality caused or contributed to by discharges from the MS4;

(b) Include more stringent requirements necessary to comply with a new Federal statutory or regulatory requirement; or

(c) *Include such other conditions deemed necessary to comply with the goals and requirements of the CWA.*

According to the permit, any changes requested by EPA or MassDEP will be in writing and will set forth the time schedule for the permittee to develop the changes and offer the opportunity to propose alternative program changes to meet the objective of the requested modification.

Revisions to the MassDOT SWMP

This version of the MassDOT SWMP reflects MassDOT's current stormwater management practices and aligns with updates to measurable goals which have been documented as part of annual reports. Modifications to this SWMP, compared to the 2009 SWMP, include removal of certain BMPs (that may have highlighted important work by MassDOT but were not necessary to address the minimum control measures) and updates to existing BMPs (which as previously written did not reflect MassDOT's most current programs or practices). Beginning May 1, 2024, annual reports submitted by MassDOT will use the BMPs in this SWMP. Documentation of requested deletions and modifications to these BMPs, including analysis of existing BMPs, efficacy of modified BMPs, and analysis of continued compliance with permit goals and requirements, has been submitted under a separate cover to EPA.

Because MassDOT has requested a TS4 permit and therefore, is not included as a regulated entity in the current MA MS4 general permit, MassDOT has not performed a comprehensive update to this SWMP to fully include MassDOT programs that are ongoing/being developed or that we anticipate will be included in the TS4 permit authorization. Ongoing programs which focus on stormwater and will likely be part of the TS4 authorization will be included in annual reports as additional accomplishments in each MCM.

3.3 Record Keeping

Records required by the NPDES Phase II permit and related to the implementation of this SWMP will be maintained at MassDOT Highway Division Headquarters. The records will include information used in the development of the stormwater management program, any monitoring, copies of reports, and all data used in the development of the NOI. MassDOT will retain these records for at least five (5) years. MassDOT will make such records accessible to the public at reasonable times during regular business hours. A reasonable fee may be charged for copying requests. MassDOT will not submit records to the EPA or MassDEP unless specifically requested to do so, except as summarized in the annual reports.

3.4 Annual Reports

Annual reports will be prepared and submitted to Region 1 EPA and MassDEP. In accordance with the general permit, the report will include:

- A self-assessment review of compliance with the permit conditions;
- An assessment of the appropriateness of the BMPs included in the current plan;
- An assessment of the progress towards achieving the selected measurable goals for each minimum control measure;
- A summary of results of any information collected and analyzed (including any type of data);
- A summary of the stormwater activities planned for the next reporting cycle;
- A discussion of any changes in identified BMPs or measurable goals for each minimum control measure; and

- A notice of reliance on another governmental entity to satisfy some of the permit obligations (if applicable).

The initial annual report shall be submitted by April 30, 2004 and annually thereafter. The annual report shall summarize the activities of the previous permit year.

4.0 Stormwater Management Plan Schedule

MassDOT will continue implementing current BMPs per the schedule and approach discussed above to meet each of the six minimum control measures. The NOI filed for applying for authorization to discharge required that permittee file a schedule for compliance during the five year permit term. Appendix D includes that summary matrix of MassDOT's original program schedule for permit years 1 through 5. Since EPA/DEP have not reissued the permit for MassDOT since 2003 this schedule has not been updated, although MassDOT continues to plan for the measures needed to maintain compliance each year. The latest annual report reflects the department responsibilities and planned activities for the upcoming permit year for each BMP.

Appendix A: Endangered Species Review for Short Nose Sturgeon

[Submitted as part of NOI on July 28, 2003]

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

MAR 19 2007

John Blundo
Massachusetts Highway Department
10 Park Plaza
Boston, Massachusetts 02116-3969

Attn: Henry Barbaro

Dear Mr. Blundo,

This is in response to your letter dated February 12, 2007 regarding an application by the Massachusetts Highway Department (MassHighway) for coverage under the National Pollutant Discharge Elimination System General Permit for Discharges from Small Municipal Separate Storm Water Systems (MS4 permit) administered by the US Environmental Protection Agency (EPA). EPA has granted MassHighway partial authorization to discharge storm water under this permit with the exception of the Merrimack and Connecticut River mega-basins. In order for MassHighway to obtain coverage for the remaining roadways (i.e., those in the Merrimack and Connecticut River watersheds), MassHighway must demonstrate to EPA that storm water runoff from these roads will have no effect on threatened and/or endangered species listed by NOAA's National Marine Fisheries Service (NMFS).

As you know, populations of shortnose sturgeon (*Acipenser brevirostrum*) occur in the Connecticut River from the Turners Falls Dam to the mouth of the River in Connecticut and in the Merrimack River from the mouth of the River to the Lawrence Dam. Several MassHighway roads exist in the Merrimack and Connecticut River watersheds and storm water runoff from these roads has the potential to enter either of these rivers.

MassHighway has used the Impervious Cover Model to demonstrate that storm water runoff from MassHighway roads in the Merrimack and Connecticut River watersheds constitute less than one percent of the total discharge volume of these rivers and less than one percent of the possible total contaminant loading. This model assumes that all pavement runoff is captured and discharged directly into the Rivers, while in reality most runoff is filtered through the ground and a minimal amount of runoff is likely directly discharged to either River. As such, MassHighway has determined that storm water runoff from these roads has no effect on the water quality of the mainstem Merrimack and/or Connecticut Rivers. Additionally, MassHighway has an extensive storm water management program and employs many Best Management Practices to reduce the pollutant load of any storm water runoff from MassHighway roads.

The information provided by MassHighway supports the conclusion that storm water runoff from MassHighway roads within the Merrimack and Connecticut River watersheds will not affect water quality in either river in a way that will cause effects to shortnose sturgeon. As such, the inclusion of these roadways in EPA's MS4 permit will not affect any species listed by NMFS. Should project plans change or new information become available that changes the basis for this determination, further coordination with NMFS should be pursued. Should you have any questions about these comments, please contact Julie Crocker at (978) 281-9300 ext. 6530 or by e-mail (Julie.Crocker@noaa.gov).

Sincerely,

Mary A. Culligan
Assistant Regional Administrator
for Protected Resources

Cc: Boelke, F/NER4

File Code: Sec 7 EPA Mass. MassHighway MS4 permit

February 12, 2007

Mary A. Colligan
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Regional Office
One Blackburn Drive
Gloucester, MA 01930-2298

Subject: MassHighway NPDES Permit – Discharges to Shortnose Sturgeon Habitat

Dear Ms. Colligan:

The Massachusetts Highway Department (MassHighway) has received your letter dated August 21, 2006, requesting additional information to help determine whether discharges from MassHighway outfalls have the potential to adversely affect shortnose sturgeon within the Connecticut and Merrimack Rivers. In response to your request, we have prepared an estimate of the average annual runoff and pollutant load from MassHighway roads in the Connecticut and Merrimack River basins.

Using a state-of-the-art model (the Impervious Cover Model), MassHighway has determined that the portion of MassHighway highways in both the Connecticut and Merrimack megabasin watersheds constitute less than one percent of the total discharge volume, as well as contaminant loading; even if it is assumed that all the pavement runoff is captured and discharged directly into the Rivers. We feel that this model, and the programs included in the attached Notice of Intent, illustrates that the shortnose sturgeon habitat is not being adversely impacted by MassHighway roads. We are attaching a copy of the current Notice of Intent (submitted to EPA and DEP) to provide you with more detail on the existing and proposed programs that are being implemented under the NPDES program

MassHighway currently has partial authorization to discharge storm water under the NPDES General Permit for MS4s (outside of the Merrimack and Connecticut mega-basins). However, MassHighway will not be issued full authorization from EPA until the National Marine Fisheries Service finds that MassHighway's storm water discharges do not adversely affect the shortnose sturgeon. Therefore, we appreciate your timely response to this submittal.

If you have any concerns or comments regarding this letter, please feel free to contact Henry Barbaro at (617) 973-7419.

Sincerely,

John, Blundo, P.E.
Chief Engineer

Enclosure: Attachment A – Analysis of MassHighway Storm Water Discharges
Attachment B - NPDES Notice of Intent (12/13/06)

Attachment A. Analysis of MassHighway Storm Water Discharges within the Connecticut and Merrimack River Watersheds

Attachment A. Analysis of MassHighway Storm Water Discharges within the Connecticut and Merrimack River Watersheds

MassHighway used the Impervious Cover Model (ICM) to perform a rough estimate of the average annual storm water volume and pollutant loading based on impervious cover associated with MassHighway roads and the land uses in the watershed.

1.0 Impervious Cover Model Overview

The Center of Watershed Protection's Impervious Cover Model (Schueler, 2003) provides a simple method for estimating storm water runoff volumes and pollutant loads based on impervious cover in the watershed. The method uses the five following steps:

Watershed Delineation including delineation of each sub-watershed in an area of interest and development of a GIS data-layer.

Impervious Cover Mapping including development of land cover and/or impervious cover GIS data-layers.

Impervious Cover Determination for overall watershed impervious cover magnitude and percentage of watershed area.

Estimation of Annual Storm Water Runoff Volume based on watershed impervious cover.

Estimation of Average Annual Pollutant Loads using annual runoff volume and event mean pollutant concentration for selected pollutants.

The equations used to estimate annual storm water runoff and pollutant load are shown in Figure 1.

Figure 1: "Simple Method"

Step 1 – Calculate Runoff Volume Coefficient

Rv = Runoff Volume Coefficient = 0.05 + 0.9Ia, where

Ia = Impervious fraction (from GIS analysis)

Step 2 – Calculate Annual Runoff Volume

R = Annual runoff (acre*ft) = P * Pj * Rv*A, where
P = Annual rainfall (ft)
Pj = Fraction of rainfall events producing runoff = 0.9
A = Watershed area (acres)

Step 3 – Calculate Annual Pollutant Load

L = Annual pollutant load (lbs) = R * C * U *A, where
C = Pollutant concentration in stormwater, EMC (mg/l) from literature
U = Unit conversion factor = 0.226
A = Area (acres).

2.0 Impervious Cover

To calculate watershed impervious cover, the Massachusetts portion of the Merrimack and Connecticut River megabasins were digitally intersected with the Massachusetts land cover layer, and the area of each land use category calculated. Watershed impervious percentage was then calculated based on the assumed impervious percentages for each land use as shown in Table 1. The assumed percentage of impervious cover for each land use was derived using recommended percentages from TR-55, Urban Hydrology for Small Watersheds (USDA, 1986).

Table 1: Estimated Percent Impervious Cover by Land Cover

Land Use	Estimated Percent Impervious Cover
Commercial-Industrial-Transportation	79%
Dense Residential Developed	65%
High Intensity Residential	65%
Highways/Runways	75%
Low Intensity Residential	25%
Sparse Residential Developed	20%
Urban/Industrial	72%
Other	0%

The MassHighway road area within each watershed was calculated using the surface width (travel lane) and shoulder width (left and right) values provided in the MassHighway road shapefiles available on MassGIS assuming 100% of this area is impervious cover, as shown in Table 2.

Table 2: Impervious Cover by Mega-Basin

Watershed	Watershed Area (acres)	Impervious Cover (acres)	Impervious Percentage (%)
MA Portion of Merrimack River Mega-Basin	766,800	86,700	11
MH Roads in Merrimack Mega-Basin	970	970	100
MA Portion of Connecticut River*	1,741,200	65,000	4
MH Roads In Connecticut Watershed*	650	650	100

3.0 Storm Water Volume Analysis

In assessing the potential impact of stormwater runoff from MassHighway roads to these rivers, the average annual storm water contribution from MassHighway roads in the Merrimack and Connecticut River megabasins was estimated using the Simple Method described above. Land use values within each of the watersheds within Massachusetts were obtained from MassGIS data. Table 3 summarizes this analysis.

Table 3: Estimated Average Annual Storm Water Volume

		Area (sq. mi.)	Area (acres)	Avg. Annual Precip. (inches)	Avg. Annual SW Runoff (inches)	Avg. Annual SW Volume (acre-ft)	SW Volume from MH Roads (%)
Merrimack River	MassHighway Roads	1.5	969	45.8	39.2	3,200	--
	MA Portion of Watershed	1,198	766,800	45.8	6.3	403,000	0.8%
	Overall Watershed	5,010	3,206,400				
Connecticut River	MassHighway Roads	1.0	654	45.5	38.9	2,200	--
	MA Portion of Watershed	2,721	1,741,200	45.5	3.4	494,000	0.4%
	Overall Watershed	11,000	7,040,000				

- Merrimack River watershed areas were obtained from Merrimack River Watershed Council web site (www.merrimack.org)
- Connecticut River watershed areas were obtained from Connecticut River Watershed Council web site (www.ctriver.org)
- MassHighway road areas were obtained from MassHighway GIS shapefiles and include all MassHighway roads within the watershed regardless of whether they are within urbanized area zones. Each area was calculated from the surface width plus the shoulder widths to determine an overall impervious width, multiplied by the length.
- Average annual precipitation was obtained from WorldClimate.com. Lawrence station was used for Merrimack River and Springfield station for the Connecticut River. Average annual runoff values were obtained from Water Atlas of the United States published by Water Information Center in 1973.
- MA portion of watershed includes only the portion of the watershed within Massachusetts.
- Connecticut mega-basin includes Connecticut, Chicopee, Westfield and Millers rivers.
- Merrimack mega-basin includes Merrimack, Nashua, Concord and Shawsheen rivers.

Although this analysis is a rough estimate, it indicates the order of magnitude of MassHighway's storm water runoff volume relative to the total runoff experienced from each watershed. The analysis only includes storm water runoff and does not account for groundwater base flow or point source discharges within the river which provides further dilution of the storm water from MassHighway roads. The analysis indicates that the estimated storm water runoff from MassHighway roads is a very small fraction of the storm water volume received by the rivers each year.

4.0 Pollutant Load Analysis

The average annual pollutant loading from MassHighway roads versus the loading from the other land uses in each of the watersheds was estimated using the Simple Method. The method uses EMC to determine the pollutant loading per acre of watershed.

4.1 Event Mean Concentrations (EMC)

EMCs represent the average concentration of the pollutant during an entire stormwater runoff event. EMCs are empirically derived from large stormwater data sets compiled by the Nationwide Urban Runoff Program, the US. Geological Survey, and the EPA NDPES Phase I stormwater program (Schueler, 2003). EMC estimates were selected because they are based on field data collected from thousands of storm events. Hoever, these estimates are based on nationwide data, so they do not account for regional variation in soil types, climate, and other factors. Thus, EMCs applied to Massachusetts watersheds should be considered to be screening-level estimates. EMC values are provided in the Impacts of Impervious Cover document (Schueler, 2003) for a variety of constituents including:

- TSS
- Total P
- Soluble P
- Total N
- TKN
- Chromium
- Nitrite & Nitrate
- Copper
- Lead
- Zinc
- Cadmium

4.2 Assumptions and Limitations

Watershed impervious cover/EMC can be employed to estimate annual pollutant loading. This method includes the following limitations and limiting assumptions:

- This method does not account for point source pollutant loadings.
- EMCs will provide reasonable accuracy over long time periods (i.e., annual loads), but since concentrations vary significantly from storm to storm, this method should not be used for calculating loads for individual storm events. The event mean concentrations are based on countrywide data and do not account for regional variation in soil types, climate and other factors.
- This method does not account for in-stream water quality processes.
- This method does not account for existing water quality BMPs or natural treatment prior to reaching the river. This is especially prevalent in the MassHighway road pollutant loadings since the model estimates the pollutant loading as if the impervious acreage is directly discharged to the river.

4.3 Watershed Specific Pollutant Load Summary

Table 4 shows the estimated annual loads calculated using the Simple Method for the Merrimack River megabasin within Massachusetts versus the annual load from MassHighway roads. The Merrimack mega-basin includes the sub-watersheds for the Merrimack, Nashua, Concord and Shawsheen rivers.

Table 4: Estimated Annual Loads – Merrimack River Mega-Basin

		Estimated Annual Load		
Constituent	**Event Mean Concentrations**	**MA Portion of Watershed**	**MH Roads**	**MH Contribution vs. MA watershed (%)**
Sediments				
TSS (lbs)	78.4	84,962,300	672,400	0.8
Nutrients				
Total P (lbs)	0.32	346,800	2,750	0.8
Soluble P (lbs)	0.13	140,900	1,120	0.8
Total N (lbs)	2.39	2,590,000	20,500	0.8
TKN (lbs)	1.73	1,874,800	14,850	0.8
Nitrite &Nitrate (lbs)	0.66	715,200	5,650	0.8
Metals				
Copper (lbs)	0.0134	14,500	115	0.8
Lead (lbs)	0.0675	73,150	580	0.8
Zinc (lbs)	0.162	175,600	1,390	0.8
Cadmium (lbs)	0.0007	760	6	0.8
Chromium (lbs)	0.004	4,340	34	0.8

Table 5 shows the estimated annual loads calculated using the Simple Method for the Connecticut River megabasin within Massachusetts, based on the relevant pollutants for this type of impairment. The Connecticut River mega-basin includes the sub-watersheds for the Connecticut, Chicopee, Westfield, and Millers rivers.

Table 5: Estimated Annual Loads – Connecticut River in MA

Constituent	Event Mean Concentrations	Estimated Annual Load		
		MA Portion of Watershed	MH Roads	MH Contribution vs. MA watershed (%)
Sediments				
TSS (lbs)	78.4	105,620,300	450,700	0.4
Nutrients				
Total P (lbs)	0.32	431,100	1,840	0.4
Soluble P (lbs)	0.13	175,100	750	0.4
Total N (lbs)	2.39	3,219,800	13,740	0.4
TKN (lbs)	1.73	2,330,700	9,950	0.4
Nitrite &Nitrate (lbs)	0.66	889,200	3,800	0.4
Metals				
Copper (lbs)	0.0134	18,000	80	0.4
Lead (lbs)	0.0675	91,000	390	0.4
Zinc (lbs)	0.162	218,200	930	0.4
Cadmium (lbs)	0.0007	950	4	0.4
Chromium (lbs)	0.004	5,400	23	0.4

4.4 Unaccounted for Treatment Factors

This analysis does not account for the many water quality treatment BMPs that mitigate the pollutant loading from MassHighway roads or the fact that a significant portion of the MassHighway roads do not directly discharge to receiving waters. A significant percentage of the storm water conveyance system along the linear roads is comprised of country drainage (i.e. overland flow and swales). Runoff from these roads typically infiltrates into the ground as it travels long distances in vegetated swales or over vegetated buffers. Only a small fraction of this runoff from these roads (e.g., I-91 within the Connecticut River Basin) ever reaches a receiving tributary.

Furthermore, MassHighway's Notice of Intent (NOI), submitted as part of applying for coverage under the NPDES Phase II MS4 General Permit, includes many programs which will provide treatment or source controls for the roads discharging to the Connecticut and Merrimack Rivers.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
One Blackburn Drive
Gloucester, MA 01930-2298

AUG 21 2006

Henry L. Barbaro
Wetlands and Water Resources
Massachusetts Highway Department
10 Park Plaza, Room 4260
Boston, Massachusetts 02116

Dear Mr. Barbaro,

This is in response to your letter dated August 16, 2006 regarding an application by MassHighway for coverage under the National Pollutant Discharge Elimination System (NPDES) permit program for urbanized area road drainage system outfalls. In order to be eligible for coverage under this permit, MassHighway must demonstrate to the US Environmental Protection Agency that the discharges are not adversely affecting any species listed as threatened or endangered under the jurisdiction of NOAA's National Marine Fisheries Service.

Included with your letter were maps detailing the location of roads within urbanized areas in the Connecticut River and Merrimack River watersheds. Populations of the endangered shortnose sturgeon (*Acipenser brevirostrum*) occur in the mainstem of both rivers. Your letter requested that NMFS review the maps and indicate which outfalls may be adversely impacting shortnose sturgeon in these rivers. In order to determine whether discharges from any of these outfalls have the potential to adversely affect this species NMFS will need the following information:

- exact location of the discharge and distance from the mainstem river;
- volume of water discharged from the outfall;
- components of the discharge, including known concentrations of any pollutants; and,
- any mitigation measures in place at the outfall.

Without this information it is difficult to determine if any given outfall has the potential to adversely affect shortnose sturgeon in the Connecticut or Merrimack River. Should you have any questions regarding this correspondence, please contact Julie Crocker of my staff at (978)281-9300 x6530 or by e-mail (Julie.Crocker@noaa.gov).

Sincerely,

Mary A. Colligan
Assistant Regional Administator
for Protected Resources

File Code: Sec 7 EPA R1 Masshighway MS4 coverage
PCTS: T/NER/2006/04049

August 16, 2006

Julie Crocker
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northeast Regional Office (NERO)
One Blackburn Drive
Gloucester, MA 01930-2298

Subject: MassHighway NPDES MS4 Permit Outfall Within Short Nose Sturgeon Habitat

Dear Ms. Crocker:

The National Pollutant Elimination System (NPDES) General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) requires that permit applicant review the potential impact of drainage system outfalls on federal threatened and endangered species habitat. We are writing to request your review of MassHighway urbanized area roads within the Connecticut River watershed. The main stem of the Connecticut River and select tributaries have been identified as potential habitat for short-nose sturgeon according to Addendum A of the NPDES General Permit.

MassHighway has submitted an application for coverage under this MS4 permit to EPA and is awaiting authorization. In the Storm Water Management Plan (SWMP) prepared as part of the submittal, MassHighway stated that they would review urbanized area roads with National Marine Fisheries Service (NMFS) to determine if known storm water outfalls from their roadways are potentially having an adverse impact to short-nose sturgeon habitat. Outfalls are eligible for coverage under this permit if the discharges or discharge related activities are not likely to jeopardize the continued existence of any species that are listed as endangered or threatened under the Endangered Species Act (ESA) or result in the adverse modification or destruction of habitat that is designated as critical under the ESA.

MassHighway has begun to inventory stormwater outfalls along these roads but, due to the large number of urbanized area road miles owned by MassHighway, will not complete the statewide inventory until the end of the permit term (March 2008). Therefore, we have included with this memo a detailed map with MassHighway roads within areas classified as "urbanized" by the Census Bureau and the Connecticut River watershed and the Merrimack River watershed below the Lawrence Dam. We ask that you review the figures and let us know if there are any specific outfalls that are adversely impacting the short-nose sturgeon. If MassHighway can provide additional information for help in the review, please feel free to contact me at (617) 973-7419, or in writing to 10 Park Plaza, Room 4260, Boston, MA 02116.

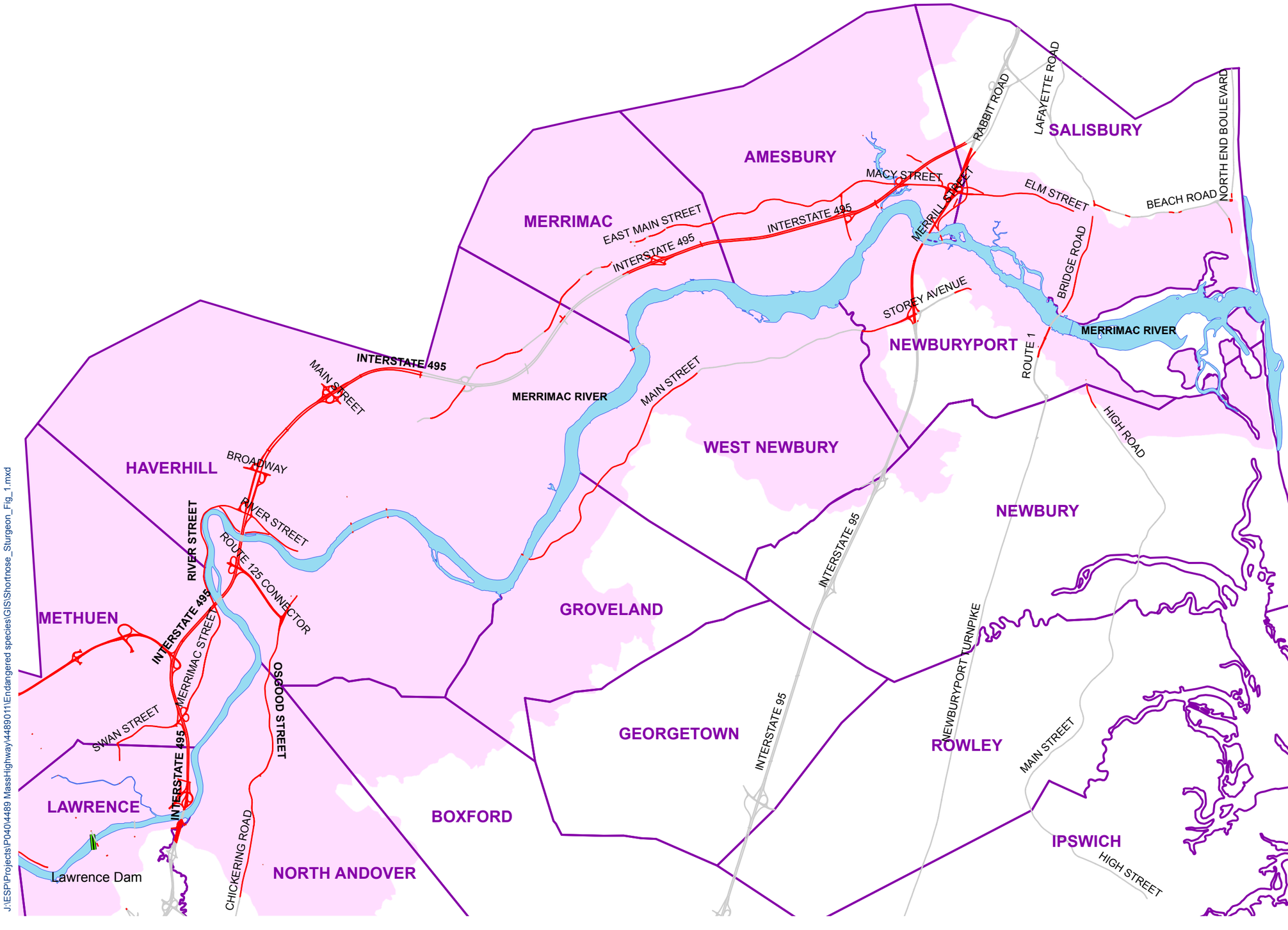
Sincerely,

Henry L. Barbaro

Henry L. Barbaro
Supervisor
Wetlands & Water Resources

Attachment: MassHighway Roads...Sturgeon Habitat (three figures)

MASS HIGHWAY ROADS IN URBANIZED AREAS AND IN SHORTNOSE STURGEON HABITAT



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LOCUS MAP

Legend

- Town Boundary
- MH Roads
- Merrimac River
- Watershed to Merrimac River
- MH Roads in UA Intersecting the Watershed

Figure 1

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ROWE
HEATH
COLRAIN
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NORTHFIELD
WARWICK
ROYALSTON
CHARLEMONT
GILL
GREENFIELD
ERVING
ORANGE
HAWLEY
BUCKLAND
SHELBURNE
ATHOL
MONTAGUE
WENDELL
PHILLIPSTON
ASHFIELD
CONWAY
DEERFIELD
LEVERETT
CUMMINGTON
GOSHEN
WHATELY
SHUTESBURY
NEW SALEM
PETERSHAM
WILLIAMSBURG
CONNECTICUT RIVER
CHESTERFIELD
HATFIELD
PELHAM
BARRE
AMHERST
HADLEY
INTERSTATE 91
HARDWICK
NORTHAMPTON
WESTHAMPTON
BELCHERTOWN
HUNTINGTON
WARE

MASS HIGHWAY ROADS IN URBANIZED AREAS AND IN SHORTNOSE STURGEON HABITAT

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LOCUS MAP

Legend
- MH Roads in UA Intersecting the Watershed
- MH Roads
- Town Boundary
- Connecticut River
- Watershed to Connecticut River

Figure 2

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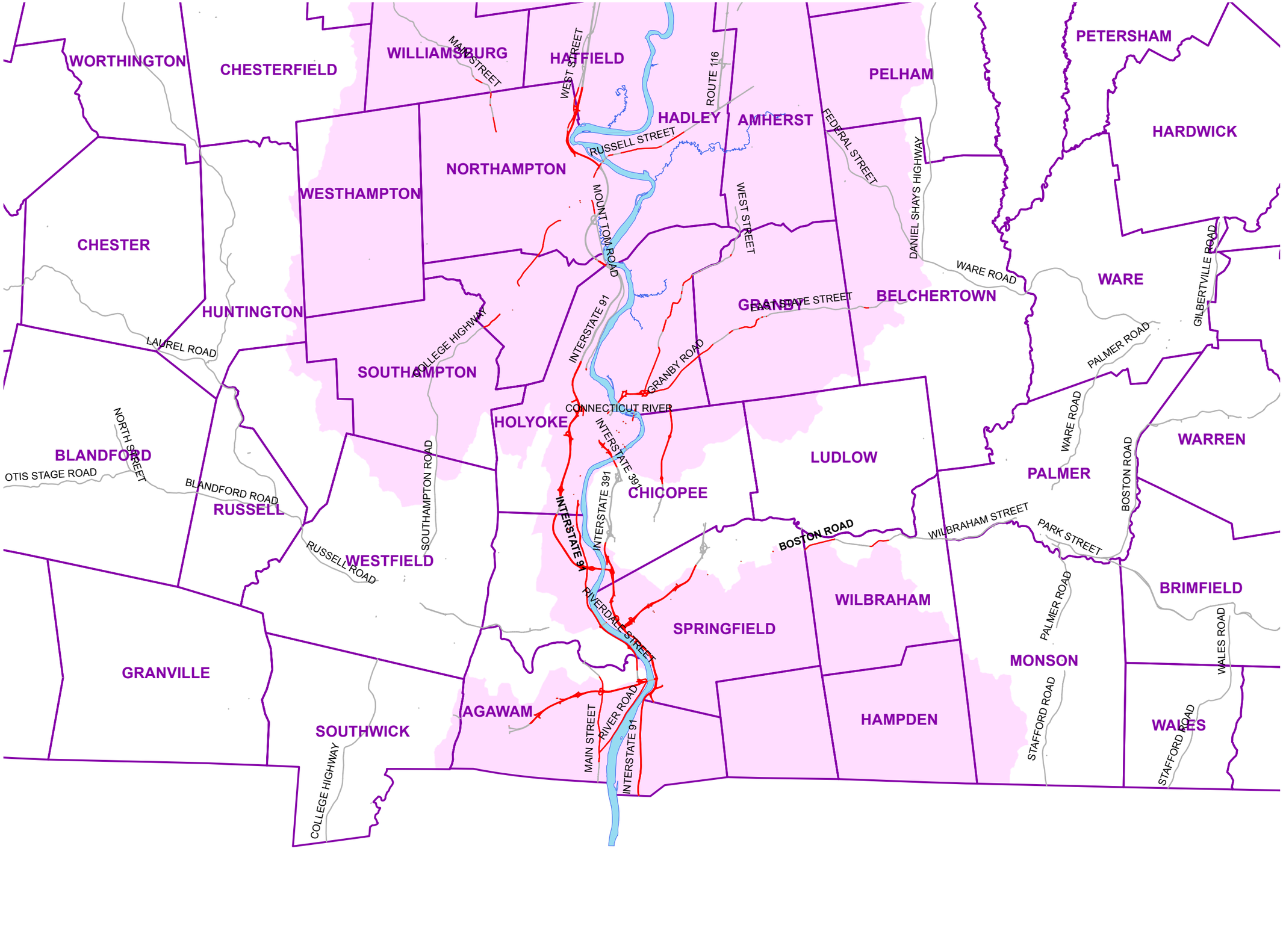
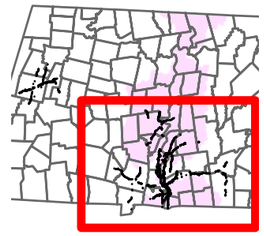
MASS HIGHWAY ROADS IN URBANIZED AREAS AND IN SHORTNOSE STURGEON HABITAT



LOCUS MAP



Legend

- Town Boundary
- MH Roads
- Connecticut River
- Watershed to Connecticut River
- MH Roads in UA Intersecting the Watershed

Figure 3

J:\ESP\Projects\P040\4489 MassHighway\4489011\Endangered species\GIS\Shortnose_Sturgeon_Fig_3.mxd

ENSR | AECOM

Appendix B: Endangered Species Review for Dwarf Wedge Mussel

[Submitted as part of NOI on July 28, 2003]

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087

September 20, 2006

Henry Barbaro
Mass Highway
10 Park Plaza, Room 4260
Boston, MA 02116

Dear Mr. Barbaro:

This responds to your recent correspondence requesting information regarding adverse impacts to dwarf wedgemussels at stormwater outfalls along urbanized area roads owned by Mass Highway within the Connecticut River watershed area.

Based on information currently available to us, no dwarf wedgemussels are known to occur in close proximity to the urbanized roads referenced above. However, there is an historic record for dwarf wedgemussel in the Mill River Diversion, downstream of Easthampton Road. The reason for the lack of persistence of the dwarf wedgemussel at this site is unknown.

Thank you for your coordination. Please contact us at 603-223-2541 if we can be of further assistance.

Sincerely yours,

Michael J. Amaral

Michael J. Amaral
Endangered Species Specialist
New England Field Office

August 16, 2006

Michael J. Amaral
Endangered Species Specialist
U.S. Fish and Wildlife Service
New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087

Subject: MassHighway NPDES MS4 Permit Outfall Within Dwarf Wedge Mussel Habitat

Dear Mr. Amaral:

The National Pollutant Elimination System (NPDES) General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) requires that permit applicant review the potential impact of drainage system outfalls on federal threatened and endangered species habitat. We are writing to request your review of MassHighway urbanized area roads within the Connecticut River watershed. The main stem of the Connecticut River and select tributaries have been identified as potential habitat for the dwarf wedge mussel according to Addendum A of the NPDES General Permit.

MassHighway has submitted an application for coverage under this MS4 permit to EPA and is awaiting authorization. In the Storm Water Management Plan (SWMP) prepared as part of the submittal, MassHighway stated that they would review urbanized area roads with United States Fish and Wildlife Service (USFWS) to determine if storm water outfalls from their roadways are potentially having an adverse impact to dwarf wedge mussel habitat. Outfalls are eligible for coverage under this permit if the discharges or discharge related activities are not likely to jeopardize the continued existence of any species that are listed as endangered or threatened under the Endangered Species Act (ESA) or result in the adverse modification or destruction of habitat that is designated as critical under the ESA.

MassHighway has begun to inventory stormwater outfalls along these roads but, due to the large number of urbanized area road miles owned by MassHighway, will not complete the statewide inventory until the end of the permit term (March 2008). Therefore, we have included with this memo a detailed map with MassHighway roads within areas classified as "urbanized" by the Census Bureau and the Connecticut River watershed. We ask that you review the figures and let us know if there are any specific outfalls that are adversely impacting the dwarf wedge mussel. If MassHighway can provide additional information for help in the review, please feel free to contact me at (617) 973-7419, or in writing to 10 Park Plaza, Room 4260, Boston, MA 02116.

Sincerely,

Henry L. Barbaro

Henry L. Barbaro
Supervisor
Wetlands & Water Resources

Attachments: MassHighway Roads...Mussel Habitat (two figures)

MONROE
ROWE
HEATH
COLRAIN
LEYDEN
BERNARDSTON
NORTHFIELD
WARWICK
ROYALSTON
FLORIDA
CHARLEMONT
SAVOY
HAWLEY
BUCKLAND
SHELBURNE
GREENFIELD
GILL
ERVING
ORANGE
ATHOL
PLAINFIELD
ASHFIELD
CONWAY
DEERFIELD
MONTAGUE
WENDELL
CUMMINGTON
GOSHEN
WHATELY
LEVERETT
SHUTESBURY
NEW SALEM
PETERSHAM
WORTHINGTON
CHESTERFIELD
WILLIAMSBURG
HATFIELD
PELHAM
AMHERST
HADLEY
NORTHAMPTON
WESTHAMPTON
CHESTER
GRANBY
BELCHERTOWN
HARDWICK
WARE
BARRE

STATE HIGHWAY
MOHAWK TRAIL
ASHFIELD ROAD
INTERSTATE 91
OLD RT 2
GREENFIELD ROAD
NORTHFIELD ROAD
ROUTE 10
MILLERS FALLS ROAD
OLD ROUTE 2
SOUTH MAIN STREET
ROUTE 122
NORTH MAIN STREET
BARRE ROAD
MAIN STREET
CAPE STREET
CONWAY ROAD
MARINE CORPS LEAGUE HIGHWAY
STATE ROAD
ROUTE 116
GOSHEN ROAD
CONNECTICUT RIVER
FEDERAL STREET
RUSSELL STREET
WEST STREET
AMHERST ROAD

MASS HIGHWAY ROADS IN URBANIZED AREAS AND IN DWARF WEDGEMUSSEL HABITAT

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LOCUS MAP

Legend
- Town Boundary
- MH Roads
- Connecticut River
- Watershed to Connecticut River
- MH Roads in UA Intersecting the Watershed

Figure 1

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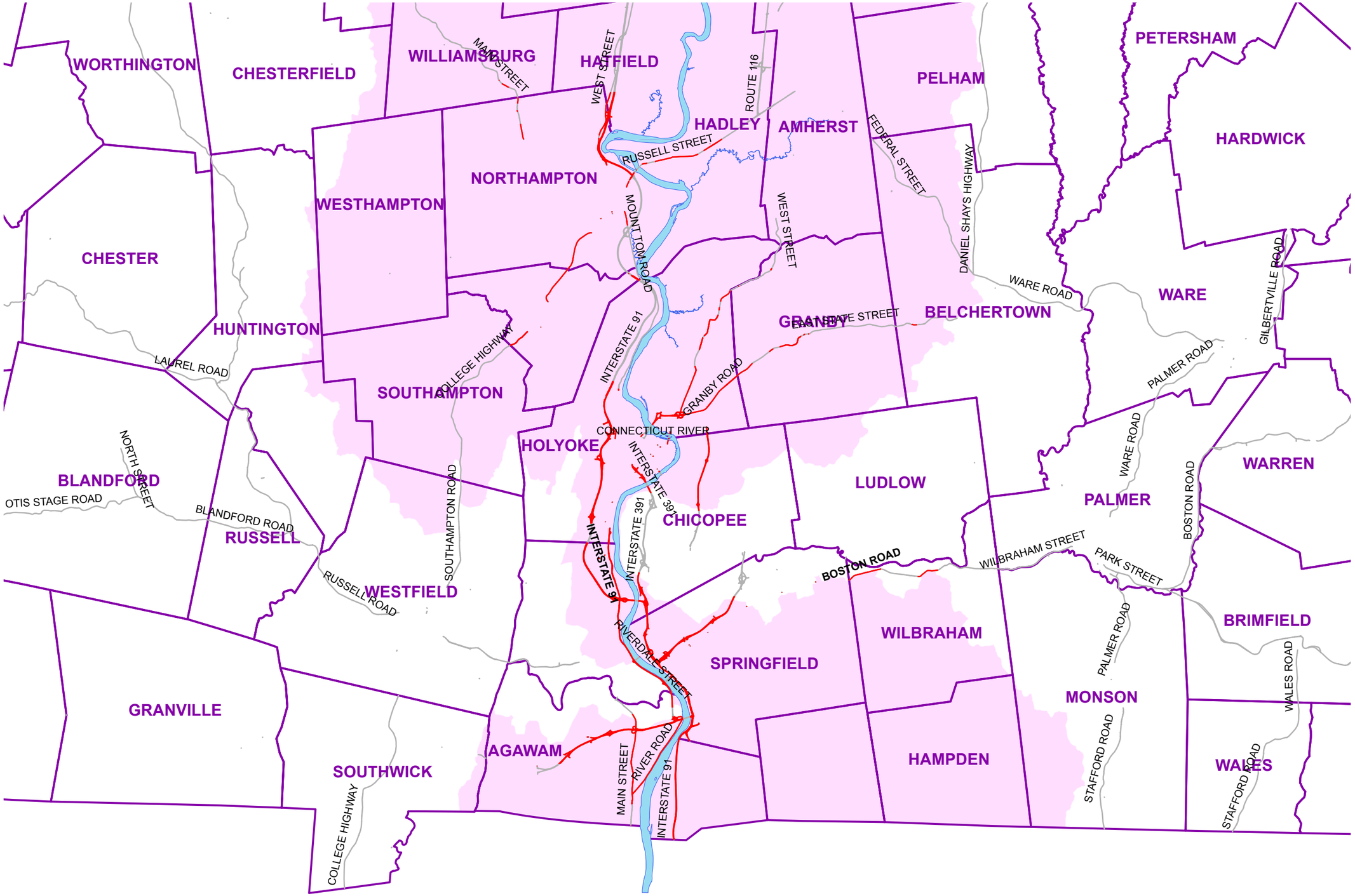

MASS HIGHWAY ROADS IN URBANIZED AREAS AND IN DWARF WEDGEMUSSEL HABITAT

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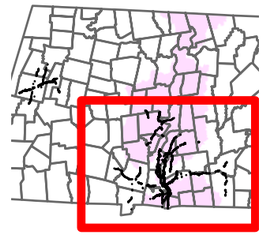
LOCUS MAP



Legend

- Town Boundary
- MH Roads
- Connecticut River
- Watershed to Connecticut River
- MH Roads in UA Intersecting the Watershed

Figure 2

J:\ESP\Projects\P040\4489 MassHighway\4489011\Endangered species\GIS\Dwarf_Wedgemussel_Fig_2.mxd

ENSR | AECOM

Appendix C: Historic Properties Review with Massachusetts Historical Commission

[Submitted as part of NOI on July 28, 2003]

MASSHIGHWAY

Mitt Romney, Governor | Kerry Healey, Lt. Governor | John Cogliano, Secretary | Luisa Paiewonsky, Commissioner

EOT
MASSACHUSETTS EXECUTIVE OFFICE OF TRANSPORTATION

August 16, 2006

Brona Simon
Deputy State Historic Preservation Officer
Massachusetts Historical Commission
220 Morrissey Boulevard
Boston, MA 02125-3314

Subject: MassHighway NPDES MS4 Permit Roads Near Historic Properties/ Districts

38693

Dear Ms. Simon:

The NPDES General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) requires that permit applicants review the potential impact of drainage system outfalls on properties listed or eligible to be listed in the National Register of Historic Places.

MassHighway has submitted an application for coverage under this permit to EPA and is awaiting authorization. In the Storm Water Management Plan (SWMP) prepared as part of the submittal, MassHighway agreed to review urbanized area roads owned by MassHighway for any currently known adverse effects on historic properties caused by storm water discharges from MassHighway-owned roadways. Discharges, or implementation of a storm water management program, which adversely affects properties listed or eligible to be listed on the National Register of Historic Places would eliminate such discharges or programs for coverage under the MS4 General Permit.

MassHighway has begun to inventory existing storm water outfalls along these roads but, due to the large number of urbanized area road miles owned by MassHighway, will not complete the statewide inventory until the end of the permit term (March 2008). Therefore, we have included with this memo a CD which contains detailed maps, by town, of MassHighway roads within areas classified as "urbanized" by the Census Bureau, overlaid with the historic properties datalayer provided by MassGIS (Massachusetts Office of Geographic and Environmental Information). The detailed maps show all MassHighway roads in urbanized areas that are located within 500 feet of any historic property identified by MassGIS.

To the best recollection of MassHighway's senior Cultural Resources Unit staff (20+ years) storm water discharge from a MassHighway roadway has never been identified as having an adverse effect on a property listed, or eligible for listing, in the National Register. If you or your staff could review the enclosed CD and confirm MassHighway's opinion that there are, at present, no known storm water discharges from the shown MassHighway roadways causing adverse effects on historic properties, it would be greatly appreciated. If we can provide additional information for help in the review, please feel free to contact me at (617) 973-7419, or in writing to 10 Park Plaza, Room 4260, Boston, MA 02116.

Sincerely,

Henry L. Barbaro

Henry L. Barbaro
Supervisor
Wetlands & Water Resources

CONCURRENCE: Brona Simon
10/3/06 BRONA SIMON
DEPUTY STATE HISTORIC
PRESERVATION OFFICER
MASSACHUSETTS
HISTORICAL COMMISSION

xc: Greg Prendergast, MHD

Attachment: Historical Resources and MassHighway Roads (CD)

Appendix D: Stormwater Management Plan Schedule for Permit Years 1 – 5

[Submitted as part of NOI on July 28, 2003. The program has evolved since this was submitted as part of the NOI application and the latest annual report reflects the department responsibilities and planned activities for the upcoming permit year for each BMP.]

STORM WATER MANAGEMENT PLAN SUMMARY MATRIX

BMP ID #	BMP	MEASURABLE GOALS	RESPONSIBLE DEPARTMENT	Permit Year One				Permit Year Two				Permit Year Three				Permit Year Four				Permit Year Five				Next Permit
				Spring 03	Summer 03	Fall 03	Winter 03-04	Spring 04	Summer 04	Fall 04	Winter 04-05	Spring 05	Summer 05	Fall 05	Winter 05-06	Spring 06	Summer 06	Fall 06	Winter 06-07	Spring 07	Summer 07	Fall 07	Winter 07-08	
Minimum Control #1: Public Education and Outreach																								
1A	MTAP	Fund one pollution reduction training regarding storm water and/or snow and ice control for MassHighway and DPW staff annually. Document attendance in annual report.	MTAP					X Annual Report				X Annual Report				X Annual Report				X Annual Report				
1B	Baystate Roads	Provide one pollution reduction training regarding snow and ice control for MassHighway employees and one for DPW snowplow drivers annually. Document attendance in annual report.	Baystate Roads					X Annual Report				X Annual Report				X Annual Report				X Annual Report				
1C	MassHighway Website	1) Add Environmental Division web page to MH web site.	IT/Environmental				X																	
1C	MassHighway Website	2) Add link for contacting Env. Section via email.	IT/Environmental																			X		
1C	MassHighway Website	3) Evaluate web page annually and revise as necessary.	IT/Environmental				X				X				X				X				X	
1E	Educational Seminars for CIM members	Provide educational seminars for CIM members on CGP Permit coverage and environmental compliance.	Construction Division				X																	
1F	Post Contact Names for Municipal Drainage Concerns on MassHighway Web Site	1) Include contact names and addresses in handout for municipal DPW staff who attend NPDES Phase II seminar. 2) Post DHD contact names on MH website and maintain link. 3) Research methods for sharing drainage outfall inventory with municipalities in a timely manner.	Environmental/ Districts																	X Handout @ Phase II mtg		X Post Contact (DHD) Names	X Research method for sharing drainage outfall inventory	
1G	River and Stream Signs	Install signs identifying rivers and streams crossed by MassHighway roads, until all named rivers and streams are signposted.	Traffic Operations					X Annual Report				X Annual Report				X Annual Report				X Annual Report				
1H	Anti-litter/ Dumping Messages on Variable Message Boards	Maintain anti-litter messages on permanent Variable Message Boards.	Operations																	X Annual Report				
1I	Anti-litter/ Dumping Literature at Rest Areas and Visitors Centers	1) Work with EOEEA Think Blue Campaign to identify appropriate brochures for use in visitor's centers. 2) Distribute literature to visitor centers and track number of brochures distributed annually.	Maintenance																		X Discuss program w/ EOEEA		X Distribute	
1J	New England DOT Coordination	Coordinate with New England DOTs to discuss on-going issues and programs being faced by the DOT's including wetland mitigation, storm water and erosion controls.	Environmental	X				X				X				X								
1K	Storm Water Coordinator	Fund a full-time storm water coordinator position each year.	Environmental																				X	
	Programs which are listed under other minimum control measures also include public education aspects (e.g. BMP# 3E, 3F, 4H, 4L-1, 4M, 4N and 4R).																							
Minimum Control #2: Public Participation and Involvement																								
2A	Project Related Public Notification and Public Participation Requirements	1) Continue compliance with federal and state public notification and public participation requirements. 2) Post notice of all public hearings on MassHighway website.	Environmental																					
2B	Adopt-a-Highway	Install signs supporting Adopt-a-Highway Program in active program areas.	Adopt-a-Highway																					
2C	511 Massachusetts	Maintain the existing 511 project.	Operations																					
2D	MassHighway Web Site	1) Within thirty days of submission, post latest version of the Storm Water Management Plan on the website.	IT/Environmental				Original						3/2/05 Version					8/21/06 Version	11/30/06 Version				January 2008 Version	
2D	MassHighway Web Site	2) Within thirty days of submission, post the annual report on the website	IT/Environmental					X Annual Report 1				X Annual Report 2				X Annual Report 3				X Annual Report 4				

STORM WATER MANAGEMENT PLAN SUMMARY MATRIX

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2E	AASHTO's Center for Environmental Excellence on "Strategies & Approaches to Complying with NPDES Phase II survey	Complete the Center for Environmental Excellence survey	Environmental												X									
	Programs which are listed under other minimum control measures also include public participation aspects (e.g. BMP# 1K and 4O).																							
Minimum Control #3: Illicit Discharge Detection and Elimination																								
3A	Rest Area Leases	1) Include drainage system requirements in all new rest area leases; 2) Summarize new rest area leases in annual report.	Environmental/ Right of-Way				X Complete Lease Req.					X Annual Report				X Annual Report				X Annual Report				
3B-1	Drainage Inventory	1) Develop Drainage Inventory Specifications; 2) Include specification in all future construction and redevelopment projects which impact drainage.	Environmental/ Construction/ Planning/ IT Division																X Draft Spec Developed				X Finalize Spec	X Include in future projects
3B-2	Drainage Inventory	1) Complete a drainage inventory of discharge from MassHighway roads in urbanized areas. 2) Summarize progress in annual report.	Environmental/ IT/ Districts																X District 4 Complete	X Annual Report		X District 2 and 3 Complete	X District 1&5 Complete/ Final Map	
3C-1	Illicit Connection Prohibition Policy	1) Issue Illicit Drainage Connection Policy; 2) Post policy on web site. 3) Enforce provisions through referral to AGs office. 4) Summarize actions taken in annual report.	Environmental														X Policy Issued 6/26/06			X Annual Report			X Post on web site	
3C-2	Drainage Tie-In SOP	1) Issue revised Drainage Tie-In SOP; 2) Summarize drainage tie-in permit applications and permits issued in annual report.	Environmental																	X Draft			X Final	
3D	Illicit Connection Review	1) Identify known potential illicit connections from District personnel, towns or public. 2) Field review discharges to priority receiving waters. 3) Develop and release RFR for development and implementation of IDDE program for prioritized watersheds. 4) Include IDDE methodology in District EMS compliance training annually. 5) Each year summarize IDDE activity in annual report.	Environmental/ Districts									Review potential illicit connections identified by District personnel or public.				X Annual Report	Address on-going complaints/ potential IDDEs.			X Annual Report	Address on-going complaints/ potential IDDEs. Develop RFR for development and implementation of IDDE program for watersheds with Final TMDL reports.		Release RFR. Include in EMS training.	Award contract and develop IDDE protocol. Review 10% of UA roads each year as funding allows.
3E	Resident Engineer Illicit Connection Training	1) Provide training on illicit connection policy, illicit connection identification and protocol for reporting during annual Resident Engineer training seminars. 2) Summarize # of attendees in Year 4 annual report.	Construction																X Training	X Annual Report				
3F	Maintenance Staff Illicit Connection Training	1) Provide training on illicit connection policy, illicit connection identification and protocol for reporting during annual environmental awareness training seminars for maintenance personnel. 2) Summarize # of attendees in Year 4 annual report.	Environmental																X Training	X Annual Report				
	Programs which are listed under other minimum control measures also include illicit discharge detection and elimination aspects (e.g. BMP# 1H, 1I, 1K and 4Q).																							
Minimum Control Measure #4: Construction Site Runoff Control																								
4A	MassHighway Department Project Development & Design Guide	All drainage systems for MH roads will be designed in accordance with Ch. 8 of the MHD Design Guide.	Environmental/ Construction/ Projects																					
4B	MA DEP Stormwater Management Policy	Continue to meet criteria in Policy for projects subject to Wetlands Protection Act.	Environmental/ Construction/ Projects																					
4C	NPDES Construction General Permit	1) File NOIs for new projects that disturb more than one acre. 2) Summarize NOIs issued to MH in annual report.	Construction					X Annual Report				X Annual Report				X Annual Report				X Annual Report				
4D	Other state environmental regulations or policy	Continue compliance with other state environmental regulations and policies.	Environmental/ Construction/ Projects																					

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4E	MassHighway Storm Water Handbook	1) Develop and issue MH SW Handbook (completed in May 2004). 2) Require that all new construction and redevelopment activities undertaken by MassHighway, or by others that are funded in whole or in part by MassHighway, comply with the Handbook.	Environmental/ Construction/ Projects					Ratified by DEP																
4F	Standard Specification for Highway and Bridges	Continue to include Subsection 7.02 "Prevention of Water Pollution" of the Standard Specification for Highway and Bridges in all MassHighway funded construction projects.	Environmental/ Construction/ Projects																					
4G	MassHighway Research Needs Program	Continue funding the program.	Environmental/ Construction																					
4H	Pre-Construction Meeting Review of NPDES requirements	District Env. Staff will review NPDES requirement at pre-construction meetings for all projects.	District Environmental Staff																					
4I	Contract Bid Item and Special Provision for SWPPPs	A Special Provision/ Pay Item is included in all new construction contracts to cover the preparation of the SWPPP by the Contractor.	Construction Division/ Contracts				X Pay Provision Finalized	X Annual Report				X Annual Report				X Annual Report				X Annual Report					
4J	Field Guide on Erosion Prevention and Sediment Control	1) Finalize field guide. 2) Issue to Resident Engineers.	Construction Division/ Chief Engineer												X Draft								X Final	
4K	Storm Water Pollution Prevention Plan Guidance Manual	SWPPP Guidance for Contractors document completed and in use by Contractors on MassHighway projects.	Construction Division													X Document Complete								
4L-1	Training	1) Conduct annual Erosion Prevention and Sediment Control Training for Construction Personnel. 2) Summarize # of attendees and topics covered in annual report.	Construction Division				X Training	X Annual Report			X Training	X Annual Report			X Training	X Annual Report			X Training	X Annual Report			X Training	
4L-2	Non-Traditional Erosion Control Specifications	1) Develop specifications for non-traditional erosion controls. 2) As new technologies/ techniques are developed, the will be tested and, if accepted, a spec will be developed.	Bay State Roads/ Construction Division																X Specs Complete					
4M	Erosion and Sediment Control Field Tests	1) Perform field tests of at least one new E&S materials on MassHighway projects. 2) Create and distribute internal memo summarizing materials effectiveness and recommended use.	Construction Division/ Districts/ Landscaping												X literature search				X lab work		X memo distributed			
4N	Construction Bulletins	Issue annual construction bulletin to each District regarding storm water issues.	Construction Division					X April 2004							X Oct 2006				X March 2007				X	
4O	Solicit Construction Activity Feedback from Public	1) Include contact info for all ongoing construction projects on MH web site. 2) Respond to concerns in a timely manner.	Construction Division/ IT									X Contact info added				X Annual Report				X Annual Report				
4P	Construction Runoff Control Enforcement	1) If MH Site Engineer determines that a construction project is not complying with local, state or federal pollution control laws, biweekly payment will be withheld until the problem is rectified. 2) Summarize actions taken in annual report.	Construction Division/ Districts													X Annual Report				X Annual Report				
4Q	Standard Practices Memo	MassHighway issued a memo dated June 16, 2006 regarding procedures to follow on discovery of any illicit discharges during construction.	Construction												X Draft	X 6/16/06 Issued								
4R	Contractor Inspector Training	MH will modify NPDES SWPPP contract bid item to include half day training requirement.	Construction																					X Inclusion in Special Provision. First training sessions.

Programs which are listed under other minimum control measures also include construction site runoff controls aspects (e.g. BMP 1E and 2A)

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Minimum Control Measure #5: Post Construction Runoff Control																								
5A-1	MassHighway Storm Water Handbook	1) Secure DEP ratification. 2) Require all new construction or redevelopment activities funded by MH to comply with Handbook.	Environmental					Ratified 5/7/04																
5A-2	Revise Ch.4 of SW Handbook	1) Complete revision of Ch.4. 2) Reissue Handbook to designers and internal staff.	Environmental																				X Reissue Handbook 1 year after DEP issues revised Policy	
5A-3	Revise Ch.5 of SW Handbook	1) Complete revision of Ch.5 within 1 year of release of revised stormwater policy. 2) Reissue Handbook to designers and internal staff.	Environmental																				X Reissue Handbook 1 year after DEP issues revised Policy	
5C	TARP	1) Continue to work with DEP to develop review protocol for innovative stormwater BMPs. 2) Summarize in annual report.	TARP					X Annual Report				X Annual Report				X Annual Report				X Annual Report				
5D	Southeast Expressway BMP Effectiveness Study	Conduct study of WQI and CB effectiveness at TSS removal from highway runoff (Completed 2002).	Environmental																					
5E	Highway Runoff Contaminant Model	Develop and calibrate model.	Env. Div. Consultant																					Complete Study Dec. 2008
5G	Right of Way Parcel Evaluation	1) Develop methodology for evaluating parcels which are candidates for disposal for their storm water management potential. 2) Implement methodology.	Environmental													X Method-ology Completed								
5H-1	Post Construction Runoff Enforcement - Illicit Discharge Prohibition	1) Develop policy for addressing unauthorized connections to the MassHighway's drainage system. 2) Enforce the provisions through referrals to the Attorney General. 3) Summarize actions taken under this BMP in annual report.	Legal/ Environmental														X Policy Completed			X Annual Report				
5H-2	Post Construction Runoff Enforcement - Drainage Tie In Policy	1) Develop permitting process for adjacent properties that would like to tie into the MassHighway drainage system. 2) Implement permitting program. 3) Summarize actions taken under this BMP in annual report.	Legal/ Environmental/ Districts																X Draft				X Final	
5H-3	Post Construction Runoff Enforcement - Off-Site Pollution to MassHighway Drainage System	Runoff not meeting the NPDES MS4 requirements which is reaching the MH MS4 and is not covered under 5H-1 or 5H-2 may be considered trespassing and referred to the AG's office by MassHighway counsel at the DHD's discretion.	Legal/ Environmental																					
5I	Rest Area Leases	1) Include drainage system requirements in all new rest area leases; 2) Summarize new rest area leases in annual report.	Environmental/ Right-of-Way				X Complete Lease Req.					X Annual Report				X Annual Report				X Annual Report				
5J	Transportation Evaluation Criteria	Continue to include environmental considerations in the funding prioritization evaluation.	Planning/ MPOs																					
5K	Federal Enhancement Funding	Continue to participate in quarterly meetings of enhancement committee.	Planning																					
	Programs which are listed under other minimum control measures also include post-construction site runoff controls aspects (e.g. BMP# 1K, 3C-1, 3C-2, 4A and 4E)																							
Minimum Control Measure #6: Pollution Prevention/Good Housekeeping																								
6A-1	Source Control: 511 Massachusetts	Maintain the existing 511 project.	Operations																					
6A-2	Source Control: Adopt a Highway	1) Continue to support Adopt-a-Highway program by installing signs where program is active. 2) Summarize number of road miles cleaned each year in annual report.	Adopt-a-Highway													X Annual Report				X Annual Report				
6A-3	Source Control: Deicing Programs and Reduced Salt Areas	Continue to support deicing and reduced salt areas programs.	Operations																					
6A-4	Source Control: HELP	Continue to provide 22 HELP vans and tow trucks to provide assistance to people with car trouble.	Operations													X Annual Report				X Annual Report				

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6A-5	Source Control: Vegetation Management	1) Develop a generic Vegetation Management Plan (VMP) outlining methods of minimizing the discharge of pollutants related to the storage and application of pesticides, herbicides and fertilizers. 2) Prepare Yearly Operational Plan (YOP). 3) Post YOP on website. 4) Summarize actions taken in previous year in annual report.	Environmental				X VMP Issued					X YOP				X YOP				X YOP					
6A-6	Source Control: Ridesharing	Continue participation in ridesharing activities.	Planning																					
6A-7	Source Control: Alternative Transportation	Continue to support alternative transportation through technical funding and assistance.	Planning																					
6A-8	Source Control: Highway Safety	1) Incorporate safety measures into all new highway designs 2) Provide signage to warn of vehicle hazards including tipping hazards and steep grades. 3) Install VMS on selected roadways to improve driver awareness. 4) Include evolving safety technologies as part of future highway design projects as they are developed.	Highway Design																					
6A-9	Source Control: Toxics Use Reduction	Maintain an active PPTF throughout the permit term. 2) Provide summary of actions taken on each pollution prevention initiatives in annual report.	Environmental					X Annual Report				X Annual Report				X Annual Report				X Annual Report				
6B-1	Employee Training: MTAP and Baystate Roads Program Training	Continue to support MTAP and Baystate Roads program.	Environmental					X Annual Report				X Annual Report				X Annual Report				X Annual Report				
6B-2	Employee Training: Environmental Awareness Training	1) Provide annual training to at least 300 maintenance facility personnel regarding good housekeeping -spill prevention. 2) Summarize attendance and topics covered in annual report.	Environmental				X Training	X Annual Report			X Training	X Annual Report			X Training	X Annual Report			X Training	X Annual Report			X Training	
6B-3	Employee Training: Snow and Ice Program	1) Provide annual training to 200 of supervisors and drivers annually on the latest on snow and ice removal. 2) Summarize attendance and topics covered in annual report.	Operations				X Training	X Annual Report			X Training	X Annual Report			X Training	X Annual Report			X Training	X Annual Report			X Training	
6B-4	Employee Training: Equipment and Vehicle Safety Training	Ensure all equipment and vehicle operators have received training on the proper operation of the equipment and vehicles they operate. 2) Summarize training in annual report.	Operations																X Training				X Training	
6C-1	Maintenance Program	Continue maintenance activities for storm water system as indicated in Appendix E of the SWMP.	Districts																					
6C-2	Maintenance/ Material Storage Yards	1) Review maintenance and material storage yards and create a facility handbook for each that provides information on necessary steps to environmental compliance. **Completed 1995**	Districts																					
6C-2	Maintenance/ Material Storage Yards	2) Post EMS Manual on MassHighway website for public information.	Districts																	X				
6C-2	Maintenance/ Material Storage Yards	3) Post generic Facility Handbook on website for public information.	Districts																				X	
6C-3	Maintenance Record and Data Management Program	1) Develop work management system. 2) Populate program with infrastructure information from inventory (BMP 7R). 3) Implement system and begin to record maintenance activities in TMDL watersheds.	Environmental																					
6D	Waste Disposal	1) Street sweeping waste will be reused in appropriate slope stabilization and road work projects in compliance with MH SOP. 2) Material which can not be reused will be disposed of according to "Reuse and Disposal of Contaminated Soil at Massachusetts Landfills" DEP Policy #COMM-97-001.	Districts																					
6E	Catch Basin Accumulation Project	Complete a study of debris accumulation in catch basins by November 2009. Include summary in annual report. Based on the results of the study, revise the existing cleaning schedule and SOP for catch basin cleaning by June 2010.	Districts														X Finalize CB to Include in Study	X Work Plan Finalized/ Train MH staff	X Initial Monitor/ Monthly Monitoring to Begin	X Annual Report	X 6 month qualitative analysis		X Year 1 Data Summary Report	X Completed Dec. 2009
6F	Snow and Ice Control GEIR – Policy Program Review	MassHighway will continue to at least biannually evaluate its snow and ice control policies and operational programs in order to make adjustments based on data and experience, and to respond to changing conditions.	Environmental													X GEIR Issued								
6G	Snow and Ice Control GEIR – Salt Remediation Program	Continue to provide the Salt Remediation Program with a funding level appropriate to quickly address salt related complaints.	Environmental/ Maintenance/ Districts																					
6H	Snow and Ice Control GEIR – Clean Well Initiative	Provide a continued level of funding that will allow MassHighway to complete up to 20 replacement wells per year.	Environmental																	X Annual Report				

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6I	Salt Management and Storage	**Review Sheds:** MassHighway will continue to prioritize the identification and selection of parcels being considered for new salt storage facilities, considering operational needs and the environmental setting.	Environmental																		X Develop priority list			
6I	Salt Management and Storage	**Review Sand Piles:** Review all facilities and implement measures identified.	Environmental																		X			
6I	Salt Management and Storage	**Personnel:** Hire a director of snow and ice operations.	Operations															X						
6J	Salt Storage BMPs/ Pollution Prevention	Continue to implement salt storage in compliance with DEP guidelines. Follow MH SOP for the Management of Sand and Deicing Chemicals at facilities. Continue to follow Facility Env. Handbook guidelines at maintenance facilities.	Environmental																					
6K	Equipment Improvements	Expand the use of anti-icing as a standard tool for snow and ice control.	Environmental																					
6L	Enhanced Weather Forecasting Information	Continue to provide sufficient funding to use weather forecasting contractor to provide up-to-date and local weather information during snow and ice season.	Environmental																					
6M	Road Weather Information System	Ensure that the RWIS system stations are maintain so as to remain fully functional.	Environmental																					
6N	Alternative Technologies	Maximize the use of premix and liquid calcium chloride as alternative deicers to reduce the quantity of granular sodium chloride. Monitor reduced salt zones during storms to ensure the proper timing of salt applications and to minimize the potential for overuse of deicing chemicals.	Environmental																					
6O	Research	Pursue research programs pertaining to storm water management. Currently, MassHighway has joined the Clear Roads program.	Environmental																			X Clear Roads Program		
Additional Programs																								
7A	Wetland Protection Act Compliance	1) All MassHighway projects will comply with the WPA and MESA. 2) When potential impacts are identified, MassHighway will work with the appropriate agencies to design the project to minimize the impacts.	Environmental																					
7B	401 Water Quality Certification	MassHighway will continue to comply with MA 401 Water Quality Certification which includes review of the project by MA Natural Heritage program and US Fish and Wildlife if endangered species habitat is mapped in the project vicinity.	Environmental																					
7C	CE Checklist	MassHighway projects which include federal funds must complete this checklist at 25% Design stage. The checklist includes determining if the site is in an area where there are federally listed endangered species or critical habitat and historic properties.	Environmental																					
7D	Environmental Site Data Form	MassHighway will develop this form to review potential impacts of a project to a variety of resource areas as part of compliance with the NPDES Construction and MS4 general permit. This form will includes review of discharges for potential impact to state or federally listed endangered species or critical habitat, historic properties, impaired waterbodies and the other critical resource areas described in the general permit. The form will includes instructions to the contractor/designer if impacts are identified.	Environmental/ Construction																			X Draft	X Final X Implement on all new design projects	

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7E	TMDL Recommendation Summary Table Update	Update table to include TMDL reports finalized within previous year and progress on implementation of any related measurable goals in annual report.	Environmental					X Annual Report				X Annual Report				X Annual Report				X Annual Report				
7F, 7G, 7H, 7I, 7J, 7K, 7L, 7M, 7N, 7P, 7Q	Impaired Waterbodies TMDL	MH will review projects which discharge to impaired waterbodies for opportunities to include additional BMPS within proposed projects if MassHighway determines they will help address the pollutant loading issue.	Environmental/ Planning/ District																					
7O	Salisbury Pond Impaired Waterbody TMDL	Sweep streets in this watershed at least once a year (usually in spring) and more often if necessary. All sumped drainage structures will be inspected and cleaned if necessary, twice a year and more often if necessary. MassHighway will inspect/ clean drainage outlet locations where sediment build-up is evident. MassHighway will inspect and repair damaged and/ or clogged drainage conveyances	Environmental/ Planning/ District 3																					
7P	Lake Quinsigamond and Flint Pond Impaired Waterbodies TMDL	Continue to maintain level of staffing and funding to provide maintenance frequencies as outlined in 6-19-02 letter in App. E.	District 3																					
7R	TMDL Watershed Review	Review 20% of MassHighway roads contributing to TMDL watersheds each year and develop conceptual plan for BMPs if review indicates potential contribution to impairment.	Environmental																					
7S	Salt Remediation Program	Continue to provide the Salt Remediation Program with a funding level appropriate to quickly address salt related complaints.	Environmental																					
7T	Review of Specific Sites for Water Quality Exceedance in Response to Conservation Law Foundation (CLF) et al. Lawsuit	1. Analyze each of the three sites identified in the CLF lawsuit. Develop summary report with modeling methodology and summary of results. 2. For the sites which are determined to contribute to the exceedance of water quality at the stream crossing, construct BMPs to address MassHighway related exceedance by December 2010. 3. Submit a remedial plan to the courts by January 2010.	Environmental																					
8A	Cultural Resources Review	Reviews all projects for impacts to historic properties at the 25% Design stage.	Cultural Resources																					
	Programs which are listed under other minimum control measures which address additional resources include BMP# 1K, 3B-1, 3B-2, 4B and 5E.																							
Reporting																								
	Storm Water Management Plan/ NOI	Prepare Storm Water Management Plan (SWMP) and Notice of Intent (NOI) Application (BRP WM 08A)	SWPPP Team																					
		Submit SWMP and NOI to EPA and DEP	SWPPP Team	X (7/25/03)																				
	Annual Report	Prepare annual report summarizing the status of meeting each of the measurable goals.	Environmental/ Construction/ IT/ SWPPP Team																					
		Submit annual report to EPA and DEP.	Environmental					X				X				X				X				
	Storm Water Management Plan Evaluation	MassHighway will evaluate the SWMP on an ongoing basis as part of the implementation and annual reporting process.	SWPPP Team																					
		If upon evaluation, improved, additional or different controls are deemed necessary to meet the required standards, MassHighway will update the SWMP and submit revisions to the EPA and DEP.	SWPPP Team																					
	Storm Water Management Plan Reapplication	MassHighway will reapply for coverage under the general permit, depending upon when permit is issued.	SWPPP Team																					

Appendix E: Illicit Discharge Detection and Elimination Plan

Illicit Discharge Detection and Elimination (IDDE) Plan

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1 Introduction

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed for the Massachusetts Department of Transportation (MassDOT) to address the requirements of United States Environmental Protection Agency's (EPA) 2003 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts[1] (MS4 Permit). MassDOT point source discharges within regulated areas are subject to this permit.

The 2003 Massachusetts MS4 Permit requires that a regulated community address six Minimum Control Measures including:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post construction storm water management in new development and redevelopment; and
6. Pollution prevention and good housekeeping for Permittee Owned Operations.

Under Minimum Control Measure 3, Section B.3.(c.) the permittee is required to "develop and implement a plan to detect and address non-storm water discharges, including illegal dumping, into the system".

The permit defines an illicit discharge as "any discharge to a drainage system that is not composed entirely of stormwater, with the exception of discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the MS4), allowable non stormwater discharges described at Part I.F (of the permit), and discharges resulting from fire-fighting activities". Illicit discharges may enter the drainage system through direct or indirect connections.

1.1 Statement of Responsibilities

MassDOT's Stormwater Management Unit is the lead division responsible for implementing the MassDOT IDDE program.

Other agencies or departments with responsibility for aspects of the program include:

- MassDOT District Offices – The respective District Highway Director will contact landowners with illicit discharges to notify the landowner that they are in violation of Chapter 81, Section 21 of Massachusetts General Laws.
- Office of The General Counsel – The Executive Office of Transportation's Office of the General Counsel will be provided a copy of the District's correspondence with the landowner.
- Massachusetts Attorney General's Office - If a landowner does not remove the illicit discharge within 90 days, MassDOT General Counsel's Office may pursue legal action with the Massachusetts Attorney General's Office.

1.2 IDDE Plan Goals

MassDOT's IDDE program focuses on finding and eliminating illicit discharges to municipal separate storm sewer systems and preventing illicit discharges from happening in the future. According to Part II.B.3(c.) of the permit "The illicit discharge plan must contain the following elements:

[1] National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems

- Procedures to identify priority areas. This includes areas suspected of having illicit discharges, for example: older areas of the city, areas of high public complaints, and areas of high recreational value or high environmental value such as beaches and drinking water sources.
- Procedures for locating illicit discharges (i.e. visual screening of outfalls for dry weather discharges, dye, or smoke testing).
- Procedures for locating the source of the discharge and procedures for the removal of the source.
- Procedures for documenting actions and evaluating impacts on the storm sewer system subsequent to the removal. "

Each of these elements are discussed in this document.

1.3 Allowable Non-Stormwater Discharges

Part 1.F of the 2003 MS4 Permit allows the following categories of non-stormwater discharges unless the permittee, EPA, or Massachusetts Department of Environmental Protection (MassDEP) identifies any category or individual discharge of non-stormwater discharge as a significant contributor of pollutants to the MS4:

- water line flushing,
- landscape irrigation,
- diverted stream flows,
- rising ground waters,
- uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20)),
- uncontaminated pumped ground water,
- discharge from potable water sources,
- foundation drains,
- air conditioning condensation,
- irrigation water, springs,
- water from crawl space pumps,
- footing drains,
- lawn watering,
- individual resident car washing,
- flows from riparian habitats and wetlands,
- dechlorinated swimming pool discharges,
- street wash water, and
- Residential building wash waters, without detergents.

If these discharges are identified as significant contributors to the MS4, they must be considered an "illicit discharge" and addressed using this IDDE Plan. MassDOT requirements may be more restrictive than EPA's, and some of these discharges may require a drainage tie-in permit from MassDOT despite not being considered an illicit flow.

2 Procedures to Identify Priority Areas

MassDOT identifies priority areas for illicit discharge detection and elimination efforts based on the following criteria:

- **Previous potential illicit discharges** – previous outfall screening/sampling results indicating likely sewer input
- **Routine operations** - dry weather flows or potential illicit discharges identified by MassDOT staff during routine design/survey, maintenance, and/or construction operations
- **Discharge complaints and reports** - municipal and/or public reports and complaints identifying suspect areas

A summary of discharges identified is included in MassDOT's MS4 annual report.

3 Procedures for Screening for Potential Illicit Discharges

The following sections provide MassDOT's procedures for reviewing potential illicit discharges within its drainage system. The MassDOT Stormwater Management Unit staff and/or subcontractors will be responsible for implementing the procedures and updating the database with results.

The 2003 MS4 Permit requires permittees to develop procedures for locating illicit discharges. While MassDOT is not subject to the 2016 MS4 Permit, but instead remains authorized under the 2003 MS4 permit until a Transportation specific permit is developed, MassDOT updated this IDDE plan to primarily reference the 2016 MS4 General Permit outfall screening procedures and testing thresholds as they are the most up to date guidance.

This IDDE plan does not incorporate the pollutants of concern testing parameters since those parameters do not address identification of potential illicit discharges but rather are included to gather 2016 MS4 permit impaired water background data.

3.1 Dry Weather Outfall Screening and Sampling

Dry weather flow is a common indicator of potential illicit connections. Dry weather outfall screening and sampling may occur when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring. MassDOT will use precipitation data from the nearest accurate weather station from the Weather Underground website[2] or similar data source for each section being reviewed when determining dry weather conditions. MassDOT will also identify at least one back-up station for each site, as needed.

The dry weather outfall inspection and sampling procedure consists of the following general steps:

1. Identify outfall(s) to be screened/sampled based on previously identified priorities.
2. Acquire the necessary staff, mapping, and field equipment (see **Appendix A** for list of potential field equipment).
3. Conduct the outfall inspection during dry weather:
    - Locate the outfall. If the outfall is not found, proceed to the next upstream structure. If an upstream structure is not found, update the database accordingly.
    - In the event that an outfall is submerged, either partially or completely, or is inaccessible, field staff will proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results. Field staff will continue to the next upstream structure until there is no longer an influence from the receiving water on the visual inspection or sampling. (Note, field staff may need to collect samples from multiple sampling points to capture a representative sample of the incoming flow.)
    - Mark and photograph the outfall or structure in the database.
    - Record the inspection information and outfall characteristics using MassDOT's mobile data collection. Inspectors will use ArcGIS Field Maps to gather screening and sampling data against mapped assets. Look for and record visual/olfactory evidence of pollutants in flowing outfalls including odor, color,

[2] https://www.wunderground.com/weatherstation/overview.asp

turbidity, and floatable matter (suds, bubbles, excrement, toilet paper or sanitary products). Also observe outfalls for deposits and stains, vegetation, and damage to outfall structures.

4. If flow is observed, sample and test the flow following the procedures described in the following sections.
5. If no flow is observed, but evidence of illicit flow exists (illicit discharges are often intermittent or transitory), place a sandbag if the forecast for the next 48 hours shows dry weather. If the forecast does not show dry weather, revisit the outfall when there is 48 hours of dry weather as soon as possible after the initial observation and place a sandbag or sample flow if observed.
6. Input lab results from screening and sampling into MassDOT's database. Data captured through the mobile ArcGIS Field Maps will be automatically saved to the database.
7. Conduct review of all data entered into the database against lab reports and field notes for quality assurance purposes.
8. Analyze whether screening and sampling results require further follow up measures or indicate no signs of illicit discharges in the flow.
9. Include all screening data in the annual report.

3.1.1 Field Equipment

Appendix A includes a checklist of field equipment commonly used for outfall screening and sampling. The listed items are suggested and should be updated as needed, based on specific samples and tests to be conducted and/or conditions. At the discretion of the sampling team, additional items can be added to the list at the end, and duplicative or unnecessary items can be removed or crossed out.

3.1.2 Sample Collection and Analysis

If flow is present during a dry weather outfall inspection, a sample will be collected and analyzed for the required permit parameters[3] listed in **Table 1** for the receiving water body. The general procedure for collection of outfall samples is as follows:

1. At least one day prior to sampling, coordinate with appropriate laboratory to schedule the laboratory analysis. This coordination will include the time of delivery and number of samples expected to be sent for analysis.
2. Prior to the start of sampling, create a trip blank by filling a laboratory provided container with clean bottled water. The trip blank will have its own unique label and will be kept in a cooler with all other samples collected during that sampling event.
3. Visit the designated location(s) provided with a two-person field crew. Upon arrival at an approved sampling location, record all pertinent observations in the mobile data collection form. Fill out comments section with any observations which cannot adequately be described using predefined categories on the field form.
4. If using bottle labels, fill out all sample information on sample bottle labels and field sheets. Make sure sample bottles are clean.
5. Put on protective gloves (nitrile/latex/other) before sampling. If writing directly on lab sample bottles, label sampling container.
6. Collect sample with dipper or directly in sample containers. To sample, place a clean grab container in the approximate middle of observed flow. After the container has been filled, retrieve, and swirl its contents to ensure

[3] Other potentially useful parameters, although not required by the MS4 Permit, include **fluoride** (indicator of potable water sources in areas where water supplies are fluoridated), **potassium** (high levels may indicate the presence of sanitary wastewater), and **optical brighteners** (indicative of laundry detergents).

that all surfaces of the container are covered and rinsed thoroughly and then dump out downstream of the sampling location. Follow this method a total of three times, to ensure that the grab container is fully rinsed.

7. Use grab container a fourth time to collect a final sample for analysis. If possible, collect water from the flow directly in the sample bottle. Be careful not to disturb sediments.
8. For samples requiring laboratory analyses, open a sterile container, provided by the laboratory. Use caution to ensure that only the outside of the container and its cap are handled to prevent contamination. Fill the sterile container with the sampled water and then seal. Take care to confirm that the sample container is sealed properly and does not leak. Label the container with a unique identifier, the date and time the sample was taken, and the analysis that is required.
9. Place laboratory samples on ice in a cooler for analysis of bacteria.
10. Fill out chain-of-custody form for laboratory samples. The chain of custody form should remain with the samples at all times.
11. Conduct in-situ field tests using the remaining water in the grab container. Use test strips, test kits, and field meters (rinse similar to dipper) for most parameters (see Table 1). All results will be recorded.
12. Samples will remain on ice until they are accepted by the laboratory. Samples must be analyzed by the laboratory within 8 hours of their collection. Any violation of this hold time is required to be documented in the laboratory's final report.
13. Dispose of used test strips and test kit ampules properly.
14. Decontaminate all testing personnel and equipment, following Health and Safety Plan (HASP) guidance.
15. Deliver samples to the laboratory.

3.1.2.1 Field Kits

Field test kits or field instrumentation are permitted for all parameters except indicator bacteria. Field kits need to have appropriate detection limits and ranges. **Table 1** lists various field test kits and field instruments that can be used for outfall sampling associated with the 2016 MS4 Permit parameters, other than indicator bacteria.

Table 1 Sampling Parameters and Analysis Methods

Analyte or Parameter	Instrumentation (Portable Meter)	Field Test Kit
Ammonia	CHEMetrics™ V-2000 Colorimeter Hach™ DR/890 Colorimeter Hach™ Pocket Colorimeter™ II	CHEMetrics™ K-1410 CHEMetrics™ K-1510 (series) Hach™ NI-SA Hach™ Ammonia Test Strips
Surfactants (Detergents)	CHEMetrics™ I-2017	CHEMetrics™ K-9400 and K-9404 Hach™ DE-2
Chlorine	CHEMetrics™ V-2000, K-2513 Hach™ Pocket Colorimeter™ II	NA
Conductivity	CHEMetrics™ I-1200 YSI Pro30 YSI EC300A Oakton 450	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450	NA

Analyte or Parameter	Instrumentation (Portable Meter)	Field Test Kit
Salinity	YSI Pro30 YSI EC300A Oakton 450	NA
pH	YSI Pro30 YSI EC300A Oakton 450	NA
Indicator Bacteria: E. coli (freshwater) or Enterococcus (saline water)	EPA certified laboratory procedure (40 CFR § 136)	NA

Table 2 lists analytical methods, detection limits, hold times, and preservatives for laboratory analysis of dry weather sampling parameters. Testing for indicator bacteria must be conducted using analytical methods and procedures found in 40 CFR § 136.[4] Samples for laboratory analysis must also be stored and preserved in accordance with procedures found in 40 CFR § 136. Methods will vary by laboratory.

Table 2 Required Analytical Methods, Detection Limits, Hold Times, and Preservatives

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
Ammonia	EPA: 350.2, SM: 4500-NH3C	0.05 mg/L	28 days	Cool ≤6°C, H2SO4 to pH <2, No preservative required if analyzed immediately
Surfactants	SM: 5540-C	0.01 mg/L	48 hours	Cool ≤6°C
Chlorine	SM: 4500-Cl G	0.02 mg/L	Analyze within 15 minutes	None Required
Temperature	SM: 2550B	N/A	Immediate	None Required
Specific Conductance	EPA: 120.1, SM: 2510B	0.2 µs/cm	28 days	Cool ≤6°C
Salinity	SM: 2520		28 days	Cool ≤6°C
Indicator Bacteria: E. coli Enterococcus	E. coli EPA: 1603 SM: 9221B, 9221F , 9223 B Other: Colilert ®, Colilert-18® Enterococcus EPA: 1600 SM: 9230 C Other: Enterolert®	E. coli EPA: 1 cfu/ 100mL SM: 2 MPN/100mL Other: 1 MPN/ 100mL Enterococcus EPA: 1 cfu/100mL SM: 1 MPN/ 100mL Other: 1 MPN/ 100mL	8 hours	Cool ≤10°C, 0.0008% Na2S2O3
Total Phosphorus	EPA: Manual-365.3, Automated Ascorbic acid digestion-365.1 Rev. 2, ICP/AES4-200.7 Rev. 4.4 SM: 4500-P E-F	EPA: 0.01 mg/L SM: 0.01 mg/L	28 days	Cool ≤6°C, H2SO4 to pH <2

[4] 40 CFR § 136: http://www.ecfr.gov/cgi-bin/text-idx?SID=b3b41fdea0b7b0b8cd6c4304d86271b7&mc=true&node=pt40.25.136&rgn=div5

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
Total Nitrogen*	EPA: Cadmium reduction (automated)-353.2 Rev. 2.0, SM: 4500-NO3 E-F	EPA: 0.05 mg/L SM: 0.05 mg/L	28 days	Cool ≤6°C, H2SO4 to pH <2

SM = Standard Methods

* - Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above.

3.1.2.2 Sandbagging

This technique can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours and should only be installed when dry weather is forecast. If flow has collected behind the sandbags/barriers after 48 hours, it can be assessed using visual observations or by sampling. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of the intermittent discharge. The challenge with this method can be finding appropriate durations of dry weather and the need for multiple trips to each manhole.

3.2 Interpreting Outfall Sampling Results

Outfall analytical data from dry weather sampling can be used to help identify the major type or source of discharge. **Table 3** shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

Table 3 Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Benchmark
Ammonia	>0.5 mg/L
Conductivity	>2,000 µS/cm
Surfactants	>0.25 mg/L
Chlorine	>0.02 mg/L (detectable levels per the 2003 MS4 Permit)
Indicator Bacteria: E. coli Enterococcus	*E.coli*: the geometeric mean of the five most recent samples taken during the same bathing season shall not exceed 126 colonies per 100 ml and no single sample taken during the bathing season shall exceed 235 colonies per 100 ml *Enterococcus:* the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 33 colonies per 100 ml and no single sample taken during the bathing season shall exceed 61 colonies per 100 ml

According to the 2016 MS4 Permit Part 2.3.4.7c.ii, likely sewer input indicators are any of the following:

- Olfactory or visual evidence of sewage;
- Ammonia ≥0.5 mg/L, surfactants ≥0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water; or
- Ammonia ≥0.5 mg/L, surfactants ≥0.25 mg/L, and detectable levels of chlorine.

4 Procedures for Locating the Source of the Illicit Discharge

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area.

4.1 Catchment Investigations

Catchment investigation techniques can include but are not limited to review of maps, historic plans, and records; manhole observation; sampling; video inspection; smoke testing; and dye testing. This section outlines a systematic procedure to investigate outfall catchments to trace the source of potential illicit discharges. All data collected as part of the catchment investigations will be recorded and reported in each annual report.

4.1.1 Outfall Catchment Delineations

A catchment is the area that drains to an individual outfall or interconnection. The catchments will be delineated to define contributing areas for investigation of potential sources of illicit discharges. Catchments are typically delineated based on topographic contours and mapped drainage infrastructure, where available.

4.1.2 Catchment Investigations

Catchment investigations will be completed during dry weather and will involve systematically and progressive observation, sampling, and evaluation of key junction manholes. Steps will be taken during the catchment investigation (as outlined below) to determine the approximate location of suspected illicit discharges.

Important terms related to catchment investigations are as follows:

- **Junction Manhole** is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.
- **Key Junction Manholes** are those junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee's ability to determine the possible presence of an upstream illicit discharge. A permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.

For catchments requiring investigation, during dry weather, field crews will systematically inspect **key junction manholes** within the problem catchment for evidence of illicit discharges. This program involves progressive inspection and sampling at manholes in the storm drain network to isolate and eliminate illicit discharges.

The manhole inspection methodology will be conducted in one of two ways (or a combination of both):

- By working progressively up from the outfall and inspecting key junction manholes along the way; or
- By working progressively down from the upper parts of the catchment toward the outfall.

The decision to move up or down the system depends on the nature of the drainage system and the surrounding land use and the availability of information on the catchment and drainage system. Moving up the system can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. Moving down the system requires more advanced preparation and reliable drainage system information on the upstream segments of the storm drain system but may be more efficient if the sources of illicit discharges are believed to be located in the upstream

portions of the catchment area. Once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment.

For most catchments, manhole inspections will proceed from the upper parts of the catchment and proceed down towards the outfall. For outfalls/interconnections with sampling results indicating sewer input, manhole inspections will typically proceed up from the outfall.

Inspection of key junction manholes will proceed as follows:

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections.
2. If flow is observed, a sample will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants. Sampling and analysis will be in accordance with procedures outlined Section 3.1.2. Additional indicator sampling may assist in determining potential sources (e.g., bacteria for sanitary flows, conductivity to detect tidal backwater, etc.).
3. If flow is not observed, the next step will vary depending on the following:
    - Catchments with likely sewer input: an obstruction (sandbag) will be placed in the manhole to capture intermittent flows. After at least 48 hours of dry weather, the sandbag will be checked. If flow is captured, a sample will be collected and analyzed for the same parameters as listed in #2.
    - All other catchments: proceed to the next key junction manhole without placing a sandbag.
4. Where sampling results or visual or olfactory evidence indicate potential illicit discharges, the area draining to the junction manhole will be flagged for further upstream manhole investigation and/or isolation and confirmation of sources.
    - Subsequent key junction manhole inspections will proceed until the location of suspected illicit discharges can be isolated to the shortest segment of pipe possible, ideally a single pipe between two manholes. Once isolated proceed to **Section 4.3**.
    - Should inspections proceed to the edge of the MassDOT system and/or a perceived municipal interconnection to the MassDOT MS4 without identifying the location of suspected illicit discharges or Sanitary Sewer Overflow (SSO) source, the investigator will note the potential source and notify the municipality and/or private landowner in accordance with MassDOT's Drainage Connection Policy Directive No. P-06-002 for alerting the owner of the upstream system.

4.2 Wet Weather Outfall Sampling

In cases where catchment investigations alone do not identify the location of a suspected illicit discharge, MassDOT may choose to perform wet weather outfall screening. Outfalls will be inspected and sampled under wet weather conditions, to the extent necessary, to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems result in discharges of sanitary flow to the MS4.

Wet weather outfall sampling will proceed as follows:

1. At least one wet weather sample will be collected at the outfall for the same parameters required during dry weather screening provided in Section 3.1.2.
2. Wet weather sampling will occur during or after a storm event of sufficient depth or intensity to produce runoff. Wet weather sampling decisions will be at the discretion of the sampling team. Wet weather screening will be conducted if there is at least 0.25 inches of rainfall, or enough rain to induce runoff. Field crews will sample within 24 hours after the end of the rainfall event. Field crews will strive to sample during active rain as much as possible. To the extent feasible, sampling should occur during the spring (March through June) when groundwater levels are relatively high.

3. If wet weather outfall sampling indicates a potential illicit discharge, then additional wet weather source sampling will be performed, as warranted, or source isolation and confirmation procedures will be followed as described in the following section.

4.3 Source Isolation and Confirmation

Once the source of an illicit discharge is approximated between two manholes, more detailed investigation techniques will be used to isolate and confirm the source of the illicit discharge. The following methods may be used in isolating and confirming the source of illicit discharges:

- Sandbagging
- Smoke Testing
- Dye Testing
- CCTV/Video Inspections
- Optical Brightener Monitoring
- IDDE Canines

These methods are described in the sections below. Instructions and Standard Operating Procedures (SOPs) will be developed as they are needed.

4.3.1 Sandbagging

This technique can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours and should only be installed when dry weather is forecast. If flow has collected behind the sandbags/barriers after 48 hours, it can be assessed using visual observations or by sampling. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of the intermittent discharge. The challenge with this method can be finding appropriate durations of dry weather and the need for multiple trips to each manhole.

4.3.2 Smoke Testing

Smoke testing involves injecting non-toxic smoke into drain lines and noting the emergence of smoke from sanitary sewer vents in illegally connected buildings or from cracks and leaks in the system itself. Typically, a smoke bomb or smoke generator is used to inject the smoke into the system at a catch basin or manhole and air is then forced through the system. Test personnel are placed in areas where there are suspected illegal connections or cracks/leaks, noting any escape of smoke (indicating an illicit connection or damaged storm drain infrastructure). It is important when using this technique to make proper notifications to area residents and business owners as well as local police and fire departments.

If the initial test of the storm drain system is unsuccessful then a more thorough smoke-test of the sanitary sewer lines can also be performed. Unlike storm drain smoke tests, buildings that do not emit smoke during sanitary sewer smoke tests may have problem connections and may also have sewer gas venting inside, which is hazardous.

It should be noted that smoke may cause minor irritation of respiratory passages. Residents with respiratory conditions may need to be monitored or evacuated from the area of testing altogether to ensure safety during testing.

4.3.3 Dye Testing

Dye testing involves flushing non-toxic dye into plumbing fixtures such as toilets, showers, and sinks and observing nearby storm drains and sewer manholes as well as stormwater outfalls for the presence of the dye. Similar to smoke testing, it is important to inform local residents and business owners. Police, fire, and local public health staff should also be notified prior to testing in preparation of responding to citizen phone calls concerning the dye and their presence in local surface waters.

A team of two or more people is needed to perform dye testing (ideally, all with two-way communication devices, such as cell phones or radios). One person is inside the building, while the others are stationed at the appropriate storm sewer and sanitary sewer manholes (which should be opened) and/or outfalls. The person inside the building adds dye into a plumbing fixture (i.e., toilet or sink) and runs a sufficient amount of water to move the dye through the plumbing system. The person inside the building then radios to the outside crew that the dye has been dropped, and the outside crew watches for the dye in the storm sewer, recording the presence or absence of the dye.

The test can be relatively quick (about 30 minutes per test), effective (results are usually definitive), and inexpensive. Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific houses or businesses.

4.3.4 CCTV/Video Inspection

Another method of source isolation involves the use of mobile video cameras that are guided remotely through stormwater drain lines to observe possible illicit discharges. IDDE program staff can review the videos and note any visible illicit discharges. While this tool is both effective and usually definitive when an active flush with sewage entering into the drain is visible, it can be costly and time consuming when compared to other source isolation techniques. When an active flush is not visible, follow-up with dye testing to confirm illicit connections will be needed.

4.3.5 Optical Brightener Monitoring

Optical brighteners are fluorescent dyes that are used in detergents and paper products to enhance their appearance. The presence of optical brighteners in surface waters or dry weather discharges suggests there is a possible illicit discharge or insufficient removal through adsorption in nearby septic systems or wastewater treatment. Optical brightener monitoring can be done in two ways. The most common, and least expensive, methodology involves placing a cotton pad in a wire cage and securing it in a pipe, manhole, catch basin, or inlet to capture intermittent dry weather flows. The pad is retrieved at a later date and placed under UV light to determine the presence/absence of brighteners during the monitoring period. A second methodology uses handheld fluorometers to detect optical brighteners in water sample collected from outfalls or ambient surface waters. Use of a fluorometer, while more quantitative, is typically more costly and is not as effective at isolating intermittent discharges as other source isolation techniques.

4.3.6 IDDE Canines

Dogs specifically trained to smell human related sewage are becoming a cost-effective way to isolate and identify sources of illicit discharges. While not widespread at the moment, the use of IDDE canines is growing as is their accuracy. The use of IDDE canines is not recommended as a standalone practice for source identification; rather it is recommended as a tool to supplement other conventional methods, such as dye testing, in order to fully verify sources of illicit discharges.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, MassDOT will notify visitors with temporary signage in the vicinity of the testing and/or inspections.

5 Procedures for Removal of Illicit Discharge

MassDOT developed the Drainage Connection Policy Directive No. P-06-002 and the SOP: Connection or Discharge to any MassDOT Drainage System to provide MassDOT with adequate legal authority and procedures for review to:

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

When the specific source of an illicit discharge is identified, MassDOT will exercise its authority as necessary to require its removal as defined in the policy. Where elimination of an illicit discharge is not possible within the schedule set in the policy, MassDOT will create an expeditious schedule for its elimination.

6 Procedures for Documenting Actions and Evaluating System Impact Following Removal

6.1 Documentation of Actions

Illicit discharge activities will document efforts using the following strategies:

- Technical memorandums and reports as necessary
- Electronically on GeoDOT
- MassDOT's Annual Report for EPA

The annual report will include the status of IDDE investigation and removal activities including the following information for each confirmed source:

- The location of the discharge and its source(s)
- A description of the discharge
- The method of discovery
- Date of discovery
- Date of elimination, mitigation, or enforcement action, OR planned corrective measures and a schedule for completing the illicit discharge removal
- Estimate of the volume of flow removed

The progress, success, and system impact of the IDDE program as a whole will be evaluated on an annual basis. The evaluation will be documented in the annual report and will include the following indicators of program progress:

- Number of illicit discharges identified and removed
- Number of notice of violations distributed
- All field investigation, screening, and sampling results
- Status of on-going investigations of suspect flows and source identification
- Number of trainings provided annually

6.2 Confirmatory Outfall Screening

Within one (1) year of removal of an identified illicit discharge, MassDOT will perform confirmatory outfall/interconnection dry weather screening. If confirmatory screening indicates evidence of additional illicit discharges, MassDOT will schedule additional investigation of the catchment.

Appendix A – Field Equipment Checklist

Field staff can use the following checklist to ensure adequate equipment before field sampling. Items can be added or removed at the discretion of the field sampling team.

Table 4 Sampling Equipment Checklist

Check	Equipment	Use/Notes
	Mobile data collector (tablet)	Collect dry weather inspection and dry weather sampling results; collect photographs of field conditions
	Map with sampling location and Facility ID's (if not using tablet)	For orientation
	GPS receiver (tablet or handheld GPS)	For taking spatial location data
	Clipboard (if not using tablet)	For organization of field sheets and writing surface
	Chain of Custody Forms	To ensure proper handling of all samples
	100 ml pre-labeled laboratory bacteria sample bottles (bacteria)	Make sure all sample containers are clean. Keep extra sample containers on hand at all times. Make sure there are proper sample containers for what is being sampled for (i.e., bacteria requires sterile containers).
	500 ml pre-labeled laboratory bacteria sample bottles (other laboratory analysis)	
	125 ml pre-labeled laboratory sample bottles (for on-site testing and BBAC off-site testing)	
	Additional sample containers as needed	
	Data sheet	Field sheets for both dry weather inspection and dry weather sampling should be available with extras.
	De-ionized water or laboratory purified water and extra bottles as necessary	For sample procedures
	Pens, pencils, and/or permanent markers	For proper labeling
	Label tape	For labeling sample containers
	Sampling pole, dipper, sampling cage	For accessing hard to reach outfalls and manholes
	Nitrile gloves	To protect sampler as well as the sample from contamination
	Flashlight/ headlamp with batteries	For looking in outfalls or manholes, helpful in early mornings as well
	Personal Protective Equipment	Personal Protective Equipment
	Disinfecting (wet) wipes and/or hand sanitizer	Disinfectant/decontaminant
	Pry Bar or Pick	For opening catch basins and manholes when necessary
	Sandbags	For damming low flows in order to take samples
	Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
	Utility Knife	Multiple uses
	Measuring Tape	Measuring distances and depth of flow
	Safety Cones	Safety
	Hand Sanitizer	Disinfectant/decontaminant
	Zip Ties/Duct Tape	For making field repairs
	Rubber Boots/Waders	For accessing shallow streams/areas

Table 5 Testing Equipment Checklist

Check	Equipment	Use/Notes
	Ammonia test strips (or kits)	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
	Chlorine test strips (or kits)	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
	Surfactants test kit	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
	Photometer	For chlorine test kit, as needed
	Conductivity, salinity, pH and temperature meter	Handheld meter, if available, for testing for various water quality parameters such as ammonia, surfactants and chlorine and if needed, for sampling conductivity, temperature, pH

Table 6 Sample Transport Checklist

Check	Equipment	Use/Notes
	Coolers	For transporting samples to the laboratory
	Frozen blue ice, ice, and/or cold packs	

Table 7 Tools Checklist

Check	Equipment	Use/Notes
	Flashlight and/or headlamp with extra batteries	For looking in outfalls or manholes, helpful in early mornings as well
	Manhole hook (from local DPW)	For opening manholes
	Measuring tape and/or carpenters' ruler	Measuring distances and depth of flow
	Shovel (from local DPW)	For opening, propping, prying as needed
	Pry bar or pick	For opening catch basins and manholes when necessary
	Sandbags	For damming low flows in order to take samples
	Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
	Utility Knife	Multiple uses
	Zip ties and/or duct tape	Field repairs
	Safety glasses	Personal Protective Equipment (PPE). Staff should review the project-specific HASP for a complete list of PPE.
	Safety vests	
	Rubber knee boots and/or waders for accessing shallow streams/areas	
	Safety (traffic) cones	Safety

Table 8 Other Checklist

Check	Equipment	Use/Notes
	Bug spray (the CDC recommends products with: DEET (exposed skin and clothing) or Permethrin (on clothing)	Protection
	Poison ivy wash (e.g., Tecnu, Zanfel)	Protection (especially if allergic to poison ivy)
	Water (drinking water quality)	For drinking, washing as needed
	Digital camera (smartphone or tablet)	For documenting field conditions at time of inspection
	Field log books	Documentation
	Paper towels	Cleaning
	Sealable bags	Miscellaneous storage, organization

Table 9 Additional Equipment (as needed)

Check	Equipment	Use/Notes
	Safety equipment, such as a face covering, for compliance with State of Massachusetts COVID-19 guidelines	Staff should review the project-specific Health and Safety Plan (HASP) for a complete guidance on COVID-19 guidelines.