

1.0 Introduction

The intent of this project is to implement water quality improvements under the Massachusetts Department of Transportation's (MassDOT's) Impaired Waters Program. Stormwater Best Management Practices (BMPs) will be installed within the Quinebaug River watershed near an impaired section of the river (MA41-02) according to MassDEP's "Massachusetts Year 2012 Integrated List of Waters" as part of MassDOT's Impaired Waters Retrofit Initiative to improve water quality.

This project is proposed to be included as part of MassDOT's 7.5-mile Resurfacing Project (#605592) of Interstate 84 (I-84), in the towns of Sturbridge and Holland. This permit application is for the installation of stormwater/drainage system improvements to provide treatment to roadway runoff in the area of the Interstate 84 eastbound and westbound roadways from River Road, north to Route 131 (Main Street) in the vicinity of the Quinebaug River and does not include the proposed resurfacing since it is an exempt activity. The installation of new BMPs and associated drainage structures will help address impaired waters and mitigate the impact of existing impervious cover from the MassDOT roadway in this area. No roadway expansion or increase in impervious area is proposed as part of the project. The location of the proposed work is shown on **Figure 1**.

1.1 Project Description

The Buffer Zone Minor Activity Exemption – 310 CMR 10.02 (2)(b)2.p. applies for the roadway resurfacing portion of this project because it includes pavement repair, resurfacing, and reclamation of existing roadways within the right-of-way configuration provided that the roadway and shoulders are not widened. Therefore, MassDOT is exempt from the buffer zone regulations for the proposed 7.5 mile resurfacing of I-84.

The proposed BMP construction is an effective impervious cover (EIC) reduction project for stormwater runoff draining to the Quinebaug River. Through this project MassDOT will implement multiple infiltration-type BMPs. The locations of the proposed BMPs are 1) the median of the I-84 eastbound and westbound roadways, between River Road and Route 131 (BMP Area Sites 1 and 3); 2) within the area bounded by I-84 exit 2 off ramp westbound, Shattuck Road and River Road (BMP Area Site 2) and 3) east of I-84 exit 2 on ramp eastbound and Haynes Road (BMP Area Site 4). All proposed BMPs are located within MassDOT right-of-way in the Town of Sturbridge, Massachusetts.

1.2 Project Goal

The goal of this project is to install the proposed infiltration-type BMPs to provide stormwater treatment and reduce effective impervious cover resulting in an improvement to water quality entering the Quinebaug River. Through the installation of the proposed infiltration-type BMPs and routing existing and proposed stormwater infrastructure to the proposed BMPs, direct impervious cover will be effectively disconnected from the Quinebaug River. The infiltration-type BMPs will provide treatment for approximately 2" of runoff from the surrounding sub-

catchment areas and will provide peak flow rate attenuation, TSS removal, filtration as well as groundwater recharge.

1.3 Project Background & Existing Conditions

The approximately 70-mile long Quinebaug River flows in an easterly direction and crosses beneath the I-84 eastbound and westbound roadways in Sturbridge, Massachusetts. This area is located just south of the I-84 tolls at the ramps to and from the Interstate 90 (I-90) exit 9 interchange.

The impaired segment of the Quinebaug River (MA41-02) is listed on the Massachusetts Department of Environmental Protection (MassDEP) final *Massachusetts Year 2012 Integrated List of Waters*. The Quinebaug River is listed as a Category 5, “Waters Requiring a TMDL”, classified as impaired for debris/floatables/trash, excess algal growth and turbidity.

The existing drainage infrastructure does not currently have any BMPs in place to mitigate for impervious cover and pollutants associated with stormwater runoff. Stormwater improvements through the installation of new drainage structures and BMPs will address impaired waters and mitigate the impact of impervious cover from the MassDOT roadways in these areas. Photos documenting existing conditions are provided in **Attachment A**.

1.4 Site Soils

The NRCS soil type along I-84 within the contributing Quinebaug River watershed is listed as predominantly Merrimack fine sandy loam. This soil type is classified as being hydrologic soil group A (HSG A), which is a well-draining soil that is conducive to infiltration.

CEI conducted exploratory test pits within the proposed project area to confirm soil types and groundwater elevations.

CEI completed numerous exploratory test pits within the proposed project area in December, 2013 and in April, 2015. These test pits were completed within the wooded and grassed areas of the I-84 median as well as in wooded and grassed areas to the east and west of I-84. Approximate depths of these test pits range from 5 feet to 7.5 feet. Based on the test pit data and analysis, the explorations confirmed the presence of Merrimack fine sandy loam within the grassed median north of the Quinebaug River (site 1). Additionally, Merrimack fine sandy loam as well as gravelly/sandy soils were found in the I-84 median south of the Quinebaug River (site 3). Test pits completed at sites 2 and 4 revealed the presence of sand and loamy sand soils, respectively. Test pit locations and logs are provided in **Attachment B**.

1.5 Resource Area Delineation

Using existing survey information, ground truthing, satellite imagery and GIS databases, CEI identified resource areas associated with the Quinebaug River including the top of bank, bordering vegetated wetlands, Land Subject to Flooding and Riverfront Area. The resource areas and associated buffers are shown on the Project Plans provided in **Attachment C**.

BMPs were specially designed and located to minimize impacts to resource areas and associated buffers. A small portion of the proposed stormwater drainage work was found to impact the 200-ft Riverfront Area at BMP Area Sites 3 and 4. The proposed Riverfront Area impacts are limited to catch basins, drain manholes, and drainage piping located within the existing pavement or along the shoulder of the highway which is intended to divert water to the proposed BMPs that are located outside sensitive resource areas. In addition, minor temporary impacts for grading and equipment access for construction will affect portions of previously disturbed 100-ft BVW buffer for BMP Area Sites 1 and 2 mainly within the median section of I-84.

2.0 Description of Proposed Work

The proposed work includes eleven infiltration swales at BMP Area Site 1, two infiltration basins at BMP Area Site 2, an infiltration basin and swale at BMP Area Site 3 and two infiltration basins BMP Area Site 4. In general the infiltration basins are graded depressions designed with forebay to provide pre-treatment and sediment removal. The infiltration swales consist of retrofitting existing median swales with vegetated stone check dams to provide sediment storage behind the check dam and promote infiltration through suitable existing underlying soils while safely passing the larger portion of the storms without causing erosion.

Locations of the proposed BMPs were carefully selected to minimize impacts to the Quinebaug River, Land Subject to Flooding, Riverfront Area, BVW and associated buffers, while providing the most effective impervious area treatment. Minor drainage modifications are required within the Riverfront Area and buffers to route the runoff to the BMPs and to minimize direct impacts from construction and BMP installations within the resource areas. The total affected Riverfront Area from the construction of these structures is approximately 1,600 square feet. Temporary impacts to previously disturbed BVW buffer are approximately 12,300 square feet with approximately 1,850 square feet of permanent impacts. The associated impacts from the proposed construction including access, grading, drainage structures and piping are shown in **Figure 2**.

The proposed BMPs will accommodate approximately 2-inches of stormwater runoff from the impervious area of Interstate 84, eastbound and westbound roadways from River Road, north to Route 131 (Main Street). The existing drainage system will be modified to divert stormwater runoff from the impervious area into infiltration basins adjacent to I-84 instead of being discharged, untreated, into Quinebaug River. As noted above, project plans detailing the proposed BMPs are provided in **Attachment C**.

2.1 Protective Measures

Measures will be taken to minimize sedimentation/siltation into the resource areas, corresponding buffer zones, and the surrounding community during construction activities. Implementation of accepted and usual methods of sedimentation erosion control will be used at the site during all phases of construction. Erosion control during construction will include the following:

- Compost filter tubes, or approved equivalent, will be placed as shown on the drawings to protect wetland resource areas.
- Compost filter tubes, or approved equivalent, will be staked in place with the grain of the material perpendicular to the ground. This will allow the erosion controls to conform to the landscape making it more effective.
- Erosion control devices will be inspected weekly and after each significant rainfall event. Any entrapped silt or other materials will be removed. Compost filter tubes and other devices will be replaced as necessary.
- Erosion control devices will remain in place locally until disturbed surfaces have been stabilized with the final vegetative cover in the area of disruption.
- Any necessary temporary soil storage will be placed in a specified staging area and be surrounded by compost filter socks, or an approved erosion control method.

Details of the erosion controls are illustrated on the project plans. An operation and maintenance plan has been included in **Attachment D**.

3.0 Activities Subject to Regulations

Although this project is intended to improve water quality, it is necessary to work partially within the 200-ft Riverfront Area and previously disturbed BVW buffer to do so. The construction proposed within the 200-ft Riverfront Area would consist of three drainage structures and approximately 200 linear feet of buried reinforced concrete pipe (RCP). Resource area impacts are shown on **Figure 2**.

3.1 Description of Resource Area Impacts

As noted previously the project is partially located within the 200-ft Riverfront Area, however, only drainage infrastructure designed to collect the stormwater is proposed within the Riverfront Area.

Equipment access and grading of the area around proposed vegetated check dams within the median portion of I-84 at a few locations are located within previously disturbed 100-ft BVW buffer.

The proposed project is located partially within a Priority Habitat of Rare Species and Estimated Habitat of Rare Wildlife as shown on the map provided by the MassGIS Online Data Viewer in **Appendix E**. Based on the provided map only very minor Riverfront Area impacts are proposed with the habitat limits. This work is associated with the installation of drainage structures and piping in the existing paved roadway or shoulders.

The three FIRM maps provided in **Attachment F** show cross sections with corresponding calculated 100-year floodplain elevations at various locations along the Quinebaug River. For the proposed stormwater improvements project site, however, a detailed study of the anticipated floodplain elevations has not been completed. CEI has assessed the upstream and downstream

locations of the Quinebaug River nearest to the project site that depicts detailed study information. A flood elevation of 567' is shown just upstream of the proposed project site and a flood elevation of 520' is shown for a location that is downstream of the proposed project site. According to the FIRM maps, the 100-year storm floodplain elevations increase to the north along the Quinebaug River and decrease to the south along the Quinebaug River. A 100-year flood elevation of approximately 570' has been assumed for the Quinebaug River at the location of the proposed project site near the I-84 crossing in Sturbridge. This estimate is slightly conservative, but shows that flows associated with the anticipated 100-year storm event would still be safely contained and would not flow over the existing river embankment during a 100-year storm event at the proposed project site. Therefore, it is apparent that the proposed project is not located within a FEMA Zone flood boundary or within areas of the 100-year flood plain. Elevations gathered from the FIRM maps and from the survey of the project area use the same vertical datum, NAVD 88.

3.2 Limited Project Status

Several sections of 310 CMR 10.00 provide for limited project status for improving inadequate drainage systems and improving the natural capacity of a resource area to protect the interests identified in the Wetlands Protection Act. The following limited project standards apply:

10.53(3)f ...maintenance and improvement of existing public roadways, but limited to widening less than a single lane, adding shoulders, correcting substandard intersections, and improving inadequate drainage systems.

10.53(4) ...projects which will improve the natural capacity of a resource area(s) to protect the interests identified...

4.0 Conclusion

MassDOT is proposing to implement this water quality improvement project under its Impaired Waters Program. Stormwater Best Management Practices will be installed within the watershed of the Quinebaug River as part of MassDOT's Impaired Waters Retrofit Initiative to improve water quality. The installation of new drainage structures and BMPs will address impaired waters and mitigate the impact of impervious cover from the MassDOT roadway in this area. No roadway expansion or increase in impervious area is proposed as part of the proposed BMP construction, the project is exclusively to treat stormwater runoff prior to reaching the Quinebaug River and is included as part of a larger resurfacing project which work falls under the Buffer Zone Minor Activity Exemption rule. The Resource Area impacts of the proposed BMP project are limited to the 200-ft Riverfront Area and a small portion of the previously disturbed 100-ft BVW buffer. MassDOT believes that the project as described in this NOI upholds the interests

of the Wetlands Protection Act and respectfully requests that the Commission issues an Order of Conditions.

5.0 DEP Stormwater Standards & Report

The following is an overview of project compliance with the ten stormwater standards. The installation of the above discussed infiltration basin will not create additional impervious area or stormwater volume. There will be no new discharges associated with this drainage system improvement project. The completed stormwater checklist is included as **Appendix G**. Supporting calculations to go along with the checklist are provided in **Appendix H**.

Standard 1. No New Untreated Discharges

This is a stormwater treatment project that will provide treatment to existing untreated stormwater runoff. No new untreated discharges are proposed.

Standard 2. Peak Rate Attenuation

No new impervious area is proposed. The infiltration-type BMP installations will reduce peak rates as well as total runoff volume by providing infiltration and recharge to groundwater.

Standard 3. Recharge

No new impervious area is proposed. The project will provide infiltration and an increase in recharge to groundwater thereby reducing effective impervious cover in the area.

Standard 4. Water Quality

The proposed infiltration-type BMPs will result in improvements to stormwater management, water quality, and increased groundwater infiltration. The infiltration-type BMPs will provide treatment for approximately 2” of runoff from the surrounding subcatchment area. Sediment forebays will be constructed to help capture any sediment prior to full treatment and discharge.

Standard 5. Land Uses with Higher Potential Pollutant Loads

N/A – The project is not in an area with higher potential pollutant loads.

Standard 6. Critical Areas

N/A- The project is not located within any Critical Areas.

Standard 7. Redevelopments and Other Projects Subject to the Standards Only to the Maximum Extent Practicable

This is a redevelopment project by way of stormwater treatment improvements.

Standard 8. Construction Period Pollution Prevention and Erosion and Sedimentation Control

Project includes about 7.2 acres of land disturbance within Sturbridge, MA and therefore a Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan will be required under the Construction General Permit which will be completed by the contractor following contract award. Erosion and sedimentation measures are discussed in Section 2.2 and identified on the project plans.

Standard 9. Operations & Maintenance Plan

An Operations and Maintenance (O&M) Plan for the drainage system improvements and the infiltration basin has been completed and is included at the end of this report. See **Appendix D** for the full O&M Plan.

Standard 10. Prohibition of Illicit Discharges

There are no illicit discharges to this drainage system.