

# MEMORANDUM

**DATE:** May 25, 2021

**ATTENTION:** Town of Millbury

**PREPARED BY:** Elizabeth Ennis, P.E.

**EMAIL:** [lennis@blcompanies.com](mailto:lennis@blcompanies.com)

**PROJECT NAME:** Downtown Revitalization Project – Phase 2, Millbury,  
Massachusetts

**PROJECT NUMBER:** 2001278

**SUBJECT:** Stormwater Management Summary

## Purpose

This memorandum has been prepared to demonstrate compliance with the Massachusetts Department of Environmental Protection (MassDEP) Stormwater Management Standards, the Town of Millbury Warrant Articles (Article 32), and the Millbury Municipal Code Chapter 13.15 for Phase 2 of the Downtown Revitalization Project (the Project).

## Project Description

The project is located along Elm Street from the intersection of Main Street to the intersection of River Street. The project includes the municipal parking lot between Elm Street and Grove Street. The Project's limit of disturbance is approximately 4.11 acres. The Town is proposing the following improvements: repave Elm Street from the municipal parking lot to River Street; improve pedestrian accessibility along Elm Street; upgrade the existing drainage system to incorporate rain gardens, porous pavers, and bioswales; and install new street trees and landscapes areas along the project site. According to the most current Zoning map, the Project is located in the Residential I district, the Business I district and the Industrial I district. The project lies within the Blackstone River Watershed. See Figure 1 for a Site Locus Plan of the project area. See Attachment B for the most current Zoning map.

## Existing Hydrology Conditions:

Under the existing conditions, the site is primarily impervious consisting of streets, sidewalks, brick paving and buildings with few green spaces. See Figure 2 for the Existing Drainage Map showing runoff areas. Stormwater runoff from EDA200 and EDA300 is collected in through a series of catch basin to an existing drainage system that flows to a subsurface stormwater chamber and ultimately discharges to the Blackstone River. Stormwater runoff from EDA100 and EDA400 is collected through a series of catch basin to an existing drainage system that discharges to the Blackstone River. The Natural Resources Conservation Service (NRCS) lists the on-site soils as Chatfield-Hollis-Rock (hydrology class B soil) and Merrimac fine sandy loam (hydrology class A soil).

The project is not subject to the Massachusetts Wetlands Protection Act (M.G.L. Chapter 131) as there are no MassDEP mapped wetlands in the proposed work area and there are no proposed improvements within 100 feet of any wetland buffer. Per the FEMA Flood Insurance Rate Map the proposed work is not located within a flood zone. The site does not contain, nor is it tributary to any critical areas as defined by MassDEP Stormwater Management Handbook. MassDEP has issued a draft Total Maximum Daily Load (TMDL) for the Blackstone River Watershed. The potential sources of pollution include urban runoff, illicit sewer connection, trash/debris, and turbidity.

### **Proposed Hydrology Conditions**

Under the proposed conditions, there will be approximately 3,100 sf of new porous pavers, 2,300 sf of new bioswales, and 4,600 sf of new rain gardens installed along Elm Street and municipal parking lot. The Project will result in a net reduction in impervious area of approximately 2,040 sf. Stormwater runoff from PDA200 and PDA300 will be collected through catch basins, porous pavers and rain gardens that will discharge to the existing drainage system and flow to a subsurface stormwater chamber system. The subsurface chamber system ultimately discharges to the Blackstone River. The subsurface stormwater chamber system is located within South Main Street and was installed during Phase I of this project. Stormwater runoff from PDA100 and PDA400 will be collected through a series of catch basin porous pavers and rain gardens to the existing drainage system and discharges to the Blackstone River. The porous pavers and rain gardens will provide groundwater recharge and treatment for the site's stormwater runoff. See Figure 3 for the Proposed Drainage Map.

### **Compliance with Massachusetts Stormwater Management Standards**

As demonstrated below, the Project complies with the MassDEP Stormwater Management Standards.

#### **Standard 1: No New Untreated Discharges**

The Project has been designed to fully comply with Standard #1. There are no wetlands or wetland buffer zones onsite. The new stormwater management components will discharge to the existing closed drainage network.

#### **Standard 2: Peak Rate Attention**

The Project was designed to mitigate post-development peak discharge rates for the 2-, 10-, 25-, and 100-year, 24-hour storms thus decreasing the pre-development peak discharge rates. A HydroCAD model, using the TR-55 methodology, was used to evaluate the site's existing and proposed drainage conditions. Proposed porous pavers were conservatively modeled as an impervious surface with curve number of 98 in the hydrologic model. The rain gardens and bioswales were modeled as grass cover in the hydrologic model. The hydrologic model did not include any infiltration or groundwater recharge components for the rain gardens, bioswales and porous pavements. See attachment E for HydroCAD results. Table 1 below provides a summary of peak runoff rates.

Table 1: Pre- & Post-development Runoff Rate Comparison

Storm Event	2 Year		10 Year		25 Year		100 Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Blackstone River	8.94 cfs	8.87 cfs	15.55 cfs	15.42 cfs	25.16 cfs	24.80 cfs	31.74 cfs	31.53 cfs

### Standard 3: Recharge

The Project has been designed to comply with Standard 3, to the maximum extent practicable. As stated above, there is a net decrease of impervious surfaces over the existing conditions, which improves the groundwater recharge. In addition, the rain gardens and porous pavers provide approximately 12,600 cf of recharge. This redevelopment project will significantly improve the groundwater recharge currently onsite and as a whole provides the required recharge volume (per MassDEP Stormwater Standards). Due to existing conditions site constraints, some areas of the site will be over recharged while other areas will not discharge to an infiltrative stormwater BMP. Supporting calculations can be found in Attachment F.

### Standard 4: Water Quality

The Project has been designed to comply with Standard 4 to the maximum extent practicable. As stated above, there is a net decrease of impervious surfaces over the existing conditions, which improves the water quality and Total Suspended Solids (TSS) removal. The rain gardens and porous pavers provide approximately 12,600 cf of water quality treatment. The deep hooded sump catch basins, bioswales, rain gardens and porous pavers will also provide TSS. The Town plans to implement an intensive street sweeping program which will provide increase the TSS removal rates. The water quality treatment and TSS removal rates will be drastically improved as a result of this redevelopment project; however, due to the existing site constraints water quality treatment and TSS removal could not be provided for all of the site's stormwater runoff. Supporting calculations are provided in Attachment F.

### Standard 5: Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

This Project is not considered a LUHPPL.

### Standard 6: Critical Areas

The site will not discharge stormwater near or to a critical area.

### Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

The Project qualifies as a redevelopment project. It fully complies with all standards of the Stormwater Management Handbook, with the exception of Standard 3, Recharge and Standard 4, Water Quality, which have been met to the maximum extent practicable. See above for a complete description.

### Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Stormwater Pollution Prevention Plan will be developed prior to construction to comply with Section 3 of the NPDES Construction General Permit for Stormwater Discharges; therefore the Project complies with Standard 8.

### Standard 9: Operation and Maintenance Plan

The Project has been designed to comply with Standard 9. An Operation and Maintenance Plan is included as Attachment G. The Operation and Maintenance complies with the Long-Term Pollution Prevention Plan (Standard 4) and the Long-Term Operation and Maintenance Plan (Standard 9) requirements of the MassDEP Stormwater Management Standards.

### Standard 10: Prohibition of Illicit Discharges

The proposed stormwater management BMPs will discharge into the existing drainage system. No statement is made with regard to the drainage system in portions of the system not included in the redevelopment project area. The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges.

### **Compliance with Millbury Article 32 Design Standards**

As demonstrated below, the proposed Project complies with the Millbury Article 32 Design Standards

#### **Low Impact Design Practices**

The proposed work incorporates low impact design practices such as reduction in impervious surfaces, limiting land disturbance during construction, promoting infiltration and the implementation of green infrastructure stormwater BMP. The Project includes the installation of 14 rain gardens, approximately 3,100 sf of porous pavers and 2,300 sf of bioswales.

#### **Groundwater Recharge**

As stated above, there is a net decrease in impervious surfaces over the existing conditions, which improves the groundwater recharge. As stated above, there is a net decrease of impervious surfaces over the existing conditions, which improves the groundwater recharge. In addition, the rain gardens and porous pavers provide approximately 12,600 cf of recharge. This redevelopment project will significantly improve the groundwater recharge currently onsite and as a whole provides the required recharge volume (per MassDEP Stormwater Standards). Due to existing conditions site constraints, some areas of the site will be over recharged while other areas will not discharge to an infiltrative stormwater BMP. Supporting calculations can be found in Attachment F.

#### **Pollutant Removal**

The Project is considered a Major Project on a redevelopment site and has been designed to meet the pollutant removal design requirements. The Town will be implementing an intensive street sweeping program which will improve the TSS removal rates. In addition, rain gardens, porous pavers, bioswales, and deep hooded sump catch basins will be installed for TSS removal. The required 80% TSS removal is provided for approximately 56% of the site. To improve the Total Phosphorous (TP) removal at the site bioswales, rain gardens, and porous pavers will be installed. The bioswales, rain gardens and porous pavers will remove 35% of the average annual TP load from the total post-construction impervious surfaces on the site. The rain gardens and porous pavement provide 12,600 cf of retention which is more than the total post-construction impervious surface area times 0.8 inches. See Attachment F for supporting calculations.

#### **Higher Potential Pollutant Loads**

As stated above, this Project is not considered a higher potential pollutant load.

#### **Critical Area**

As stated above, this Project is not located in a critical area.

#### **Erosion and Sediment Controls**

A Stormwater Pollution Prevention Plan will be developed prior to the construction to comply with Section 3 of the NPDES Construction General Permit for Stormwater Discharges and will comply with the latest edition of the *Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Area: A guide for Planners, Designers and Municipal Officials*.

#### **Operation and Maintenance Plan**

An Operation and Maintenance Plan is included as Attachment G.

#### Figures

- Figure 1 – Locus Map
- Figure 2 – Existing Drainage Map
- Figure 3 – Proposed Drainage Map
- Figure 4 – Rain Garden and Porous Paver Catchment Area

#### Attachments

- Attachment A – Millbury Stormwater Application; Submission of Stormwater Plan Review Checklist
- Attachment B - Zoning Map
- Attachment C – NRCS Soil Data
- Attachment D – NOAA Atlas Storm Data
- Attachment E – Pre-Development Hydrology Calculations; Post-Development Hydrology Calculations
- Attachment F – Water Quality Calculations; Recharge Calculations; TSS Removal Worksheets; Pollutant Removal Calculations
- Attachment G – Operation & Maintenance Plan
- Attachment H – Geotechnical Report

Attachments D-F are  
included in Reviewing  
Engineers copy only

## **ATTACHMENT A**

MILLBURY STORMWATER APPLICATION

MILLBURY SUBMISSION OF STORMWATER PLAN REVIEW CHECKLIST

**TOWN OF MILLBURY  
APPLICATON FOR STORMWATER PERMIT**

**APPLICANT:**

NAME Town of Millbury

STREET 127 Elm Street CITY/TOWN Millbury

STATE MA ZIP 02157 TELEPHONE 508-865-4754

NAME OF PROPERTY OWNER (if different from Applicant) Town of Millbury

Deed recorded in the Worcester District Registry of Deeds Book N/A Page \_\_\_\_\_

**SITE INFORMATION:** Elm Street from South Main Street to River Street  
and the parking lot adjacent to the Millbury Baptist  
STREET AND NUMBER Church

ZONING DISTRICT B1 & R1 ASSESSOR'S MAP/LOT #(S) 53-81

LOT SIZE N/A FRONTAGE N/A

CURRENT USE Public roads, parking lot and parks

**PROJECT PLAN INFORMATION:**

PLAN TITLE Town of Millbury Improvements to Millbury Downtown - Phase 2

PREPARED BY (name/address of PE/Architect) Nicholas Giardina PE  
BL Companies, 100 Constitution Plaza, 10th Floor  
Hartford, CT 06103

DATES May, 2021

USES FOR WHICH STORMWATER PERMIT IS SOUGHT  
Reconstruction of municipal parking lot and roadway

CITE ALL APPROPRIATE SECTIONS OF THE GENERAL BYLAW WHICH  
PERTAIN TO THIS APPLICATION; USE AND SITE: Chapter 13.15 Warrant 32

**TO THE MILLBURY PLANNING BOARD:**

The undersigned, being the Applicant named above, hereby applies for a Stormwater Permit to be granted by the Planning Board and certifies that, to the best of applicant's knowledge and belief, the information contained herein is correct and complete.

Applicant's Signature \_\_\_\_\_

Property Owner's Signature (if not Applicant) \_\_\_\_\_

**CHECKLIST**  
Millbury Planning Board  
Submission of Stormwater Plan Review

**Plan Name:** Millbury Downtown - Phase 2

Property Address: Elm St, Millbury Assessor's Map 53, Lot \_\_\_\_\_

Applicant's Name: Town of Millbury Address: 127 Elm St, Millbury, Ma Tel. No. 508-865-4754  
(If the applicant is not the owner, a notarized statement authorizing the applicant to act on the owner's behalf and disclosing his interest shall be submitted)

Owner's Name: Town of Millbury Address: 127 Elm St, Millbury, Ma Tel. No. 508-865-4754

Engineering Firm: BL Companies Address: 220 Norwood Park, Norwood, MA Tel. No. 781-619-9500

**Submission Checklist:**

- 1) Submission Fee of \$ \_\_\_\_\_ and Technical Review Fee of \$ ~~6,000~~ made payable to the Town of Millbury
- 2) One original Stormwater Management Plan and ten (10) copies thereof showing:
  - a) Names, addresses and telephone numbers of the owner, applicant and person(s) or firm(s) preparing the plan
  - b) Name of project, property address, assessor's map and lot number, the date, north arrow, names of abutters and scale
  - c) A locus map
  - d) The existing zoning, and land use at the site
  - e) The proposed land use
  - f) The location(s) of existing and proposed easements
  - g) The location of existing and proposed utilities
  - h) The site's existing & proposed topography with contours at one (1) foot intervals
  - i) The existing site hydrology
  - j) A description and delineation of existing stormwater conveyances, impoundments, and wetlands on or adjacent to the site or into which stormwater flows
  - k) A delineation of 100 year flood plains, if applicable
  - l) Estimated seasonal high groundwater elevation (November to April) in areas to be used for stormwater retention, detention or infiltration
  - m) The existing and proposed vegetation and ground surfaces with runoff coefficient for each
  - n) A drainage area map showing pre and post construction watershed boundaries, drainage area and stormwater flow paths
  - o) A description and drawings of all components of the proposed drainage system, including:
    - Locations, cross sections and profiles of all brooks, streams, drainage swales and their method of stabilization
    - All measures for the detention, retention or infiltration of water
    - All measures for the protection of water quality
    - The structural details for all components of the proposed drainage systems and stormwater management facilities
    - Notes on drawings specifying materials to be used, construction specifications and typicals
    - Expected hydrology with supporting calculations
  - p) Proposed improvements including locations of buildings or other structures, impervious surfaces, and drainage facilities if applicable
  - q) Timing schedules and sequence of development including clearing, stripping, rough grading, construction, final grading and vegetative stabilization
  - r) A maintenance schedule for the period of construction
- 3) One original Operation and Maintenance Plan and ten (10) copies thereof showing:
  - a) The names(s) of the owners(s) for all components of the system
  - b) Maintenance agreements that specify:
    - The names and addresses of the person(s) responsible for operation and maintenance
    - The person(s) responsible for financing maintenance and emergency repairs
    - A maintenance schedule for all drainage structures, including swales and ponds
    - A list of easements with the purpose and location of each
    - The signature(s) of the owner(s)



Note: The Planning Board may waive any of the above listed requirements if it believes that said requirement is not necessary based on the size and scope of the project. The applicant may petition the Planning Board prior to making a formal application to request notification as to which sections (s) of the stormwater plan review by-law requirements are necessary. The Planning Board will then notify the applicant within thirty (30) days as to which sections relate to the proposed project based on the size and scope of the project.

The Millbury Planning Board has accepted the submission of the above Stormwater Plan. This document certifies that, as currently submitted, the Stormwater Plan meets the minimum submission guidelines as set forth by the Town of Millbury. This document certifies that the Stormwater Plan is officially accepted for Planning Board review and consideration. It does not constitute approval of the Stormwater Plan.

Town Planner/Planning Board Clerk Signature \_\_\_\_\_ Date \_\_\_\_\_

## Stormwater Submission Checklist

1. See attached correspondence
2. See Stormwater memorandum and attachment
  - a. See title block on plan set
  - b. See title block on plan set
  - c. See Stormwater memorandum (Figure 1)
  - d. See Stormwater memorandum (Attachment B)
  - e. See Stormwater memorandum and Plan Set
  - f. See Existing Conditions Map
  - g. See Grading and Drainage Plan
  - h. See Grading and Drainage Plan
  - i. See Stormwater Memorandum (Figure 2 and Attachment E)
  - j. See Existing Conditions Map and Stormwater Memorandum
  - k. N/A
  - l. See Stormwater Memorandum (Attachment H)
  - m. See Stormwater Memorandum (Figures 2&3 and Attachment E)
  - n. See Stormwater Memorandum (Figures 2&3)
  - o. See Grading and Drainage Plan
    - N/A
    - See Grading and Drainage Plan; See Construction Details
    - See Grading and Drainage Plan; See Construction Details
    - See Stormwater Memorandum (Figure 3 and Attachment E)
  - p. See Grading and Drainage Plan
  - q. See Stormwater Memorandum
  - r. See Stormwater Memorandum
3. See Operation & Maintenance Manual found in Attachment G of the Stormwater Memorandum
  - See page 3
  - See page 3
  - See page 9
  - See page 4
  - See page 6

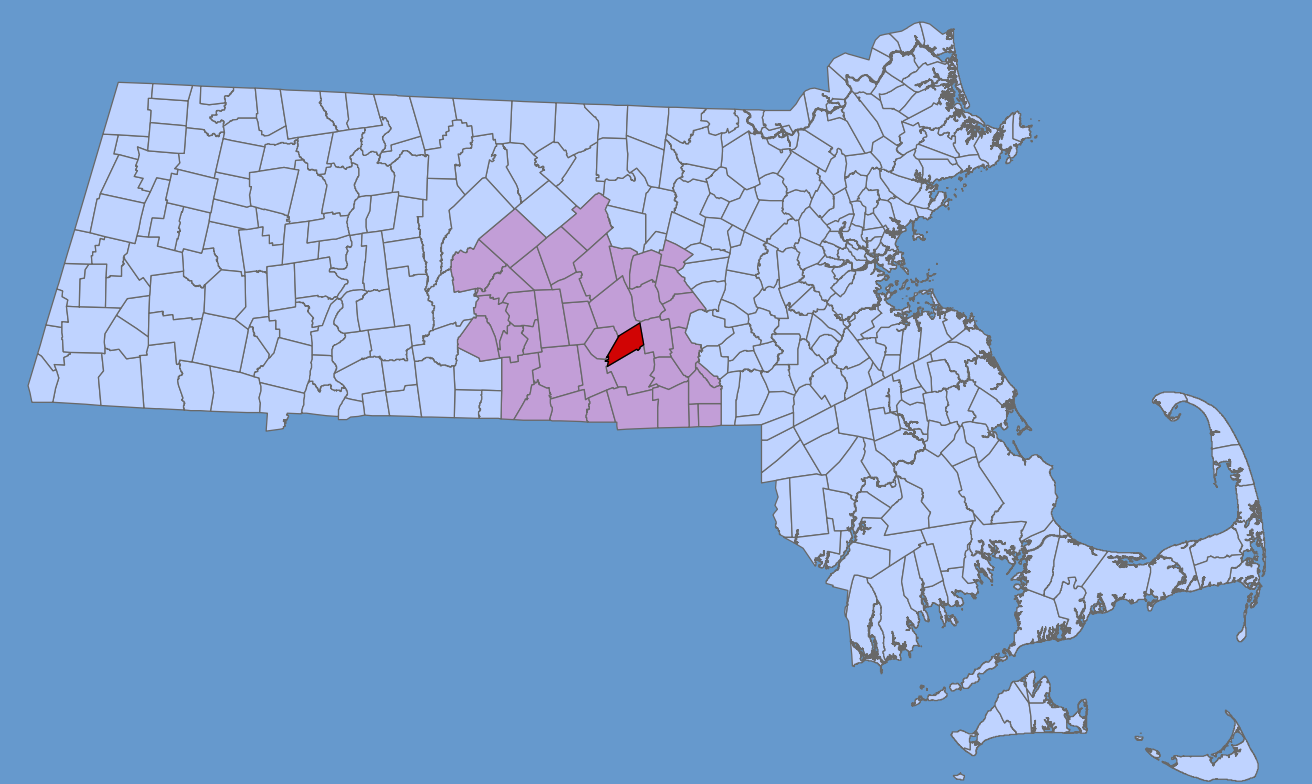
## **ATTACHMENT B**

MILLBURY ZONING MAP

Town of Millbury Dimensional Regulations <i>(See Millbury Zoning Bylaws for More Information)</i>									
Zoning Code	Zoning District	Area Without Water or Sewer (Sq. Ft.)	Area With Water (Sq. Ft.)	Area With Sewer (Sq. Ft.)	Area With Water & Sewer (Sq. Ft.)	Minimum Frontage (Ft.)	Minimum Front Yard (Ft.)	Minimum Side Yard (Ft.)	Minimum Rear Yard (Ft.)
R-1	Residential I	40,000	32,000	20,000	12,500	100	25	10	10
R-1	Residential II	40,000	32,000	20,000	12,500	100	25	10	10
R-1	Residential III	40,000	32,000	20,000	12,500	100	25	10	10
S-1	Suburban I	40,000	60,000	40,000	60,000	150	25	10	10
S-1	Suburban II (B) (B) (C) (D)	80,000	80,000	80,000	80,000	200	25	10	10
S-2	Suburban II	40,000	32,000	15,000	15,000	150	25	10	10
S-3	Suburban III	40,000	32,000	20,000	20,000	150	25	10	10
S-4	Suburban IV	40,000	32,000	20,000	20,000	150	25	10	10
BV	Bramanville Village (see note)	5,000	5,000	5,000	5,000	60	7	10	10
B-1	Business I	12,500	12,500	12,500	12,500	100	25	10	10
B-1	Business I - All Other	No Minimum	No Minimum	No Minimum	No Minimum	No Minimum	No Minimum	No Minimum	No Minimum
B-2	Business II	12,500	12,500	12,500	12,500	100	25	10	10
B-2	Business II - All Other	16,000	16,000	16,000	16,000	250	25	10	10
I-1	Industrial I	80,000	80,000	80,000	80,000	150	30	20	20
I-2	Industrial II	80,000	80,000	80,000	80,000	200	30	20	20

\*The front yard setback requirement for a property containing exclusively residential uses shall be a minimum of 18' and a maximum of 25'. The front yard setback requirement for a property containing nonresidential uses or mixed uses shall be a minimum of 0' and a maximum of 18'.

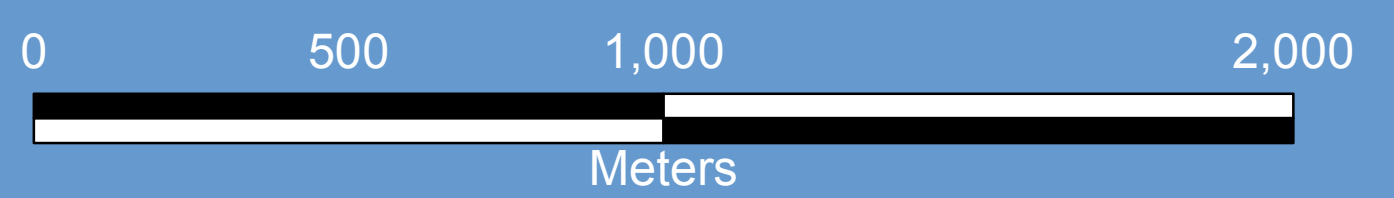
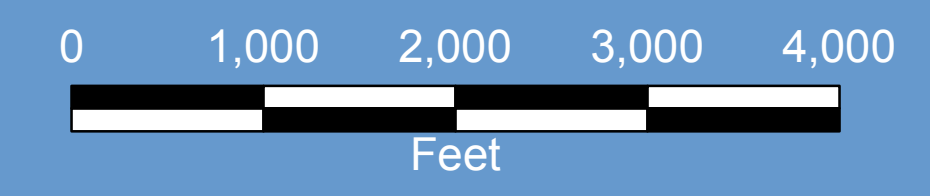
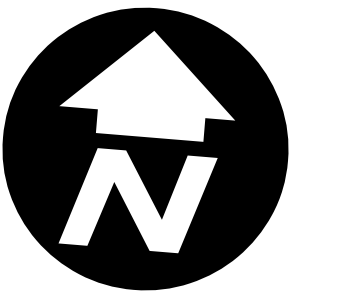
# TOWN OF MILLBURY OFFICIAL ZONING MAP



## Legend

### Zoning and Overlay Districts

- Residential I
- Residential II
- Residential III
- Suburban I
- Suburban II
- Suburban III
- Suburban IV
- Bramanville Village
- Business I
- Business II
- Industrial I
- Industrial II
- Route 146 Highway Corridor Overlay District
- Residential Office Overlay
- Adaptive Reuse Overlay
- Aquifer Protection Overlay Area A
- Aquifer Protection Overlay Area B
- Municipal Boundary
- Mass. Turnpike
- Major Road
- Public Road
- Private Road
- Active Rail
- Abandoned Rail
- Stream
- Intermittent stream



Source data:  
Traditional zoning and zoning overlay developed by CMRPC and the Town of Millbury.  
Hydrography derived from USGS Digital Line Graph files and later enhanced by MassGIS.  
Road centerlines derived from MassDOT.



Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

Produced by the GIS Program at  
Central Massachusetts Regional Planning Commission  
One Mercantile Street, Suite 520, Worcester, MA 01608  
Phone: 508.756.7717

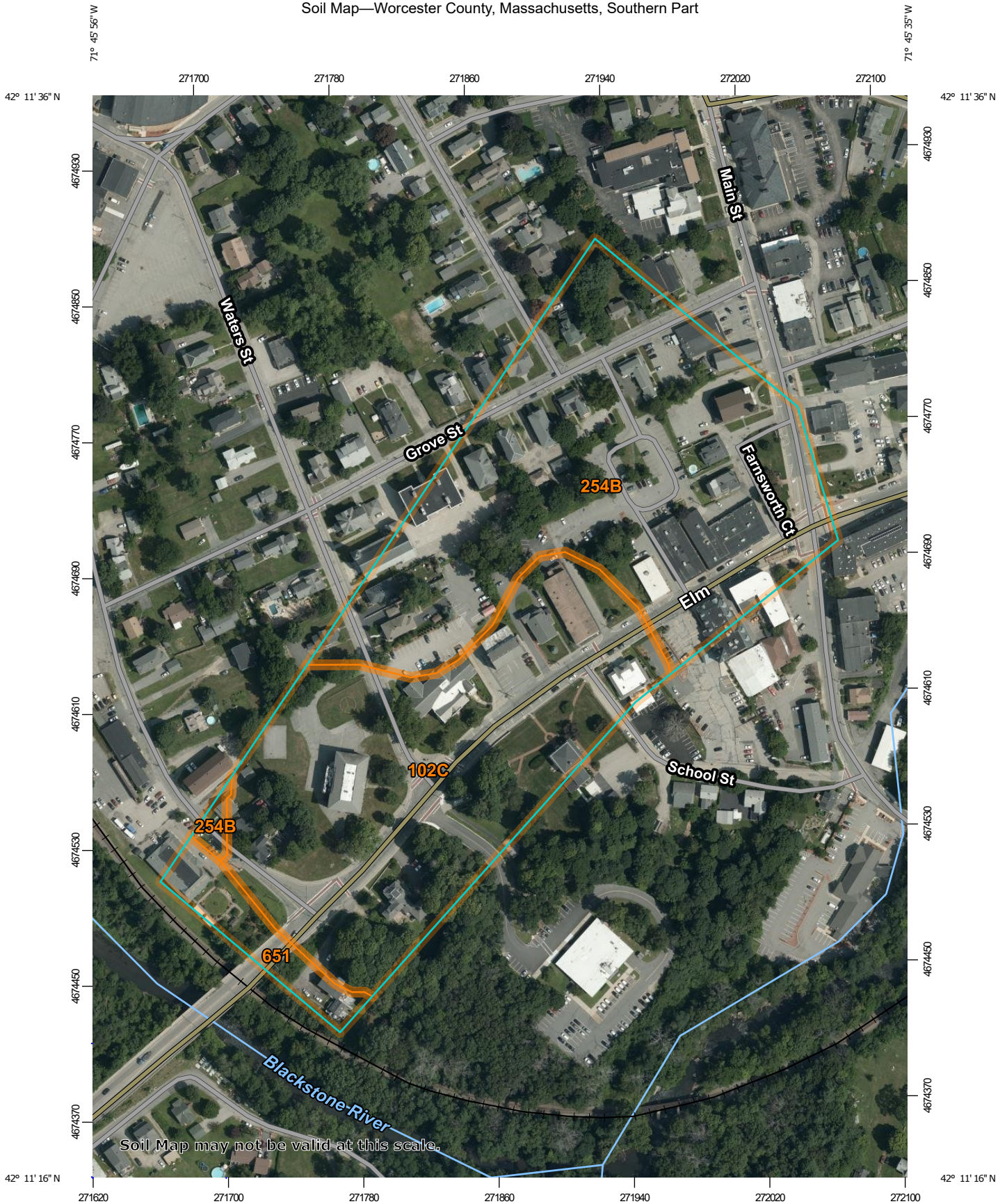
Map Edited September 19, 2018

REVISED BY	DATE
Michael Morin	Draft, April 11, 2005
Michael Morin	Final Draft, April 26, 2005
Matthew Franz	Over Update, Apr 26, 2007
Matthew Franz	Over Update, Oct. 2009
Matthew Franz	Over Update, Nov. 2010
Matthew Franz	Zoning Update, Aug. 18, 2014
Matthew Franz	Zoning Update, Oct. 2015
CMRPC	May 1 <sup>st</sup> , 2018 TM Article

## **ATTACHMENT C**

NRCS SOIL DATA

Soil Map—Worcester County, Massachusetts, Southern Part



Map Scale: 1:3,100 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84



### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)




















**Soils**

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

**Special Point Features**






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


**Water Features**

 Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

**Warning:** Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Worcester County, Massachusetts, Southern Part  
 Survey Area Data: Version 13, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 26, 2019—Oct 5, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	8.6	44.0%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	10.0	51.4%
651	Udorthents, smoothed	0.9	4.5%
<b>Totals for Area of Interest</b>		<b>19.5</b>	<b>100.0%</b>



Hydrologic Soil Group—Worcester County, Massachusetts, Southern Part



Map Scale: 1:3,100 if printed on A portrait (8.5" x 11") sheet.

0 45 90 180 270 Meters

0 150 300 600 900 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84



### MAP LEGEND

**Area of Interest (AOI)**









 Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**





-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

**Soil Rating Lines**

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

**Soil Rating Points**



-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

**Water Features**

 Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

**Warning:** Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Worcester County, Massachusetts, Southern Part  
 Survey Area Data: Version 13, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 26, 2019—Oct 5, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	B	8.6	44.0%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	10.0	51.4%
651	Udorthents, smoothed	A	0.9	4.5%
<b>Totals for Area of Interest</b>			<b>19.5</b>	<b>100.0%</b>

### Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

## **ATTACHMENT G**

### OPERATION & MAINTENANCE PLAN

# **Operation and Maintenance Manual**

*For the Proposed:*

## **Downtown Revitalization Project – Phase 2**

*Located at:*

**Elm Street  
Millbury, Massachusetts**

*Prepared for Submission to:*

**Town of Millbury, MA**

May 17, 2021

*Prepared for:*

**Town of Millbury**

*Prepared by:*

**BL Companies**

220 Norwood Park South, Suite 201

Norwood, MA 02062

Phone: (781) 619-9500

Fax: (203) 630-2615

BL Project Number: 2001478

## Table of Contents

### Contents

<b>GENERAL OVERVIEW .....</b>	<b>3</b>
PURPOSE & GOALS .....	3
SITE OWNER.....	3
RESPONSIBLE PARTIES .....	3
EASEMENTS .....	4
MAINTENANCE LOGS AND CHECKLISTS .....	4
FORMS .....	4
EMPLOYEE TRAINING.....	4
TOWN AND CONTRACTOR INFORMATION .....	5
<b>LONG TERM POLLUTION PREVENTION PLAN .....</b>	<b>7</b>
STORAGE OF MATERIALS AND WASTE.....	7
VEHICLE WASHING .....	7
ROUTINE INSPECTIONS AND MAINTENANCE OF STORMWATER BMPS.....	7
SPILL PREVENTION.....	7
MAINTENANCE OF LANDSCAPED AREAS .....	7
STORAGE AND USE OF FERTILIZERS AND PESTICIDES.....	7
SNOW AND DEICING MANAGEMENT .....	8
<i>Trash Collection</i> .....	8
<i>Maintaining Native Vegetation</i> .....	8
<i>Dumping</i> .....	8
<i>Illicit Discharge</i> .....	8
<b>STORM WATER MANAGEMENT .....</b>	<b>9</b>
SYSTEM COMPONENTS .....	9
<i>Porous Pavers</i> .....	9
<i>Catch Basins, and Manholes</i> .....	9
<i>Rain Gardens</i> .....	10
<i>Bioswales</i> .....	10
<i>Street/Parking Lot Sweeping</i> .....	11
<b>OPERATIONS AND MAINTENANCE LOG FORM.....</b>	<b>12</b>

## General Overview

The subject site is located along Elm Street from the intersection of Main Street to the intersection of River Street in Millbury, MA. The project site also includes the municipal parking lot adjacent to the Millbury Baptist Church.

The purpose of the Project is to revitalize the downtown Millbury area and municipal parking lot as well as improvement the existing stormwater management treatment components along the project area.

The following Operations and Maintenance Plan was prepared specifically for the Downtown Revitalization Project – Phase 2 in Millbury, Massachusetts. The Plan was developed to satisfy the Massachusetts DEP and Town of Millbury requirements.

### Purpose & Goals

The purpose of this Operations and Maintenance Plan is to ensure that the facility is operated in accordance with all approvals and permits. The primary goal is to inform the Town about how the system operates and what maintenance items are necessary to protect downstream watercourses. The secondary goal is to provide a practical, efficient means of maintenance planning and record keeping verifying permit compliance.

### Site Owner

Site Owner:           The Town of Millbury  
                              127 Elm Street  
                              Millbury, MA 01527

Responsible Party:   The Town of Millbury

The Town of Millbury shall maintain ownership of the stormwater management system as well as the responsibility for operation and maintenance during the post-development stages of the project. The site has been inspected for erosion and appropriate measures have been taken to permanently stabilize any eroded areas. All aspects of the stormwater BMPs have been inspected for damage, wear and malfunction, and appropriate steps have been taken to repair or replace the system or portions of the system so that the stormwater at the site may be managed in accordance with the Stormwater Management Standards.

### Responsible Parties

The Town of Millbury will be responsible for implementing the Plan on the subject site. The Town of Millbury may retain a management company to oversee the maintenance of the site.



### Easements

There are no Stormwater Maintenance Easements. The stormwater management system is the Elm Street right-of-way and the municipal parking lot.

### Maintenance Logs and Checklists

The Town will maintain a log of all inspections and maintenance activities performed in the past three years. The Operation and Maintenance Log includes information related to inspections, repairs, and disposal of the project's stormwater management system. Copies of inspection reports and maintenance records shall be kept at the Town of Millbury Department of Public Work's office. The Log is located at the end of this manual.

The Operation and Maintenance Log shall be made available to the Conservation Commission and MassDEP. The Conservation Commission and MassDEP shall be allowed to enter and inspect the premises to evaluate and ensure that the responsible party complies with the maintenance requirements for each BMP.

### Forms

The following forms will be developed for annual maintenance. Copies of the forms will be kept on-site as part of the Storm Water Management Plan.

- Annual Checklist
- Semi-Annual Checklist
- Monthly Checklist

### Employee Training

The Town will have an employee-training program, with annual updates, to ensure that the employees charged with maintaining the site are educated in the general concepts of stormwater management. The Operation and Maintenance Manual will be reviewed with the appropriate employees. The employees will be trained on the proper course of action for specific events expected to be incurred during routine maintenance or emergency situations. All sub-contractors will be informed of special requirements and responsibilities.

Town and Contractor Information

The names of the Town and any maintenance contractors are to be provided below when known.

Owner	Name:
	Responsible Person:
	Phone:
	Email:
	Address:
Person(s) Responsible for Financing Maintenance and Emergency Repairs	Name:
	Responsible Person:
	Phone:
	Email:
	Address:
Contractor	Name:
	Responsible Person:
	Phone:
	Email:
	Address:

**Owner:**

I have read this Operation and Maintenance manual and understand the maintenance and inspection procedures and schedule.

\_\_\_\_\_  
Signature Date

Printed Name: \_\_\_\_\_

**Responsible Person:**

I have read this Operation and Maintenance manual and am the responsible party for implementing maintenance and inspection procedures and schedule.

\_\_\_\_\_  
Signature Date

Printed Name: \_\_\_\_\_

**Person(s) Responsible for Financing Maintenance and Emergency Repairs:**

I have read this Operation and Maintenance manual and am the responsible party for financing maintenance and emergency repairs.

\_\_\_\_\_  
Signature Date

Printed Name: \_\_\_\_\_

## **Long Term Pollution Prevention Plan**

This section has been designed to comply with Standard 4 of the 2008 MassDEP Stormwater Management Handbook, this section outlines source control and pollution prevention measures to be employed on-site after construction

### Storage of Materials and Waste

The site shall be kept clear of trash and debris. Certain materials and waste will be stored inside or outside upon an impervious surface and covered, as required by local/state law.

### Vehicle Washing

No commercial vehicle washing shall take place on site.

### Routine Inspections and Maintenance of Stormwater BMPS

Stormwater BMPs shall be routinely maintained in accordance with this manual.

### Spill Prevention

A contingency plan shall be implemented to address the spill or release of petroleum products and hazardous materials. The plan will include these components:

- Equipment to quickly address accidental spills/leaks will be stored onsite in a safe location. Such equipment will include: goggles, gloves, safety boots, fire extinguishers, sand, shovels, absorbent materials, storage containers and first aid equipment.
- Spills/leaks shall be treated appropriately according to the material, volume and location of spill. Mitigation shall include prevention of further spilling, containing the spill, removing the spilled material, and remediation if necessary.
- In the case of a large spills Massachusetts DEP Hazardous Waste Incident Response Group will be contacted and an emergency response contractor will be consulted.

### Maintenance of Landscaped Areas

Landscaped areas will be maintained regularly by the Town. Landscaped stormwater BMPs will be maintained in accordance with this manual.

### Storage and Use of Fertilizers and Pesticides

All fertilizers and pesticides shall be stored in accordance with applicable local, state and/or federal law. The rate and use of fertilizers and pesticides will not exceed local, state and/or federal specifications.

### Snow and Deicing Management

Snow removal and use of deicing materials at the site will comply with following guidelines:

- Plowed snow shall be placed in the areas designated outside the stormwater BMPs and any wetland. The following measures will be followed at all snow disposal sites:
  - Trash and debris will be removed from the area before using it for snow disposal.
  - Trash, debris, and accumulated sediments will be removed from the stormwater BMP areas at the end of the season (no later than May 15).
  - Per MGL, Chapter 85, Section 7A, salt and de-icing chemicals will be stored indoors. Salt and deicing chemicals will be stored per MGL.
  - Sand piles will be contained and steps will be taken to prevent sand from entering any wetlands/water bodies, and covered if possible.
  - The rate of salt usage on proposed parking will not exceed state/local requirements.

### Trash Collection

All trash will be contained in litter/recyclable receptacles or dumpster enclosures. Trash will be collected on a regular basis and disposed of legally off-site.

### Maintaining Native Vegetation

Existing vegetation around the perimeter of the project site will be maintained in its native condition. No clearing, grading, stockpiling, storage, or development will occur in these areas. from sidewalk and parking areas as soon as practical during and after winter storms.

### Dumping

No dumping of any kind, solid or liquid, either onsite or into the adjacent Stream/wetland systems is allowed.

### Illicit Discharge

Discharging any substance or creating any connection to the existing or proposed stormwater management system other than those as shown on the design plans provided with this operation and maintenance plan is strictly prohibited.

## Storm Water Management

### System Components

The storm water management system has several components that are shown on the Operation & Maintenance Plan (OM-1), and they perform various functions in treating storm water runoff. Stormwater management updates proposed as part of this project include approximately 4,600 sf rain gardens, 3,100 sf of porous pavers, 2,300 sf of bioswales and 6 new catch basins with deep hooded sumps. Maintained properly, these BMPs will promote infiltration and improve water quality.

### Porous Pavers

Frequent cleaning and maintenance of pervious pavers/pavement is critical to prevent clogging. The required operation and maintenance measures include the following:

- No winter sanding shall be conducted on the porous asphalt.
- Salt use during winter months shall be minimized.
- Adjacent landscaped areas shall be well maintained to prevent soil from being transported onto pavement.
- Surface of pervious pavers/pavement shall be cleaned using vacuum sweeping machines monthly.
- Pervious pavers/pavement shall be monitored regularly to ensure proper drainage after storm events.
- Pervious pavers/pavement shall never be resealed or repaved with impermeable materials.
- Surface shall be inspected annually for deterioration.
- Pervious pavers/pavement area shall be inspected annually for evidence of ponding. If ponding is observed, the area shall be graded to induce sheet flow conditions.

### Catch Basins, and Manholes

The Town is responsible for cleaning the catch basins and manholes associated with this project. A Massachusetts licensed hauler shall clean the sumps and dispose of removed sand legally. The road sand may be reused for winter sanding. As part of the hauling contract, the hauler shall notify the Town in writing where the material is being disposed.

Each catch basin, and manhole shall be inspected every four months, with one inspection occurring during the month of April. Any debris occurring within one foot from the bottom of each sump by Vacuum "Vactor" type of maintenance equipment.

During the inspection of each of the catch basin sumps, the hoods on each of the outlet pipes shall also be observed. In the event that a hood is damaged or off the hanger, it shall be reset or repaired.

**Rain Gardens**

Rain gardens are shallow depressions filled with sandy soil, topped with a thick layer of mulch, and planted with dense native vegetation. There proposed rain gardens are exfiltration rain gardens and are designed to recharge groundwater in addition to acting as a filter.

This operating and maintenance procedure shall apply to proposed rain gardens within the project area. Annual maintenance of all rain garden components, including plants, soil, and mulch, shall be performed to ensure the overall success. Specific maintenance activities and their required frequency are outlined in the table below.

**Maintenance Schedule: Rain Gardens**

<b>Activity</b>	<b>Time of Year</b>	<b>Frequency</b>
Inspect for soil erosion and repair	Year round	Monthly
Inspect for invasive species and remove if present	Year round	Monthly
Remove trash	Year round	Monthly
Mulch Void Areas	Spring	Annually
Remove dead vegetation	Fall and spring	Bi-annually
Replace dead vegetation	Spring	Annually
Prune	Spring or fall	Annually
Replace all media and vegetation	Late spring/early summer	As needed

When failure is discovered, excavate the rain garden area, scarify the bottom and sides, replace the filter fabric and soil, replant vegetation, and mulch the surface.

Never store snow within a rain garden. This would prevent the recharge and water quality treatment of ground water.

**Bioswales**

The maintenance and inspection schedule should take into consideration the effectiveness of the bioswale. Inspect the bioswale the first few months after construction to make sure that there is no filling or gullyng, and that vegetation in the channels is adequate. Thereafter inspect the bioswale twice a year for slope integrity, soil moisture, vegetative health, soil stability, soil compaction, soil erosion, ponding and sediment accumulation.

Specific maintenance activities and their required frequency are outlined in the table below.

**Maintenance Schedule: Bioswales**

<b>Activity</b>	<b>Frequency</b>
Inspect bioswale to make sure vegetation is adequate and for signs of rilling and gullyng. Repair any rills or gullies. Replace dead vegetation	The first few months after construction and twice a year thereafter
Mow	As necessary. Grass heigh shall not exceed 6 inches
Remove sediment and debris manually	At least once a year
Reseed	As necessary. Use of road salt or other deicers during the winter will necessitate yearly reseeding in the spring.

Street/Parking Lot Sweeping

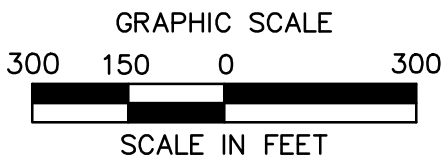
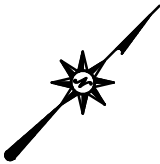
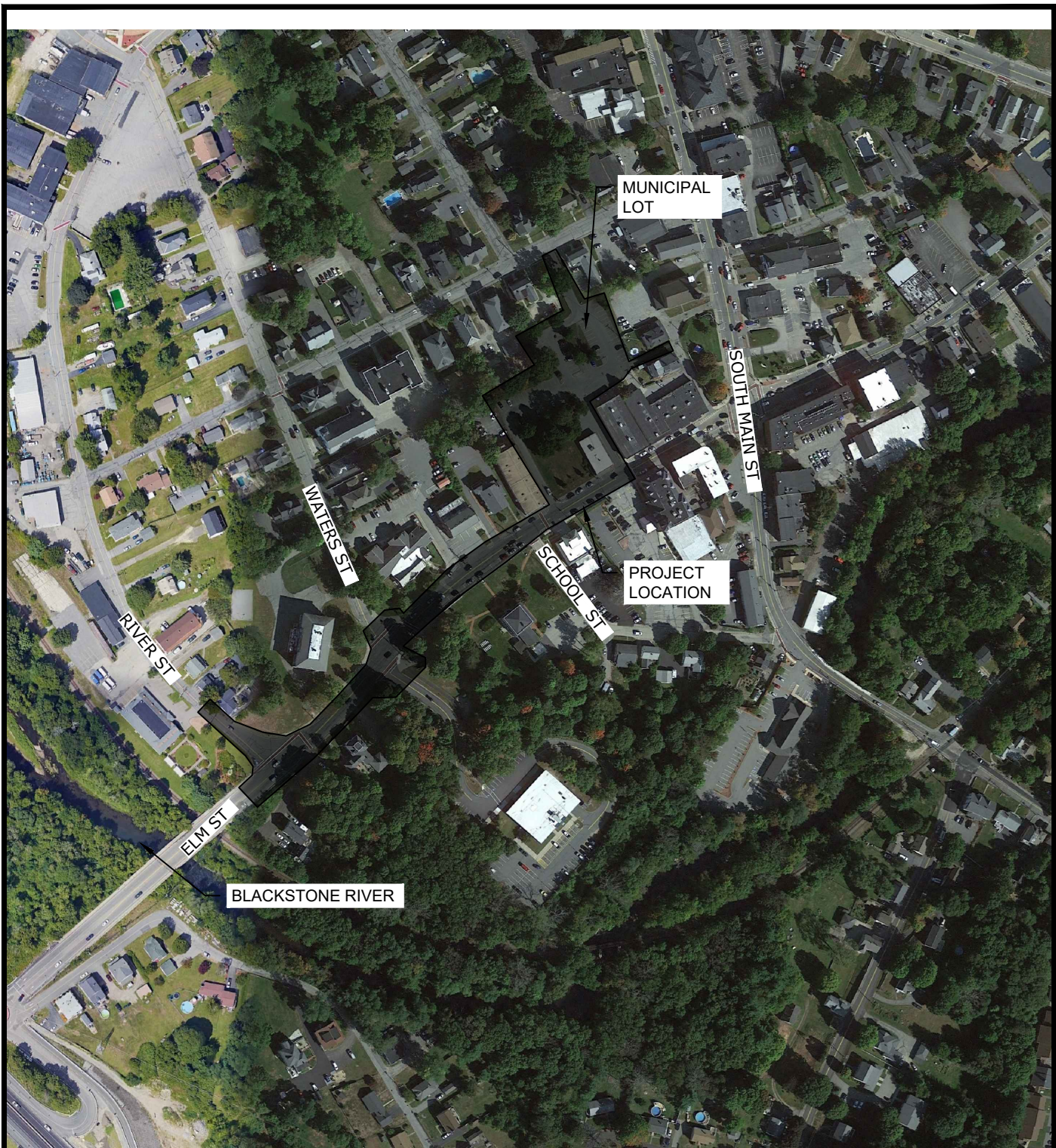
Street sweeping has significant impacts on the function of drainage infrastructure and receiving water quality. For this reason, it is included as necessary operation and maintenance activities related to drainage improvements for this project. Street sweeping shall be conducted bi-annually and shall at a minimum include sweeping or vacuuming paved surfaces and properly dispose of cleanings. Streets and sidewalks should be swept once in the Spring when snowfall events have ceased, and once in the fall following leaf collection.



## Operations and Maintenance Log Form

Inspection Type	Inspection Date	Inspector Initials
Rain Garden	_____ _____ _____	_____ _____ _____
Permeable Pavers/Pavement	_____ _____ _____	_____ _____ _____
Catch Basins, Manholes	_____ _____ _____	_____ _____ _____
Landscaping	_____ _____ _____	_____ _____ _____

**ATTACHMENT H**  
GEOTECHNICAL REPORT



**BL**  
**Companies**  
 ARCHITECTURE  
 ENGINEERING  
 ENVIRONMENTAL  
 LAND SURVEYING

**DOWNTOWN  
 REVITALIZATION PROJECT**  
 ELM STREET  
 MILLBURY, MASSACHUSETTS

Designed  
 Drawn  
 Checked  
 Approved  
 Scale  
 Project No.  
 Date  
 CAD File

E.A.E.  
 E.A.E.  
 1"=1,000'  
 200147801  
 4/14/2021  
 RText (RText)

**FIGURE 1**  
 LOCUS PLAN



**PROPOSED HYDROLOGY**

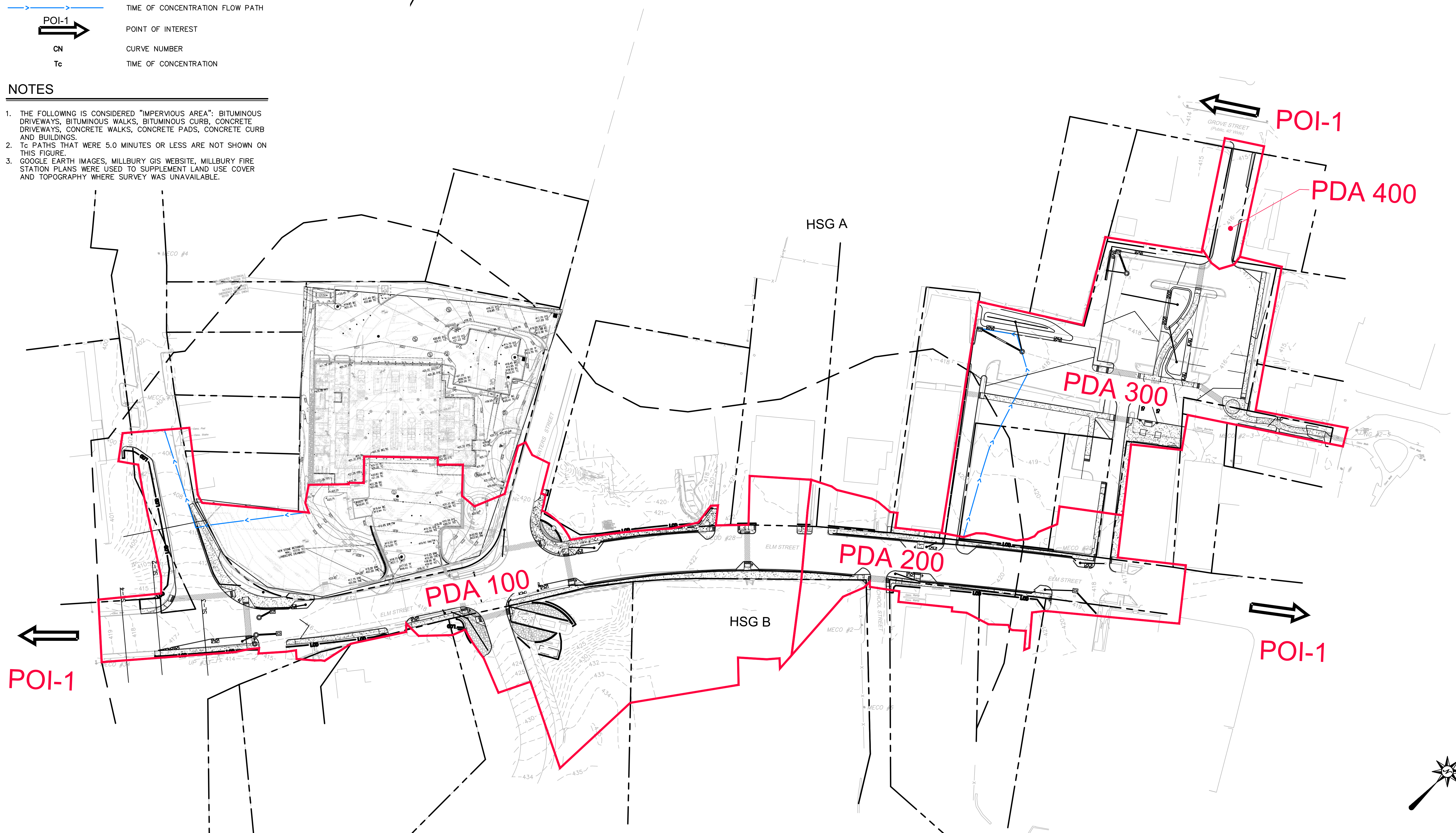
DRAINAGE AREA	TOTAL AREA (S.F.)	IMPERVIOUS AREA (S.F.)	PERVIOUS AREA (S.F.)	PERCENT IMPERVIOUS (%)	CN	Tc (MIN.)
PDA 100	133,268	79,003	54,265	59.4%	83	7.8
PDA 200	37,217	28,034	9,183	75.3%	88	5.0
PDA 300	71,351	42,401	28,950	59.4%	76	8.5
PDA 400	5,336	3,555	1,781	66.6%	78	5.0

**LEGEND**

- PROPERTY LINE
- EXISTING DRAINAGE AREA BOUNDARY
- TIME OF CONCENTRATION FLOW PATH
- POINT OF INTEREST
- CURVE NUMBER
- TIME OF CONCENTRATION

**NOTES**

- THE FOLLOWING IS CONSIDERED "IMPERVIOUS AREA": BITUMINOUS DRIVEWAYS, BITUMINOUS WALKS, BITUMINOUS CURB, CONCRETE DRIVEWAYS, CONCRETE WALKS, CONCRETE PADS, CONCRETE CURB AND BUILDINGS.
- Tc PATHS THAT WERE 5.0 MINUTES OR LESS ARE NOT SHOWN ON THIS FIGURE.
- GOOGLE EARTH IMAGES, MILLBURY GIS WEBSITE, MILLBURY FIRE STATION PLANS WERE USED TO SUPPLEMENT LAND USE COVER AND TOPOGRAPHY WHERE SURVEY WAS UNAVAILABLE.



PERMIT SET

REVISIONS	
No.	Date

Designed	L.A.E.
Drawn	L.A.E.
Reviewed	XXX
Scale	1"=50'
Project No.	2001478
Date	May, 2021
CAD File:	PD200147801

Title  
**PROPOSED DRAINAGE MAP**

Sheet No.

**FIG. 3**

5/25/2021, LENHS, C:\120320\1\WORK\DWG\PD200147801.DWG (PLOT) 1:24000, 50% SCALE

© 2021 BL COMPANIES, INC. THESE DRAWINGS SHALL NOT BE UTILIZED BY ANY PERSON, FIRM OR CORPORATION WITHOUT THE SPECIFIC WRITTEN PERMISSION OF BL COMPANIES.

