



## STORMWATER DRAINAGE ANALYSIS

### PROPOSED SITE PLAN

179 Main Street  
(Parcel IDs: 27-B-15)  
Sturbridge, MA 01566

### BEI JOB NUMBER

12-627

### DATE PREPARED

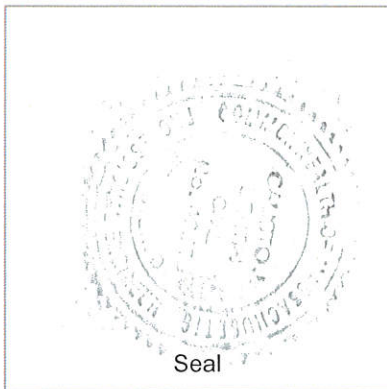
June 21, 2019

### OWNER:

179 Main, LLC  
179 Main Street  
Sturbridge, MA 01566

### PREPARED BY:

Calisto J. Bertin, P.E.



Seal

Calisto J. Bertin, PE  
MA License No. 40595

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## Site Overview

### EXISTING

The existing property, 175 Main Street, is located within Sturbridge's Commercial District. The property consists of 4.2<sup>+/-</sup> acres, and is partially. There is currently a 13,400 sf multi-tenant commercial building on the property. Abutting properties surrounding the site are commercial with single-family homes to the north and undeveloped wooded land to the east. There are wetlands within the proposed site, so Conservation approval will be required. The site contains soils of C Hydrologic Soil Groups. Under existing conditions, stormwater runoff from the front of the site flows to the north towards the undeveloped portion of the site

### PROPOSED

A portion of the parking lot which is gravel and R.A.P. will be converted entirely to R.A.P. The current R.A.P. are of the parking lot was previously vegetated as shown on 2011-2012 aerial photos provided by the Conservation Commission.

The proposed stormwater system will consist of infiltration structures designed to capture a portion of the runoff from the existing roof area and parking lot. The collected amount of runoff will offset the amount of additional runoff created by the change in surface coverage. Ground water recharge for the site will be achieved via the infiltration structures. through the proposed infiltration basin and the subsurface recharge trench in the rear of the site.

There is no direct impact to the wetlands, however work is proposed within a wetland buffer zone. Therefore, Conservation Commission Approval is required. The wetland will be protected at all times during construction with appropriate erosion control measures.

**Drainage Analysis Summary**

**SUMMARY**

The proposed development will include infiltration structures to handle the increase in runoff volume created by the change in surface coverage. A comparison of the runoff volumes of various return periods are tabulated and presented below.

Total Runoff from Redeveloped Area

| Frequency<br>(year) | Existing |        | Proposed |        | Change |       |
|---------------------|----------|--------|----------|--------|--------|-------|
|                     | (cfs)    | (cf)   | (cfs)    | (cf)   | (cfs)  | (cf)  |
| 2                   | 1.11     | 3,499  | 2.49     | 8,580  | 1.38   | 5,081 |
| 10                  | 2.39     | 7,363  | 3.85     | 13,526 | 1.46   | 6,163 |
| 25                  | 3.16     | 9,736  | 4.61     | 16,311 | 1.46   | 6,575 |
| 100                 | 4.03     | 12,472 | 5.46     | 19,407 | 1.43   | 6,935 |

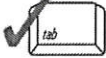
Total Runoff Captured by Proposed Infiltration Structures = 7,016 cf > 6,935 cf



# Checklist for Stormwater Report

## A. Introduction

**Important:** When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.<sup>1</sup> This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8<sup>2</sup>
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

<sup>1</sup> The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

<sup>2</sup> For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.



# Checklist for Stormwater Report

## B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

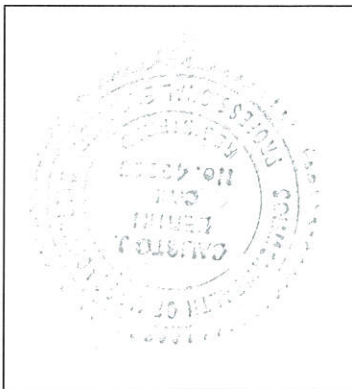
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.


A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

### Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



 6-21-19  
Signature and Date

## Checklist

**Project Type:** Is the application for new development, redevelopment, or a mix of new and redevelopment?

- New development
- Redevelopment
- Mix of New Development and Redevelopment



# Checklist for Stormwater Report

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## Checklist (continued)

**LID Measures:** Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- No disturbance to any Wetland Resource Areas
- Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- Reduced Impervious Area (Redevelopment Only)
- Minimizing disturbance to existing trees and shrubs
- LID Site Design Credit Requested:
  - Credit 1
  - Credit 2
  - Credit 3
- Use of "country drainage" versus curb and gutter conveyance and pipe
- Bioretention Cells (includes Rain Gardens)
- Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- Treebox Filter
- Water Quality Swale
- Grass Channel
- Green Roof
- Other (describe): \_\_\_\_\_

### Standard 1: No New Untreated Discharges

- No new untreated discharges
- Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 2: Peak Rate Attenuation

- Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.
- Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

### Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
  - Static
  - Simple Dynamic
  - Dynamic Field<sup>1</sup>
- Runoff from all impervious areas at the site discharging to the infiltration BMP.
- Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
- Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
  - Site is comprised solely of C and D soils and/or bedrock at the land surface
  - M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
  - Solid Waste Landfill pursuant to 310 CMR 19.000
  - Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.
- Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
- Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

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<sup>1</sup> 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.





# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 3: Recharge (continued)

- The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
- Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

### Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
  - Provisions for storing materials and waste products inside or under cover;
  - Vehicle washing controls;
  - Requirements for routine inspections and maintenance of stormwater BMPs;
  - Spill prevention and response plans;
  - Provisions for maintenance of lawns, gardens, and other landscaped areas;
  - Requirements for storage and use of fertilizers, herbicides, and pesticides;
  - Pet waste management provisions;
  - Provisions for operation and management of septic systems;
  - Provisions for solid waste management;
  - Snow disposal and plowing plans relative to Wetland Resource Areas;
  - Winter Road Salt and/or Sand Use and Storage restrictions;
  - Street sweeping schedules;
  - Provisions for prevention of illicit discharges to the stormwater management system;
  - Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
  - Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
  - List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.
- A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.
  - Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:
    - is within the Zone II or Interim Wellhead Protection Area
    - is near or to other critical areas
    - is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
    - involves runoff from land uses with higher potential pollutant loads.
  - The Required Water Quality Volume is reduced through use of the LID site Design Credits.
  - Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.



# Checklist for Stormwater Report

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## Checklist (continued)

### Standard 4: Water Quality (continued)

- The BMP is sized (and calculations provided) based on:
  - The ½" or 1" Water Quality Volume or
  - The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.
- The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the proprietary BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.
- A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

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

- The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.
- The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted **prior to** the discharge of stormwater to the post-construction stormwater BMPs.
- The NPDES Multi-Sector General Permit does **not** cover the land use.
- LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.
- All exposure has been eliminated.
- All exposure has **not** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
- The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

### Standard 6: Critical Areas

- The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
- Critical areas and BMPs are identified in the Stormwater Report.



# Checklist for Stormwater Report

## Checklist (continued)

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

- The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:
  - Limited Project
  - Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
  - Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
  - Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
  - Bike Path and/or Foot Path
  - Redevelopment Project
  - Redevelopment portion of mix of new and redevelopment.
- Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
- The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
  - Construction Period Operation and Maintenance Plan;
  - Names of Persons or Entity Responsible for Plan Compliance;
  - Construction Period Pollution Prevention Measures;
  - Erosion and Sedimentation Control Plan Drawings;
  - Detail drawings and specifications for erosion control BMPs, including sizing calculations;
  - Vegetation Planning;
  - Site Development Plan;
  - Construction Sequencing Plan;
  - Sequencing of Erosion and Sedimentation Controls;
  - Operation and Maintenance of Erosion and Sedimentation Controls;
  - Inspection Schedule;
  - Maintenance Schedule;
  - Inspection and Maintenance Log Form.
- A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.



# Checklist for Stormwater Report

## Checklist (continued)

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

- The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has **not** been included in the Stormwater Report but will be submitted **before** land disturbance begins.
- The project is **not** covered by a NPDES Construction General Permit.
- The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

### Standard 9: Operation and Maintenance Plan

- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
  - Name of the stormwater management system owners;
  - Party responsible for operation and maintenance;
  - Schedule for implementation of routine and non-routine maintenance tasks;
  - Plan showing the location of all stormwater BMPs maintenance access areas;
  - Description and delineation of public safety features;
  - Estimated operation and maintenance budget; and
  - Operation and Maintenance Log Form.
- The responsible party is **not** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
  - A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
  - A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

### Standard 10: Prohibition of Illicit Discharges

- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted **prior to** the discharge of any stormwater to post-construction BMPs.

## Stormwater Management Calculations

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

No new untreated discharges are proposed to existing wetland resources. The proposed site development will follow the same drainage patterns as the existing.

### **Standard #2, Post-Development Peak Discharge Rates:**

Post-development discharge volumes are demonstrated on the Summary page of this report. Post-development discharge volumes do not exceed pre-development volumes with the use of proposed infiltration structures on the site.

### **Standard #3, Recharge to Groundwater**

The site is comprised of hydrologic class "C" according to USDA Web Soil Survey. All recharge will take place in the HSG "C". The required annual recharge was calculated as 0.25-inches over the proposed impervious area:

$0.25/12 \times 36,066 = 751$  cubic feet. The project proposed groundwater recharge meets the standard via the infiltration structures providing 7,016 cubic feet of recharge volume during a 2-year storm event. The dry wells have a storage volume of 6,439.3 cubic feet at elevation 693. The two systems combine for a total recharge storage volume of 7,016 cubic feet.

### **Standard #4, 80% TSS Removal**

#### TSS Removal

No additional TSS Removal proposed.

#### Water Quality Volume

$$V_{WQ} = (D_{WQ}/12 \text{ inches/foot}) * (A_{IMP} * 43,560 \text{ square feet/acre})$$

$$V_{WQ} = \text{Required Water Quality Volume (in cubic feet)}$$

$$D_{WQ} = \text{Water Quality Depth: } \frac{1}{2} \text{ inch}$$

$$A_{IMP} = \text{Impervious Area (in acres)}$$

$$V_{WQ} = (0.5/12 \text{ inches/foot}) * (36,036 \text{ s.f.})$$

$$V_{WQ} = 1,501.5 \text{ c.f.}$$

$V_{wq}$  will be infiltrated.

### **Standard #5, Land Uses With Higher Potential Pollutant Loads (LUHPPLs)**

LUHPPLs are not located at the site.

**Standard #6, Critical Areas**

The site does not discharge to a critical area.

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

The site is a redevelopment project.

**Standard #8, Construction Period Pollution Prevention and Erosion and Sedimentation Control**

A Stormwater Pollution Prevention Plan that shows stormwater controls & erosion control measures has been provided in the Plan set titled "Drainage Improvement for Rear Parking Lot".

**Standard #9, Operation/Maintenance Plan**

See Attached Operation/Maintenance Plan.

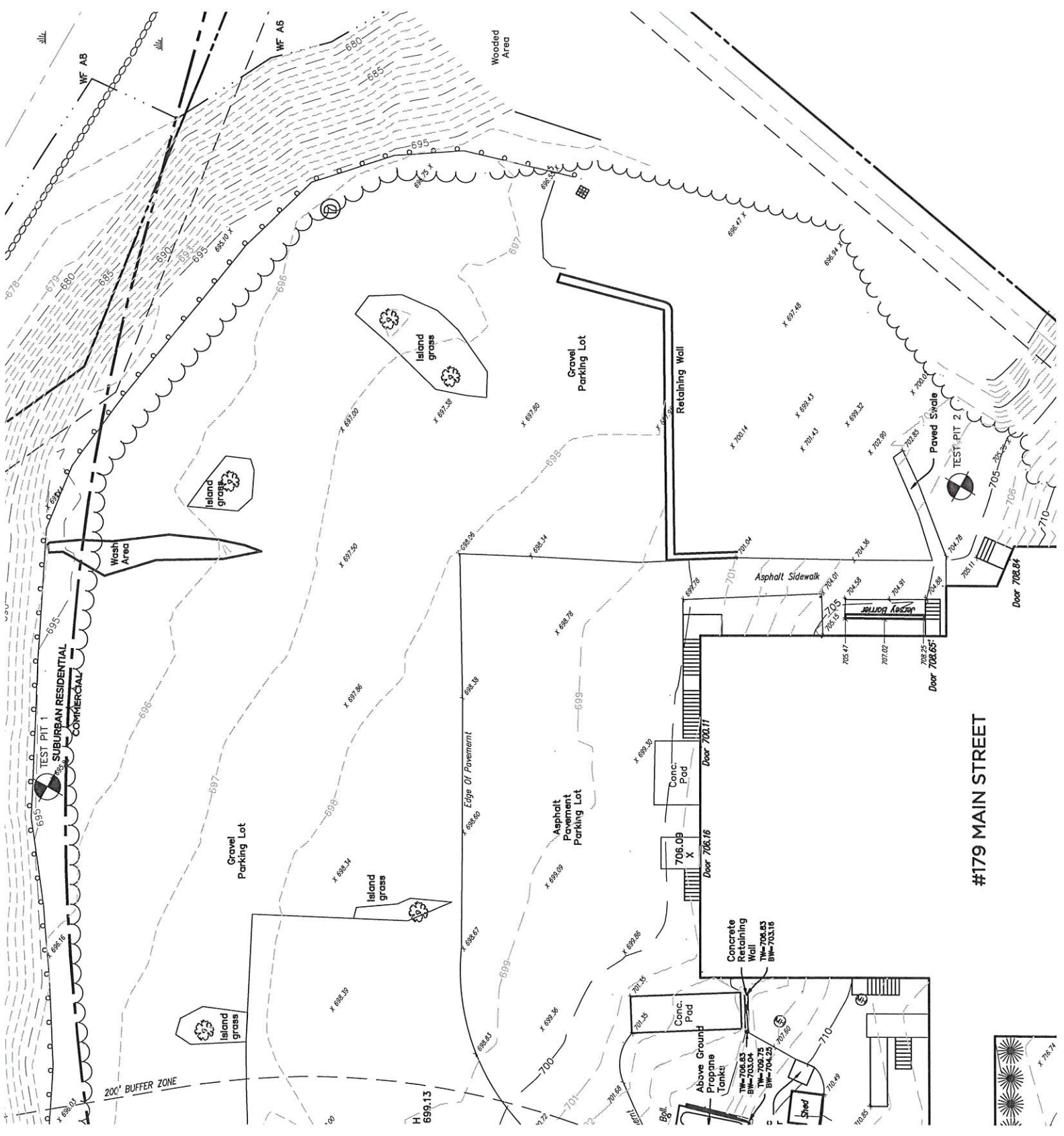
Test Pit Photos  
179 Main Street, Sturbridge, MA 01566



Test Pit #1



Test Pit #2



TEST PIT LOCATION MAP  
 179 Main Street, Sturbridge, MA 01566



## **Stormwater Operation and Maintenance Plan**

This is an Operation and Maintenance Plan for the Definitive Site plan.

Current Operator:

179 Main, LLC  
179 Main Street  
Southbridge, MA 01566

Long-term Operator of Stormwater System:

Owner of the Site

### **Stormwater Management Systems**

The stormwater management system for the site is as follows:

- Subsurface Infiltration Basin & Dry Wells

### **Inspection Schedule**

**The inspection log shall be completed after every inspection of each component listed below. (See attached Inspection Log sheet)**

Subsurface Infiltration Basin & Dry Wells

The underground infiltration basin & dry wells shall be inspected for excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding 1 inch of rainfall in a period of one (1) hour via the inspection ports.

### **Maintenance Procedures**

**Maintenance log shall be completed after any maintenance is performed on any component listed. (See attached Maintenance Log sheet)**

Subsurface Infiltration Basin & Dry Wells

Disposal of debris, trash, sediment, and other waste material removed from the system are to be done at suitable disposal/recycling sites and in compliance with local, state, and federal waste regulations. All structural components such as inlets, manholes, and outlet control structures must be inspected for cracking, subsidence, spalling, erosion and deterioration at least annually.

### **Plans**

Plans indicating the location and features of the stormwater management system can be found on the "Drainage Improvement Plan for Rear Parking Lot".

Description of Public Safety Features

All features are below ground and pose no danger to the public.

## Operation and Maintenance Budget

The owner will have to pay for a service to perform the operation and maintenance described above; therefore the budget is mainly for labor and disposal of sediment collected.

## The Estimated Yearly Cost

Approximately \$800.00



## **Long-Term Pollution Prevention Plan**

This is a Long-term Pollution Prevention Plan for the above-mentioned site.

Current Operator:

179 Main, LLC  
179 Main Street  
Southbridge, MA 01566

Long-term Operator of Stormwater System:

Owner of the Site

### **Good Housekeeping:**

Good housekeeping practices, outlined below, will be used on site:

- ◆ An effort will be made to store only enough products that will be needed.
- ◆ All materials stored on site will be stored neatly, in their appropriate containers, and, if possible, under a roof or other enclosure.
- ◆ Products will be kept in their original containers with the original manufacturer's label.
- ◆ Substances will not be mixed with one another unless recommended by the manufacturer.
- ◆ Whenever possible, all of a product will be used up before disposing of the container.
- ◆ Manufacturer's recommendations for proper use and disposal will be followed.

### **Routine Inspections**

Routine inspections and procedures are outlined in the Stormwater Operation & Maintenance Plan.

### **Waste Materials**

All waste materials will be collected and stored in a metal dumpster. All trash and debris from the site will be deposited in the dumpsters. Dumpsters will be emptied weekly or more often if necessary, and the trash will be hauled off-site to an approved waste facility. No construction waste materials will be buried on site. All personnel will be instructed regarding the correct procedures for waste disposal. Individual(s) managing day-to-day operations will be responsible for seeing that these procedures are followed.

### **Hazardous Waste**

All hazardous waste materials will be disposed of in the manner specified by local or state regulation or by the manufacturer. Site personnel will be instructed in these practices and the individual managing day-to-day operations will be responsible for implementing these practices.

## Hazardous Materials

These practices will be used to reduce the risks associated with hazardous materials.

Products will be kept in original containers unless they are not re-sealable. Original labels and material safety data sheets (MSDS) will be retained; they contain important product information.

Manufacturers' and local and/or state recommended methods for proper disposal of excess materials will be followed.

## Spill Control Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be used for spill prevention and cleanup:

Manufacturers' recommended methods for spill cleanup will be clearly posted and site personnel will be familiar with the procedures and location of the information and cleanup supplies.

Materials and equipment necessary for spill cleanup will be kept in the material storage area on site. Equipment and materials will include, but not be limited to, brooms, dustpans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.

All spills will be cleaned up immediately upon discovery.

Spill areas will be kept well ventilated, and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

Spills of toxic or hazardous material will be reported to the appropriate state or local government agency, regardless of the size of the spill.

The spill prevention plan will be adjusted to include measures to prevent this type of spill from re-occurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.

## Snow and Ice Management

Any deicing materials will be stored indoors and used per manufacturer's recommendations. Site personnel will be instructed in these practices and the individual managing day-to-day operations will be responsible for implementing these practices.

## Supporting Plans & Analyses

Drainage Improvement Plan for Rear Parking Lot  
Stormwater Operation and Maintenance Plan  
Stormwater Drainage Calculations

**Illicit Discharge Compliance Statement**

This statement is to document that there are no and will be no Illicit Discharges for the  
Proposed Site Plan located at  
179 Main Street, Southbridge, MA 01566  
operated by 179 Main, LLC.

\_\_\_\_\_  
Ben Tully / Agent

\_\_\_\_\_  
Date

**Sequence of Construction**

| <b>Sequence</b> | <b>Description</b>          |
|-----------------|-----------------------------|
| 1               | Install Silt Fence          |
| 2               | Clear Development Area      |
| 3               | Install Drainage Structures |
| 4               | Install Pavement & Curbing  |
| 5               | Remove Silt Fence           |

Soil Map—Worcester County, Massachusetts, Southern Part  
(Soil Map)










































Soil Map may not be valid at this scale.

Map Scale: 1:2,180 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



## MAP LEGEND

- |  |   |
|--|---|
|  Area of Interest (AOI) |  Spoil Area            |
|  Area of Interest (AOI) |  Stony Spot            |
|  Soils                  |  Very Stony Spot       |
|  Soil Map Unit Polygons |  Wet Spot              |
|  Soil Map Unit Lines    |  Other                 |
|  Soil Map Unit Points   |  Special Line Features |
|  Special Point Features |   |
|  Blowout                | <b>Water Features</b>   |
|  Borrow Pit             |  Streams and Canals    |
|  Clay Spot              | <b>Transportation</b>   |
|  Closed Depression      |  Rails                 |
|  Gravel Pit             |  Interstate Highways   |
|  Gravelly Spot          |  US Routes             |
|  Landfill               |  Major Roads           |
|  Lava Flow              |  Local Roads           |
|  Marsh or swamp         | <b>Background</b>   |
|  Mine or Quarry         |  Aerial Photography    |
|  Miscellaneous Water   |   |
|  Perennial Water      |   |
|  Rock Outcrop         |   |
|  Saline Spot          |   |
|  Sandy Spot           |   |
|  Severely Eroded Spot |   |
|  Sinkhole             |   |
|  Slide or Slip        |   |
|  Sodic Spot           |   |

## 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 11, Sep 11, 2018

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

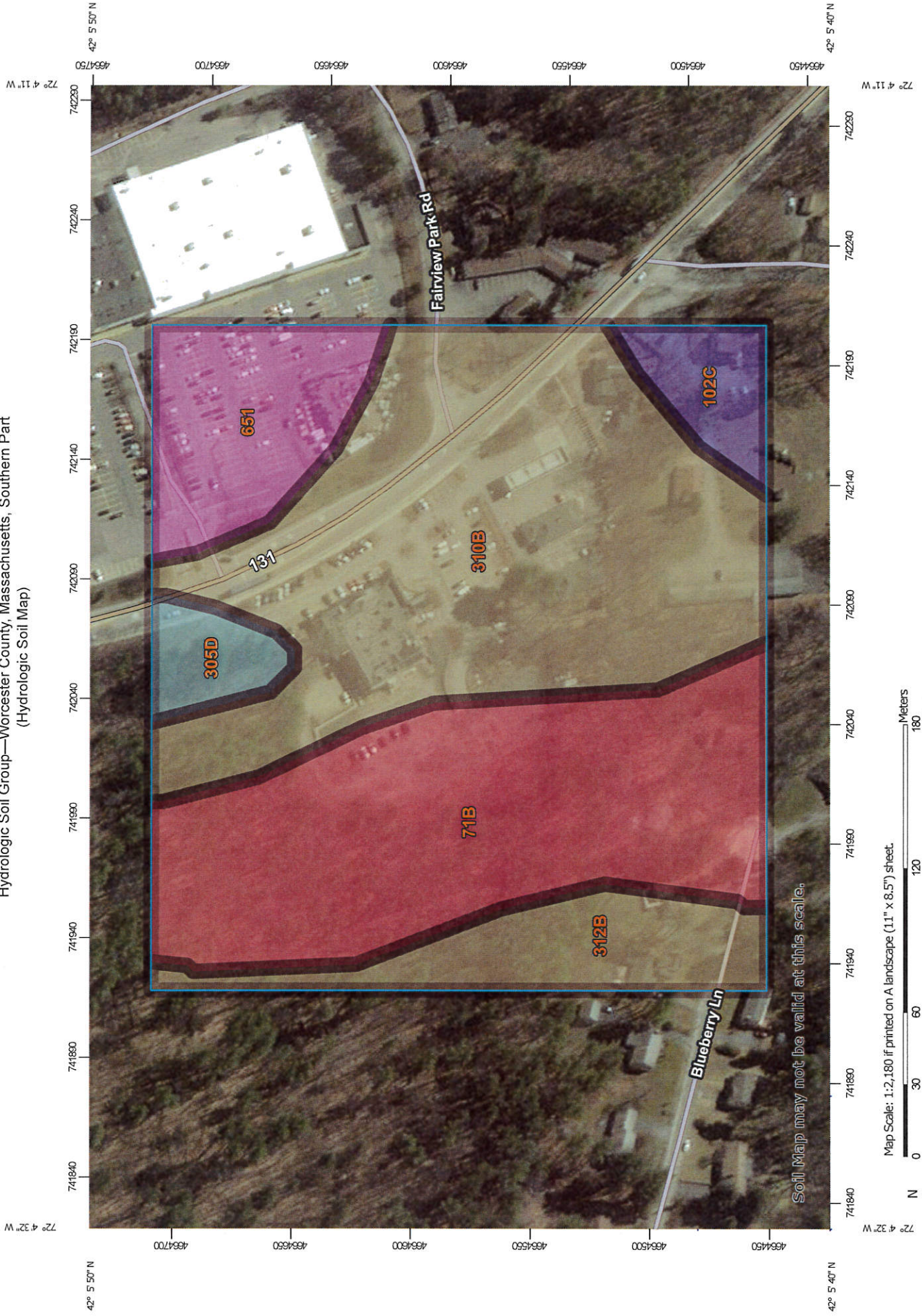
Date(s) aerial images were photographed: Apr 14, 2011—Aug 27, 2016

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 |
|------------------------------------|--|--------------|----------------|
| 71B                                | Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony  | 5.6          | 31.6%          |
| 102C                               | Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes      | 0.7          | 3.9%           |
| 305D                               | Paxton fine sandy loam, 15 to 25 percent slopes                    | 0.6          | 3.1%           |
| 310B                               | Woodbridge fine sandy loam, 3 to 8 percent slopes                  | 7.5          | 42.4%          |
| 312B                               | Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony | 1.6          | 9.2%           |
| 651                                | Udorthents, smoothed   | 1.8          | 9.8%           |
| <b>Totals for Area of Interest</b> |  | <b>17.8</b>  | <b>100.0%</b>  |

Hydrologic Soil Group—Worcester County, Massachusetts, Southern Part  
(Hydrologic Soil Map)





































Soil Map may not be valid at this scale.



Natural Resources  
Conservation Service

Web Soil Survey  
National Cooperative Soil Survey

## MAP LEGEND

|  |  |
|--|--|
|  Area of Interest (AOI)     |  C                          |
|  Soils                      |  C/D                        |
|  Soil Rating Polygons       |  D                          |
|  A                          |  Not rated or not available |
|  A/D                        | <b>Water Features</b>  |
|  B                          |  Streams and Canals         |
|  B/D                        | <b>Transportation</b>  |
|  C                          |  Rails                      |
|  C/D                        |  Interstate Highways        |
|  D                          |  US Routes                  |
|  Not rated or not available |  Major Roads                |
| <b>Soil Rating Lines</b>   |  Local Roads                |
|  A                          | <b>Background</b>  |
|  A/D                        |  Aerial Photography         |
|  B                          |  |
|  B/D                        |  |
|  C                          |  |
|  C/D                        |  |
|  D                          |  |
|  Not rated or not available |  |
| <b>Soil Rating Points</b>  |  |
|  A                          |  |
|  A/D                       |  |
|  B                        |  |
|  B/D                      |  |

## 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 11, Sep 11, 2018

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

Date(s) aerial images were photographed: Apr 14, 2011—Aug 27, 2016

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 |
|------------------------------------|--|--------|--------------|----------------|
| 71B                                | Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony  | D      | 5.6          | 31.6%          |
| 102C                               | Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes      | B      | 0.7          | 3.9%           |
| 305D                               | Paxton fine sandy loam, 15 to 25 percent slopes                    | C      | 0.6          | 3.1%           |
| 310B                               | Woodbridge fine sandy loam, 3 to 8 percent slopes                  | C/D    | 7.5          | 42.4%          |
| 312B                               | Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony | C/D    | 1.6          | 9.2%           |
| 651                                | Udorthents, smoothed   | A      | 1.8          | 9.8%           |
| <b>Totals for Area of Interest</b> |  |        | <b>17.8</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

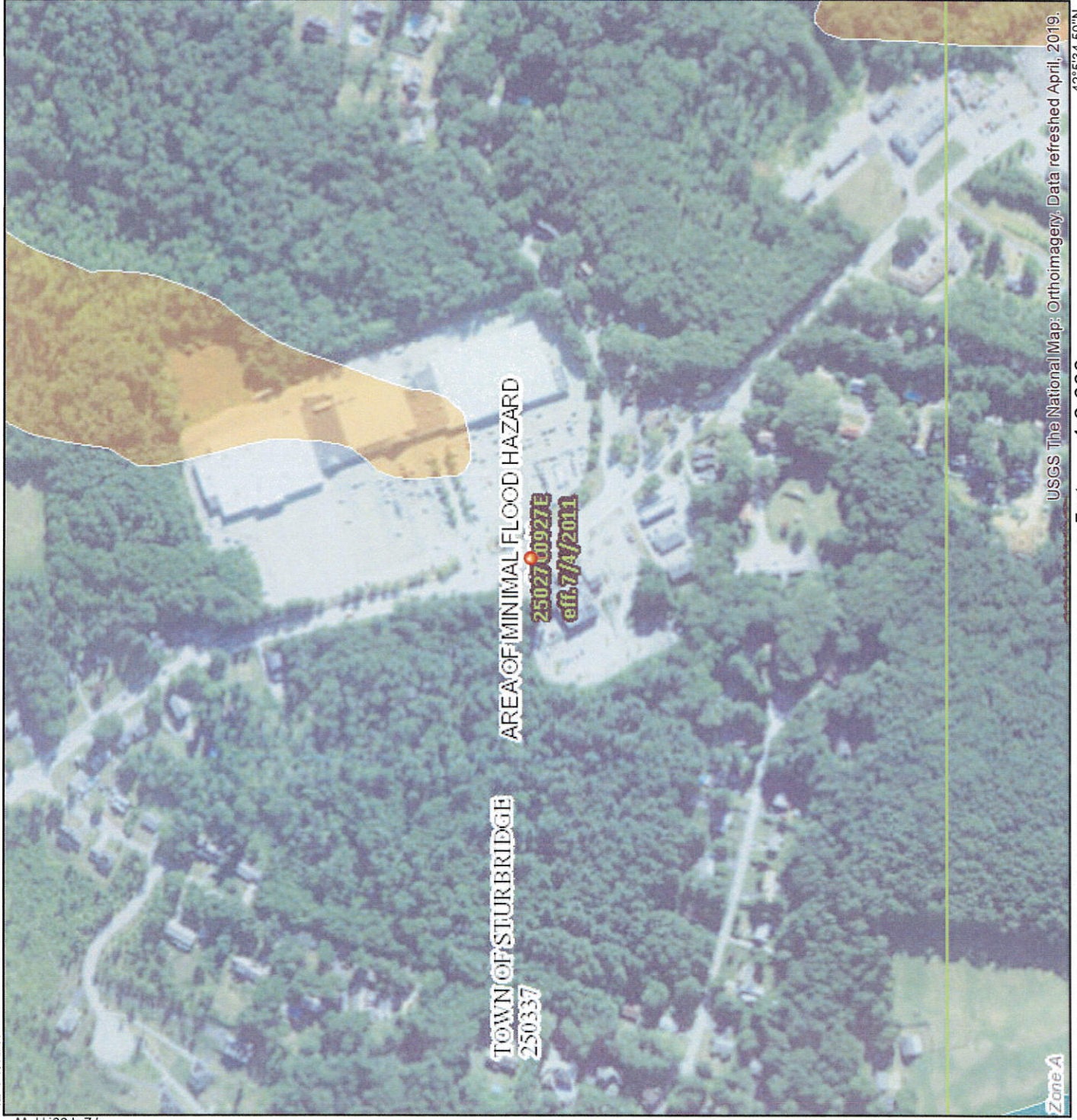
*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

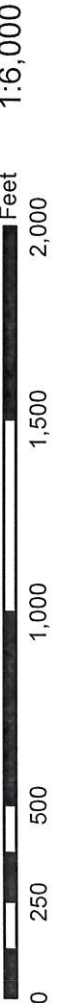
# National Flood Hazard Layer FIRMette



42°6'1.19"N



USGS The National Map: Orthoimagery. Data refreshed April, 2019.



72°4'1.65"W

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

|  |   |
|--|---|
|  | Without Base Flood Elevation (BFE)<br>Zone A, V, A99  |
|  | With BFE or Depth<br>Zone AE, AO, AH, VE, AR  |
|  | Regulatory Floodway   |
|  | 0.2% Annual Chance Flood Hazard, Area of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile<br>Zone 2 |
|  | Future Conditions 1% Annual Chance Flood Hazard<br>Zone X   |
|  | Area with Reduced Flood Risk due to Levee. See Notes.<br>Zone X   |
|  | Area with Flood Risk due to Levee<br>Zone D   |
|  | Area of Minimal Flood Hazard<br>Zone X  |
|  | Effective LOMRS   |
|  | Area of Undetermined Flood Hazard<br>Zone   |
|  | Channel, Culvert, or Storm Sewer  |
|  | Levee, Dike, or Floodwall   |
|  | Cross Sections with 1% Annual Chance Water Surface Elevation  |
|  | Coastal Transect  |
|  | Base Flood Elevation Line (BFE)   |
|  | Limit of Study  |
|  | Jurisdiction Boundary   |
|  | Coastal Transect Baseline   |
|  | Profile Baseline  |
|  | Hydrographic Feature  |
|  | Digital Data Available  |
|  | No Digital Data Available   |
|  | Unmapped  |
|  | The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.                                |

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/27/2019 at 5:27:24 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

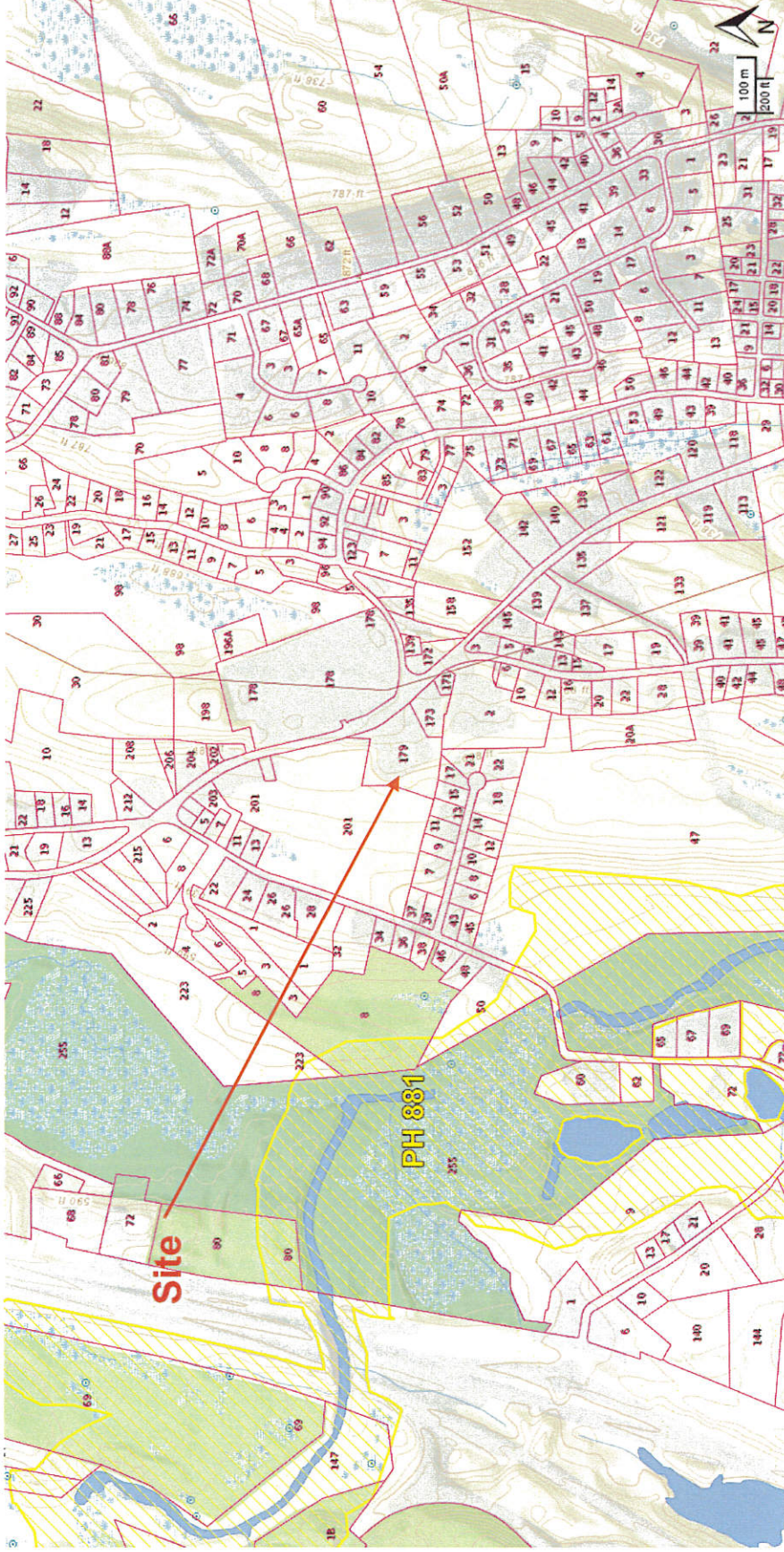
USGS Map  
179 Main Street, Sturbridge, MA 01566

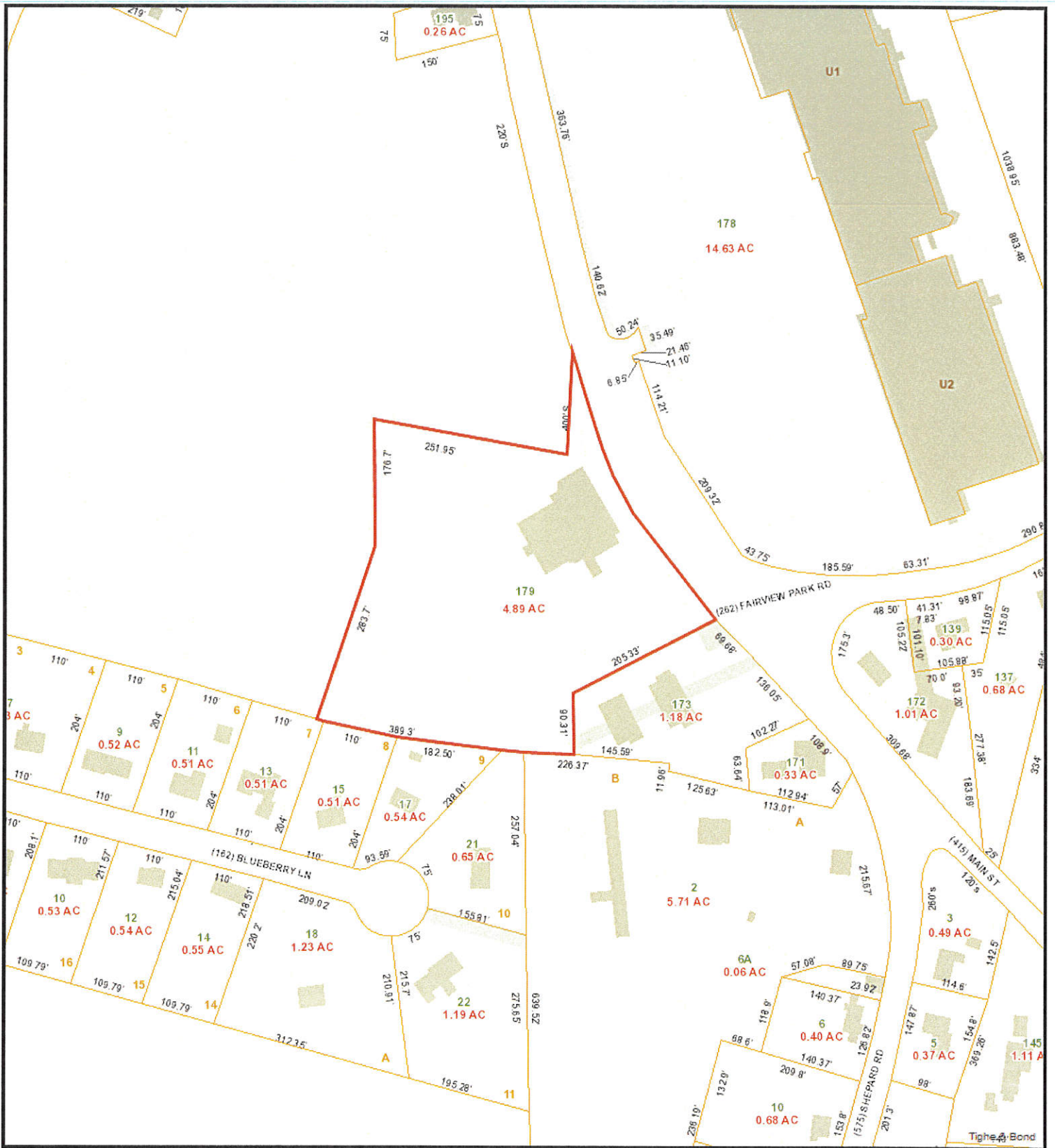


**Site**



NHESP Map  
179 Main Street, Sturbridge, MA 01566





# Tax Map

6/28/2019 10:39:39 AM

Scale: 1"=200'

Scale is approximate

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

