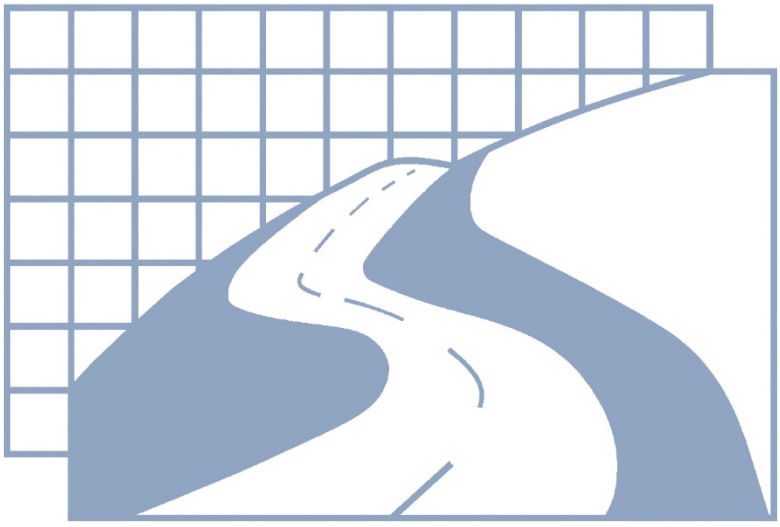
Land Planning, Inc.
Civil Engineers • Land Surveyors
Environmental Consultants

STORMWATER REPORT

Single-Family Lot Development

Located at
Muschopauge Road
Lots 1, 2, 3
Holden, Massachusetts



Prepared for:

James M. Harrity, Jr (Trustee)
Simac Realty Trust
139 Turkey Hill Road
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Prepared by:

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214 Worcester Street
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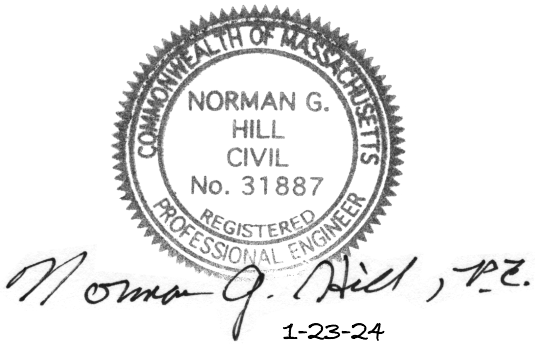


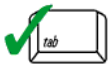
January 11, 2024

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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.[1] 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[2]
- 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.

[1] 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.

[2] 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.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

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.

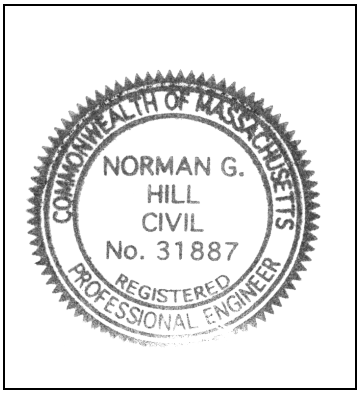
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the 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



Norman G. Hill, P.E. 1-23-24

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

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

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[1]

☐ 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.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

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

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 propriety 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.

Land Planning Inc.

Lots 1, 2, 3
Muschopauge Road, Holden
Single-Family Lot Development

Stormwater Management Standards Compliance

Standard 1: No New Untreated Discharges
Supporting Calculations

The three single family residential lots shall be developed without any point discharges. Stormwater runoff will exit the property as sheet flow. The requirement of no new untreated discharges has been met. Additional calculations demonstrating compliance with Standard 1 are not required.

Standard 2: Peak Rate Attenuation

The attached drainage analysis demonstrates that the proposed development will not result in an increase in peak discharge rates as compared to the existing site.

The provided storage volume of the permeable pavement system and roof with infiltration was derived from the existing site condition depth requirement.

$$S = (1000/CN) - 10$$

$$S = (1000 / 75) - 10 = 3.33 \text{ in.} = 0.28 \text{ ft}$$

The Permeable Pavement System:

$$Width_{driveway} = 10 \text{ ft}^2 / \text{ft}$$

$$Vol_{req} = (Width_{driveway} * S) / 0.40$$

$$Vol_{req} = ((10 \text{ ft}^2 / \text{ft}) * 0.28 \text{ ft}) / 0.40 = 7 \text{ ft}^3 / \text{ft}$$

$$Vol_{prov} = (2.5 * 3.0 * 1) \text{ ft}^3/\text{ft} = 7.5 \text{ ft}^3 / \text{ft}$$

Permeable pavement system achieved through a trench with dimensions of: Width 3. ft

Depth 2.5 ft.

214 Worcester Street, North Grafton, MA 01536 Phone: 508-839-9526 Fax: 508-839-9528
www.landplanninginc.com

Lot 1 roof with infiltration:

$$Area_{roof} = 1,.244\ ft^2$$

$$Vol_{req} = Area_{roof} * S$$

$$Vol_{req} = (1,244 * 0.28) = 349\ ft^3$$

$$Vol_{prov} = 446\ ft^3$$

Roof with infiltration on Lot 1 achieved through 12 Stormtech SC-130 installed per typical manufacturers specifications.

Standard 3: Recharge

Calculate required recharge volume:

Hydrologic Soil Type	F (Inches)	New Impervious Area (Acres)	Rv (ft^3)
A	0.60	0	0 ft^3
B	0.35	0.18	234 ft^3
C	0.25	0.10	86 ft^3
D	0.10	0	0 ft^3
Total Recharge Volume			**320 ft^3**

$$R_v = \frac{F\ (in) * Impervious\ Area\ (ac.) * (43{,}560\ sf/ac.)}{12\ in/ft}$$

Recharge Volume:

Recharge volume required has not been adjusted per Low Impact Development (LID) credit #3. The recharge volume provided is equal to the storage volume provided for the permeable pavement system and Lot #1 roof infiltration.

$$Vol_{driveway} = (7.5\ ft^3 / ft) * 561.5\ ft) * 0.40 = 1{,}684\ ft^3$$

$$Vol_{storage} = (446 + 1{,}684)\ ft^3 = 2{,}130\ ft^3 > 320\ ft^3 = Vol_{required}$$

The storage volume exceeds the required recharge volume. Requirement of Standard 2 has been achieved.

Standard 4: Water Quality

Water Quality Treatment Volume:

The required water quality volume has not been adjusted per Low Impact Development (LID) credit #3. Water quality volume is provided by the grass filter strip/ qualifying impervious area and the stone trench storage volume.

A_{imp} = 0.28 acres

D_{wq} = 1.0”

$V_{wq} = (D_{wq} / 12 \text{ in/ft}) * (A_{imp})$

$V_{wq} = (1.0 \text{ in} / 12 \text{ in/ft}) * (0.28 \text{ acres}) * (43{,}560 \text{ ft}^2/\text{ac}) = 1{,}017 \text{ ft}^3$

$V_{wq} = 1{,}017 \text{ ft}^3 < 1{,}684 \text{ ft}^3 = Vol_{driveway}$

TSS Removal Requirements:

Location: **Muschopauge Rd - Holden**

TSS Removal Calculation Worksheet

B BMP	C TSS Removal Rate	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Filter Strip & Stone Trench	90%	1.00	0.90	0.10

Total TSS Removal = 90%

Project: **Muschopauge Rd Holden**

Prepared By: SB

Date: 1/22/2024

*Equals remaining load from previous BMP € which enters the BMP

Standard 5: Land Uses with Higher Potential Pollutant Loads

The existing and proposed use of the property is not classified as Land Use with Higher Potential Pollutant Loads (LUHPPL). This standard is not applicable to this site.

Standard 6: Critical Areas

The project does not discharge stormwater near or within a Critical Area. This standard is not applicable to the project.

Standard 7: Redevelopment Project

This project does not qualify as a redevelopment. This standard is not applicable to this site.

Standard 8: Construction Period Pollution Prevention and Erosion Control

See attached report.

Standard 9: Operation and Maintenance Plan

See attached report.

Standard 10: Prohibition of Illicit Discharges Illicit Discharge Compliance Statement

Per the requirements of Standard 10 of the Stormwater Management Standards, the property has been inspected for the presence of illicit discharges. It has been determined that no illicit discharges exist on the property.

The developer, contractor, and property owner shall continue to be responsible for the prevention, detection, and elimination of illicit discharges.

Land Planning, Inc.

Norman G. Hill, P.E.

Norman G. Hill, P.E. 1-23-24
President

Attachments

- Pre and Post Development Drainage Analysis
- Watershed Maps
- NRCS Soil Report
- Storm Water Pollution Prevention Plan
- Operation & Maintenance Plan

Drainage Analysis

Located at
Muschopauge Road
Lots 1, 2, 3
Holden, MA

By
Land Planning, Inc.
214 Worcester St
N. Grafton, MA 01536

January 11, 2024

1.0 INTRODUCTION

Land Planning Inc. has evaluated the hydrologic impacts for the proposed single-family residential developments located on Lots 1, 2, and 3 Muschopauge Road. Being a portion of Assessors Map 84, Block 5 as shown on record Plan 95 of Plan Book 973 on record at the Worcester Registry of Deeds.

At the time of this report, it is the applicant/ owner's intent to amend the record plan and merge Lots 3 and 4 as one undivided parcel, hereinafter referred to as Lot 3.

Included in this report are the proposed method to mitigate any additional runoff from the proposed conditions of this project. The supporting hydrologic calculations are at the end of this report.

2.0 EXISTING CONDITIONS

The undivided lots 1,2, and 3 are 4.15 (+/-) - acres located to the northwest of the intersection of Muschopauge Road, Parsons Street and Cutler Road in Holden. The existing land use of the project sites is undeveloped woods. The property slopes easterly toward Parsons Street. The runoff reaches a 12" culvert that is below Parsons Street. The design point for analysis is the inlet to the culvert.

The soils located within the area of analysis include Canton fine sandy loam, Paxton fine sandy loam., and Woodbridge fine sandy loam. Canton, Paxton, and Woodbridge soils belong to the hydrologic soil group "B", "C", and "C/D" respectively. (See attached NRCS soil report.)

3.0 PROPOSED CONDITIONS

The proposed use of the lots is single-family residential. Three dwellings, paved driveways and private septic systems are proposed on all three lots. This land use will render the lot coverages of impervious pavement and roof, lawn, woodland, and areas of unmaintained shrub, weed, grass mix. Runoff from the site shall be mitigated by minimizing land disturbing activities and tree clearing, directing driveway runoff to a qualifying pervious area, and providing a storage volume equal to the existing site runoff depth.

As indicated above the design point is the inlet to the culvert below Parsons Street.

4.0 DESIGN CRITERIA AND METHODOLOGY

4.1 Hydrologic Model

Used in the preparation of this hydrologic model were the following:

- Soil Conservation Service (SCS) Technical Release 55
  - Times of Concentration and Curve Numbers
- USDA Web Soil Survey
- NOAA LiDAR data
  - LiDAR confirmed by a topographic survey completed by Land Planning, Inc.
- NOAA Atlas 14
- HydroCAD software
- NOAA Land Cover

This report was prepared in accordance with the requirements of Volume 3, Chapter 1 of the Massachusetts Stormwater Handbook.

4.2 Design Storms and Rainfall Depth

The 2, 10, 25 and 100-year storms were utilized to determine the runoff from the site. See the following table for rainfall intensities used for each storm event (NOAA Atlas 14).

Storm Events	
Storm Event	**24 Hour Rainfall (Inches)**
2-year	3.18
10-year	4.87
25-year	5.93
100-year	7.56

5.0 SUMMARY

Summary of Peak Flows							
2-year		**10-year**		**25-year**		**100-year**	
Pre	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**
3.41 cfs	3.36 cfs	9.96 cfs	9.83 cfs	14.78 cfs	14.58 cfs	22.84 cfs	22.45 cfs

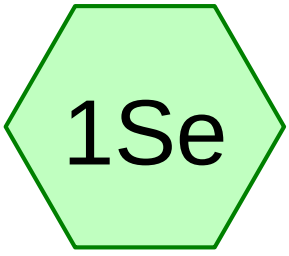
6.0 CONCLUSION

The stormwater management system, as designed, will provide for runoff rates that are less than predevelopment levels. The proposed stormwater management system meets the objectives and requirements of Stormwater Management Standard 2.

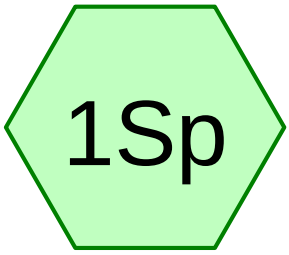
Pre & Post Development Drainage Analysis

DRAINAGE ANALYSIS

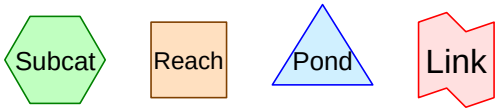
LOTS 1, 2, &3



PRE



POST



Routing Diagram for drainage analysis
Prepared by Land Planning Inc

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type III 24-hr		Default	24.00	1	3.18	2
2	10-yr	Type III 24-hr		Default	24.00	1	4.87	2
3	25-yr	Type III 24-hr		Default	24.00	1	5.93	2
4	100-yr	Type III 24-hr		Default	24.00	1	7.56	2

Summary for Subcatchment 1Se: PRE

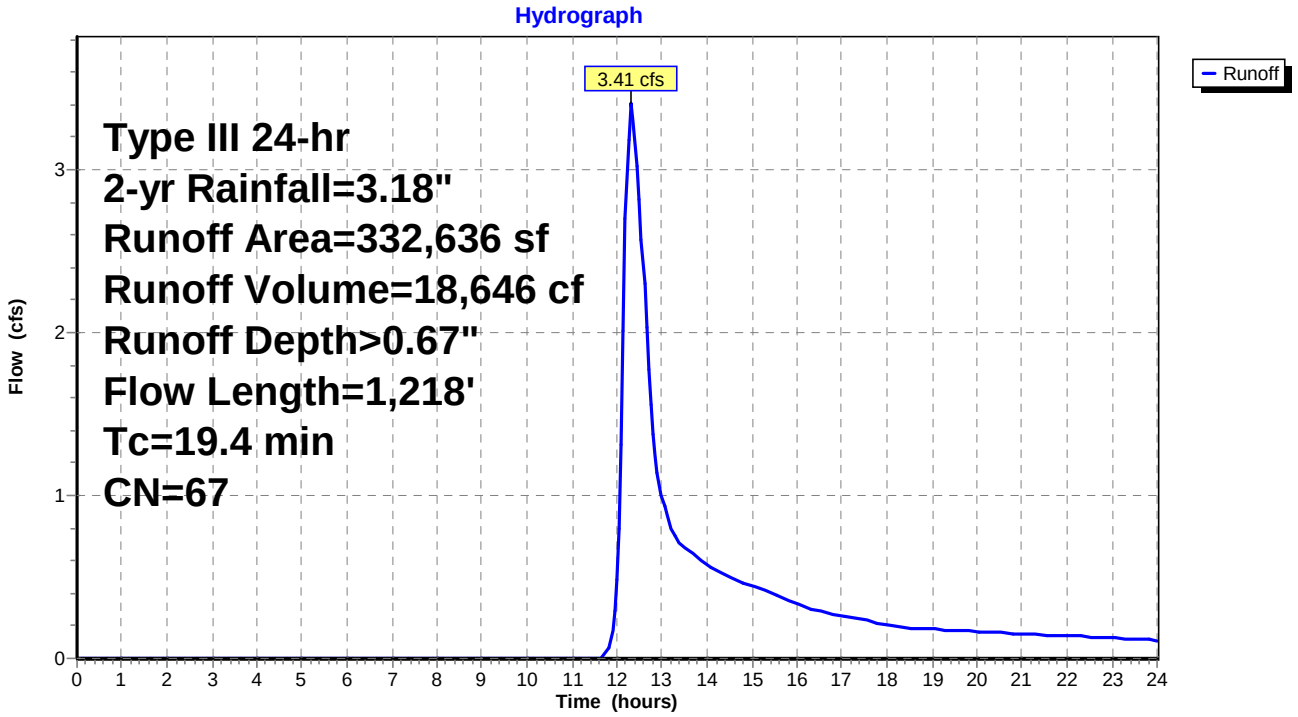
Runoff = 3.41 cfs @ 12.32 hrs, Volume= 18,646 cf, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.18"

	Area (sf)	CN	Description
	10,958	61	>75% Grass cover, Good, HSG B
	8,038	98	Paved parking, HSG B
*	100	98	Wetland, HSG B
	135,349	55	Woods, Good, HSG B
	16,325	74	>75% Grass cover, Good, HSG C
	4,053	98	Paved parking, HSG C
	78,813	70	Woods, Good, HSG C
*	2,314	74	>75% Grass cover, Good, HSG C/D
*	4,385	98	Paved parking, HSG C/D
*	21,396	98	Wetland, HSG C/D
*	50,905	70	Woods, Good, HSG C/D
	332,636	67	Weighted Average
	294,664		88.58% Pervious Area
	37,972		11.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
3.0	321	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	53	0.4500	3.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	51	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	116	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.2	292	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	97	0.0700	4.26		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.9	147	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.0	91	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.4	1,218	Total			

Subcatchment 1Se: PRE



Summary for Subcatchment 1Sp: POST

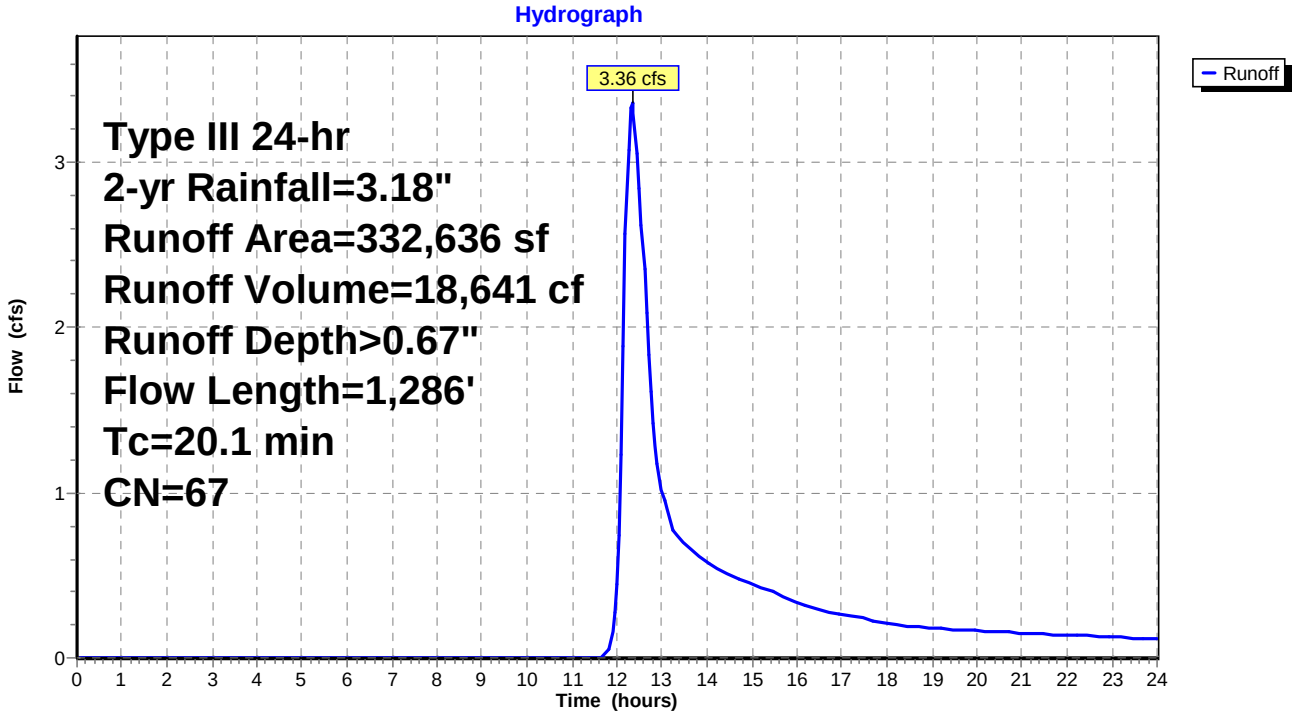
Runoff = 3.36 cfs @ 12.33 hrs, Volume= 18,641 cf, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-yr Rainfall=3.18"

	Area (sf)	CN	Description
	36,350	61	>75% Grass cover, Good, HSG B
*	5,386	75	Permeable pave system, HSG B
*	8,050	98	Paved parking, HSG B
	12,062	48	Brush, Good, HSG B
*	1,244	75	Roof with Infiltration, HSG B
*	1,392	98	Roofs, HSG B
*	94	98	Wetland, HSG B
	89,867	55	Woods, Good, HSG B
	16,325	74	>75% Grass cover, Good, HSG C
*	4,053	98	Paved parking, HSG C
	78,813	70	Woods, Good, HSG C
*	9,893	74	>75% Grass cover, Good, HSG C/D
*	2,602	75	Paved parking, HSG C/D
*	4,369	98	Paved parking, HSG C/D
	5,392	65	Brush, Good, HSG C
*	1,536	98	Roofs, HSG C/D
*	15,435	98	Wetland, HSG C/D
*	39,773	70	Woods, Good, HSG C/D
	332,636	67	Weighted Average
	297,707		89.50% Pervious Area
	34,929		10.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
3.0	321	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	53	0.4500	3.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	51	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	116	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.8	248	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	135	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	88	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	72	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.5	152	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.1	1,286	Total			

Subcatchment 1Sp: POST



Summary for Subcatchment 1Se: PRE

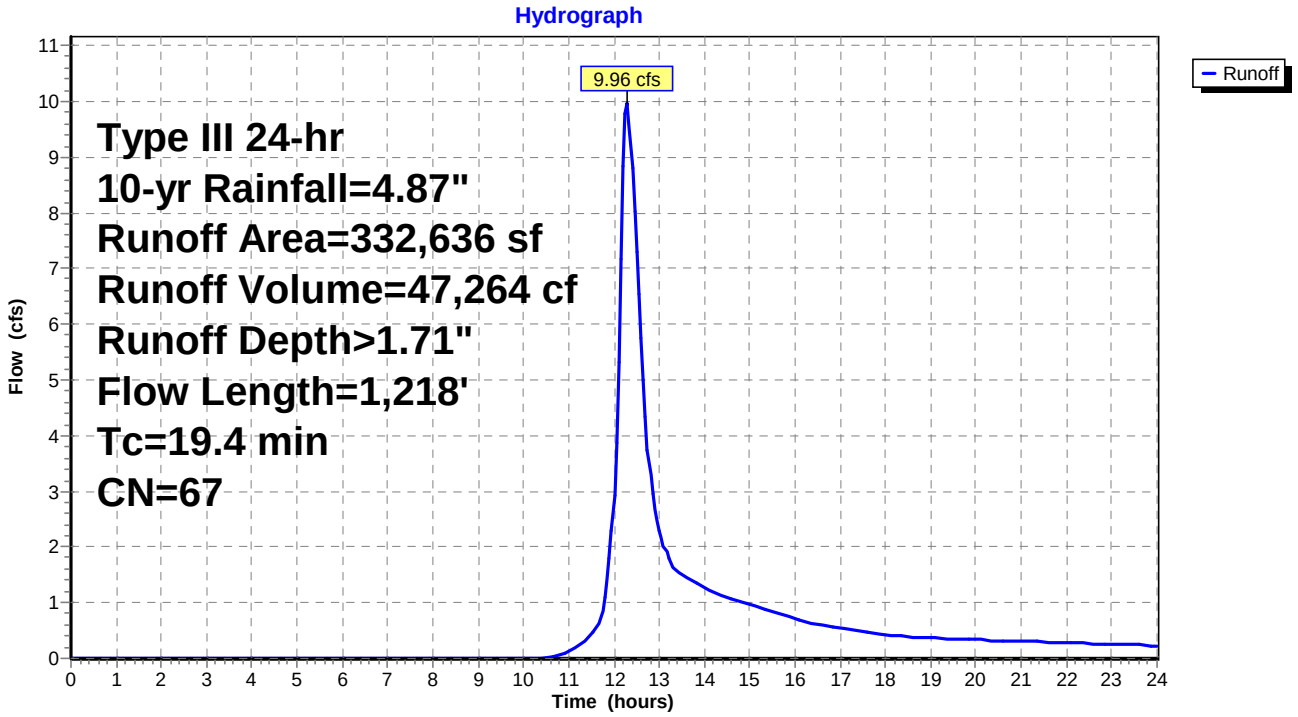
Runoff = 9.96 cfs @ 12.29 hrs, Volume= 47,264 cf, Depth> 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
	10,958	61	>75% Grass cover, Good, HSG B
	8,038	98	Paved parking, HSG B
*	100	98	Wetland, HSG B
	135,349	55	Woods, Good, HSG B
	16,325	74	>75% Grass cover, Good, HSG C
	4,053	98	Paved parking, HSG C
	78,813	70	Woods, Good, HSG C
*	2,314	74	>75% Grass cover, Good, HSG C/D
*	4,385	98	Paved parking, HSG C/D
*	21,396	98	Wetland, HSG C/D
*	50,905	70	Woods, Good, HSG C/D
	332,636	67	Weighted Average
	294,664		88.58% Pervious Area
	37,972		11.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
3.0	321	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	53	0.4500	3.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	51	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	116	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.2	292	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	97	0.0700	4.26		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.9	147	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.0	91	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.4	1,218	Total			

Subcatchment 1Se: PRE



Summary for Subcatchment 1Sp: POST

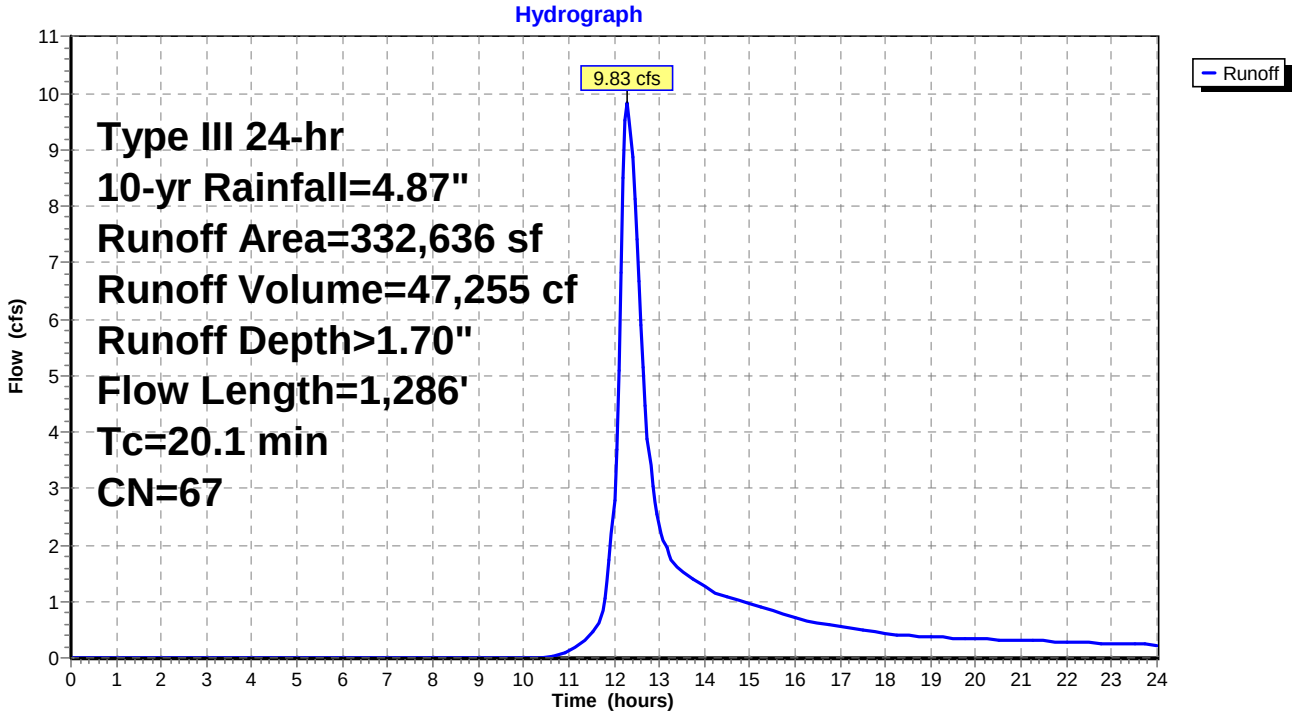
Runoff = 9.83 cfs @ 12.30 hrs, Volume= 47,255 cf, Depth> 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-yr Rainfall=4.87"

	Area (sf)	CN	Description
	36,350	61	>75% Grass cover, Good, HSG B
*	5,386	75	Permeable pave system, HSG B
*	8,050	98	Paved parking, HSG B
	12,062	48	Brush, Good, HSG B
*	1,244	75	Roof with Infiltration, HSG B
*	1,392	98	Roofs, HSG B
*	94	98	Wetland, HSG B
	89,867	55	Woods, Good, HSG B
	16,325	74	>75% Grass cover, Good, HSG C
*	4,053	98	Paved parking, HSG C
	78,813	70	Woods, Good, HSG C
*	9,893	74	>75% Grass cover, Good, HSG C/D
*	2,602	75	Paved parking, HSG C/D
*	4,369	98	Paved parking, HSG C/D
	5,392	65	Brush, Good, HSG C
*	1,536	98	Roofs, HSG C/D
*	15,435	98	Wetland, HSG C/D
*	39,773	70	Woods, Good, HSG C/D
	332,636	67	Weighted Average
	297,707		89.50% Pervious Area
	34,929		10.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
3.0	321	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	53	0.4500	3.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	51	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	116	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.8	248	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	135	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	88	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	72	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.5	152	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.1	1,286	Total			

Subcatchment 1Sp: POST



Summary for Subcatchment 1Se: PRE

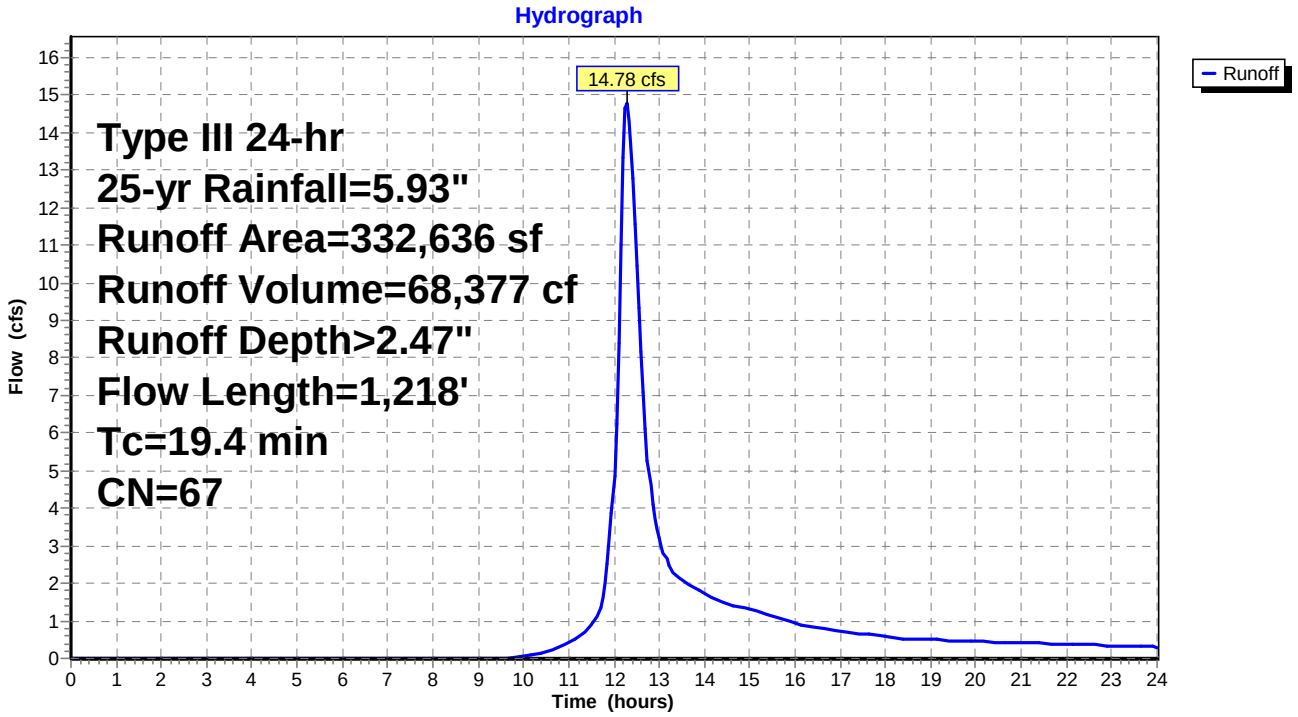
Runoff = 14.78 cfs @ 12.28 hrs, Volume= 68,377 cf, Depth> 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.93"

	Area (sf)	CN	Description
	10,958	61	>75% Grass cover, Good, HSG B
	8,038	98	Paved parking, HSG B
*	100	98	Wetland, HSG B
	135,349	55	Woods, Good, HSG B
	16,325	74	>75% Grass cover, Good, HSG C
	4,053	98	Paved parking, HSG C
	78,813	70	Woods, Good, HSG C
*	2,314	74	>75% Grass cover, Good, HSG C/D
*	4,385	98	Paved parking, HSG C/D
*	21,396	98	Wetland, HSG C/D
*	50,905	70	Woods, Good, HSG C/D
	332,636	67	Weighted Average
	294,664		88.58% Pervious Area
	37,972		11.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
3.0	321	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	53	0.4500	3.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	51	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	116	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.2	292	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	97	0.0700	4.26		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.9	147	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.0	91	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.4	1,218	Total			

Subcatchment 1Se: PRE



Summary for Subcatchment 1Sp: POST

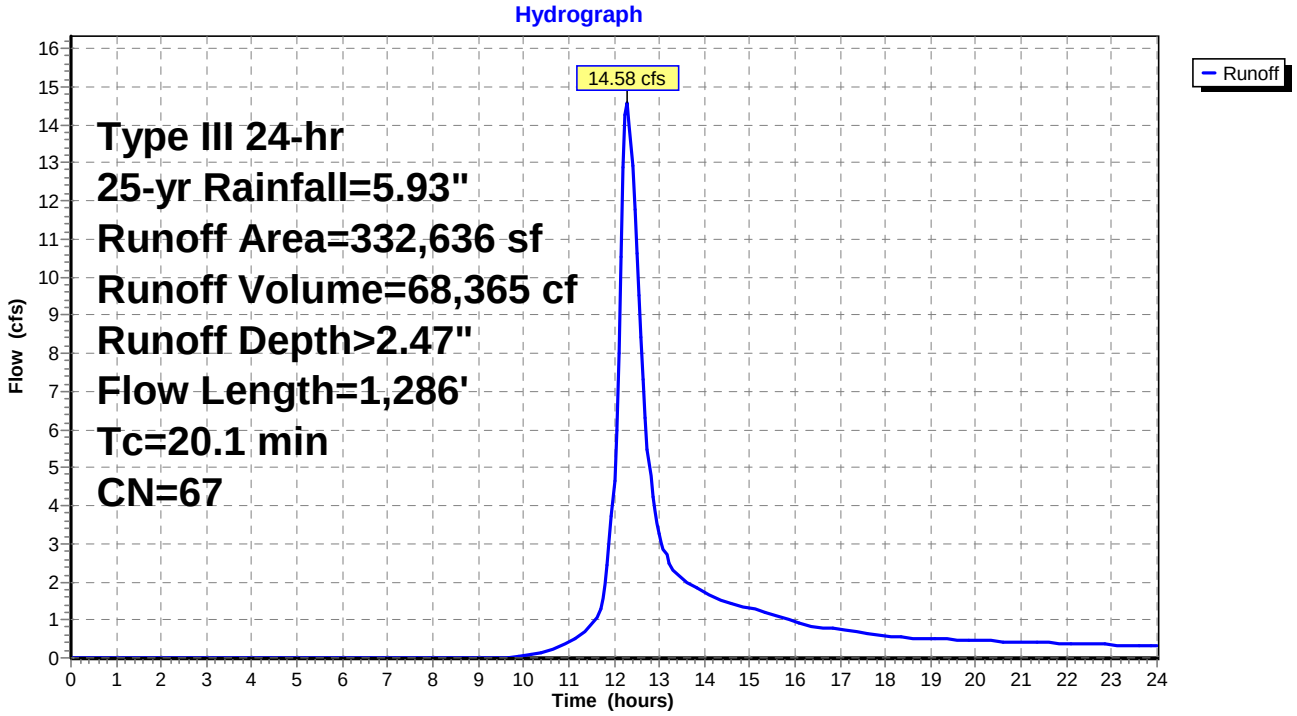
Runoff = 14.58 cfs @ 12.29 hrs, Volume= 68,365 cf, Depth> 2.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-yr Rainfall=5.93"

	Area (sf)	CN	Description
	36,350	61	>75% Grass cover, Good, HSG B
*	5,386	75	Permeable pave system, HSG B
*	8,050	98	Paved parking, HSG B
	12,062	48	Brush, Good, HSG B
*	1,244	75	Roof with Infiltration, HSG B
*	1,392	98	Roofs, HSG B
*	94	98	Wetland, HSG B
	89,867	55	Woods, Good, HSG B
	16,325	74	>75% Grass cover, Good, HSG C
*	4,053	98	Paved parking, HSG C
	78,813	70	Woods, Good, HSG C
*	9,893	74	>75% Grass cover, Good, HSG C/D
*	2,602	75	Paved parking, HSG C/D
*	4,369	98	Paved parking, HSG C/D
	5,392	65	Brush, Good, HSG C
*	1,536	98	Roofs, HSG C/D
*	15,435	98	Wetland, HSG C/D
*	39,773	70	Woods, Good, HSG C/D
	332,636	67	Weighted Average
	297,707		89.50% Pervious Area
	34,929		10.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
3.0	321	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	53	0.4500	3.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	51	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	116	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.8	248	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	135	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	88	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	72	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.5	152	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.1	1,286	Total			

Subcatchment 1Sp: POST



Summary for Subcatchment 1Se: PRE

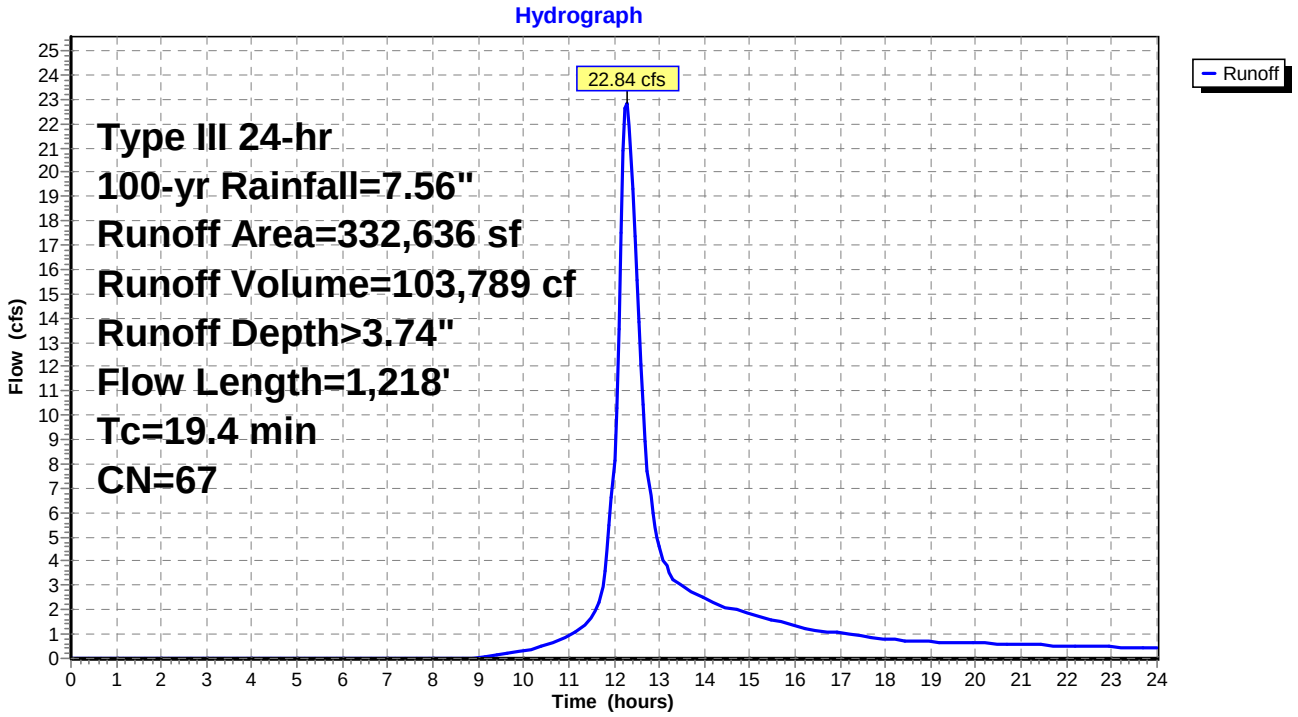
Runoff = 22.84 cfs @ 12.27 hrs, Volume= 103,789 cf, Depth> 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.56"

	Area (sf)	CN	Description
	10,958	61	>75% Grass cover, Good, HSG B
	8,038	98	Paved parking, HSG B
*	100	98	Wetland, HSG B
	135,349	55	Woods, Good, HSG B
	16,325	74	>75% Grass cover, Good, HSG C
	4,053	98	Paved parking, HSG C
	78,813	70	Woods, Good, HSG C
*	2,314	74	>75% Grass cover, Good, HSG C/D
*	4,385	98	Paved parking, HSG C/D
*	21,396	98	Wetland, HSG C/D
*	50,905	70	Woods, Good, HSG C/D
	332,636	67	Weighted Average
	294,664		88.58% Pervious Area
	37,972		11.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
3.0	321	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	53	0.4500	3.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	51	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	116	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.2	292	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	97	0.0700	4.26		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
1.9	147	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.0	91	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.4	1,218	Total			

Subcatchment 1Se: PRE



Summary for Subcatchment 1Sp: POST

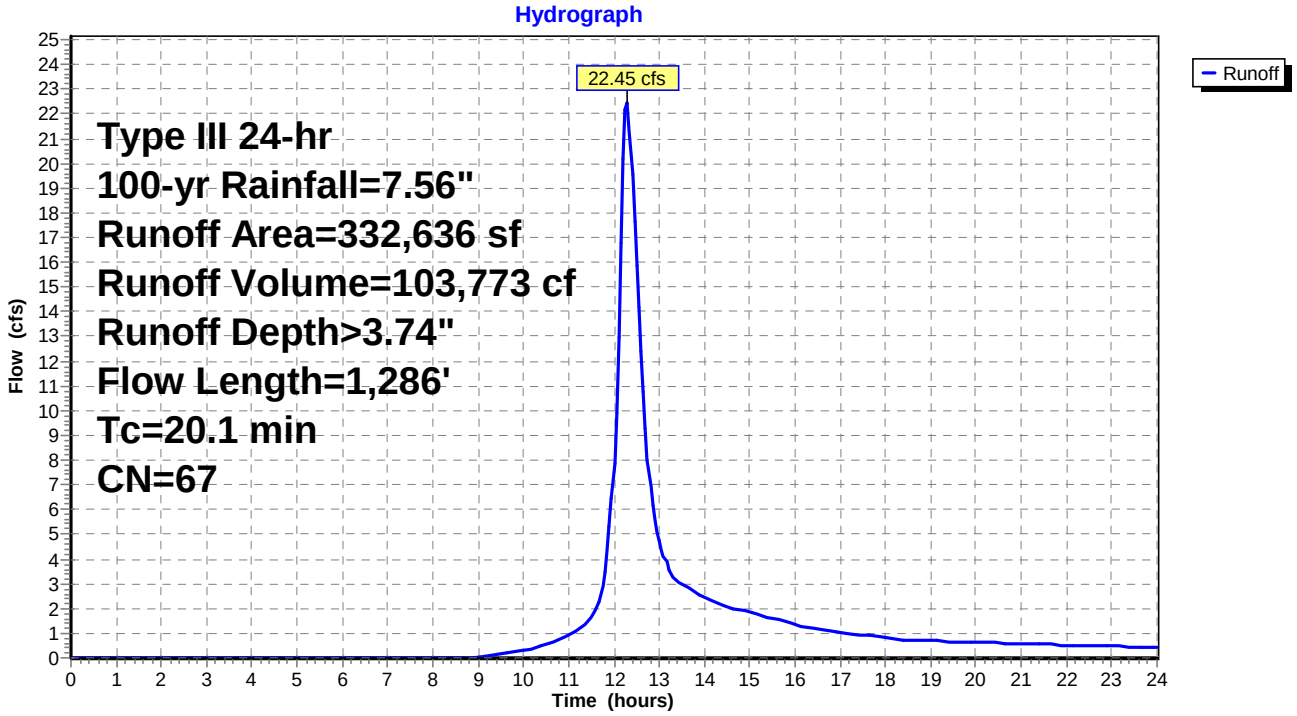
Runoff = 22.45 cfs @ 12.28 hrs, Volume= 103,773 cf, Depth> 3.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-yr Rainfall=7.56"

	Area (sf)	CN	Description
	36,350	61	>75% Grass cover, Good, HSG B
*	5,386	75	Permeable pave system, HSG B
*	8,050	98	Paved parking, HSG B
	12,062	48	Brush, Good, HSG B
*	1,244	75	Roof with Infiltration, HSG B
*	1,392	98	Roofs, HSG B
*	94	98	Wetland, HSG B
	89,867	55	Woods, Good, HSG B
	16,325	74	>75% Grass cover, Good, HSG C
*	4,053	98	Paved parking, HSG C
	78,813	70	Woods, Good, HSG C
*	9,893	74	>75% Grass cover, Good, HSG C/D
*	2,602	75	Paved parking, HSG C/D
*	4,369	98	Paved parking, HSG C/D
	5,392	65	Brush, Good, HSG C
*	1,536	98	Roofs, HSG C/D
*	15,435	98	Wetland, HSG C/D
*	39,773	70	Woods, Good, HSG C/D
	332,636	67	Weighted Average
	297,707		89.50% Pervious Area
	34,929		10.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
3.0	321	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	53	0.4500	3.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	51	0.0300	2.79		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
0.8	116	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.8	248	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.6	135	0.0400	1.40		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.5	88	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.8	72	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.5	152	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.1	1,286	Total			

Subcatchment 1Sp: POST



United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Worcester County, Massachusetts, Northeastern Part

September 11, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:5,910 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

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 1:20,000.

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, Northeastern Part
Survey Area Data: Version 17, Sep 9, 2022

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

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
1	Water	0.6	0.3%
52A	Freetown muck, 0 to 1 percent slopes	2.3	1.3%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	11.4	6.2%
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	6.8	3.7%
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	7.1	3.9%
245B	Hinckley loamy sand, 3 to 8 percent slopes	23.4	12.8%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	11.8	6.5%
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	6.5	3.5%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	1.3	0.7%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	3.8	2.1%
305D	Paxton fine sandy loam, 15 to 25 percent slopes	2.1	1.2%
306B	Paxton fine sandy loam, 0 to 8 percent slopes, very stony	8.4	4.6%
306C	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	26.8	14.6%
307B	Paxton fine sandy loam, 0 to 8 percent slopes, extremely stony	1.2	0.6%
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	6.0	3.3%
307D	Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony	22.6	12.3%
311B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	2.1	1.2%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	5.9	3.2%
420B	Canton fine sandy loam, 3 to 8 percent slopes	2.8	1.5%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
421C	Canton fine sandy loam, 8 to 15 percent slopes, very stony	11.9	6.5%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	1.1	0.6%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	14.9	8.1%
600	Pits, gravel	2.5	1.4%
Totals for Area of Interest		**183.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the

development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Worcester County, Massachusetts, Northeastern Part

1—Water

Map Unit Setting

National map unit symbol: w3qb
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

52A—Freetown muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2t2q9
Elevation: 0 to 1,110 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Freetown and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Freetown

Setting

Landform: Depressions, depressions, swamps, kettles, marshes, bogs
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material

Typical profile

Oe - 0 to 2 inches: mucky peat
Oa - 2 to 79 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 19.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Ecological site: F144AY043MA - Acidic Organic Wetlands
Hydric soil rating: Yes

Minor Components

Whitman

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Swansea

Percent of map unit: 5 percent
Landform: Bogs, swamps, marshes, depressions, depressions, kettles
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

71B—Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w69c
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: fine sandy loam
Bw - 6 to 10 inches: sandy loam
Bg - 10 to 19 inches: gravelly sandy loam
Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Woodbridge, extremely stony

Percent of map unit: 10 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Whitman, extremely stony

Percent of map unit: 8 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Paxton, extremely stony

Percent of map unit: 2 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

73A—Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w695
Elevation: 0 to 1,580 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Whitman, extremely stony, and similar soils: 81 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Whitman, Extremely Stony

Setting

Landform: Drumlins, ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 1 inches: peat
A - 1 to 10 inches: fine sandy loam
Bg - 10 to 17 inches: gravelly fine sandy loam
Cdg - 17 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent

Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY041MA - Very Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Ridgebury, extremely stony

Percent of map unit: 10 percent
Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Drainageways, depressions, outwash terraces, outwash deltas
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Swansea

Percent of map unit: 3 percent
Landform: Marshes, bogs, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Woodbridge, extremely stony

Percent of map unit: 1 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

102C—Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w69g
Elevation: 0 to 1,540 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Chatfield, extremely stony, and similar soils: 39 percent
Hollis, extremely stony, and similar soils: 26 percent
Rock outcrop: 17 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chatfield, Extremely Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 2 inches: fine sandy loam
Bw - 2 to 30 inches: gravelly fine sandy loam
2R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 0 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 41 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Hollis, Extremely Stony

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: gravelly fine sandy loam
Bw - 7 to 16 inches: gravelly fine sandy loam
2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 0 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting

Parent material: Igneous and metamorphic rock

Properties and qualities

Slope: 0 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Charlton, extremely stony

Percent of map unit: 12 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Sutton, extremely stony

Percent of map unit: 3 percent
Landform: Hills, ground moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Paxton, extremely stony

Percent of map unit: 2 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Leicester, extremely stony

Percent of map unit: 1 percent
Landform: Ground moraines, hills, drainageways, depressions
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: Yes

245B—Hinckley loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svm8
Elevation: 0 to 1,430 feet
Mean annual precipitation: 36 to 53 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hinckley and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Outwash deltas, outwash terraces, kames, kame terraces, moraines, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 8 percent
Landform: Outwash deltas, outwash terraces, moraines, eskers, kames, outwash plains, kame terraces
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Concave, convex, linear

Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Outwash deltas, outwash terraces, moraines, outwash plains, kame terraces
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Head slope, side slope, base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Agawam

Percent of map unit: 2 percent
Landform: Outwash deltas, outwash terraces, moraines, eskers, kames, outwash plains, kame terraces
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Nose slope, side slope, base slope, crest, riser, tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

254C—Merrimac fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2tyqt
Elevation: 0 to 1,030 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Merrimac and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting

Landform: Eskers, outwash plains, moraines, kames, outwash terraces
Landform position (two-dimensional): Backslope, footslope, summit, shoulder
Landform position (three-dimensional): Side slope, crest, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Landform: Outwash plains, dunes, deltas, outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Eskers, outwash plains, deltas, kames
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, crest, side slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear

Hydric soil rating: No

260B—Sudbury fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: w3pw
Elevation: 0 to 2,100 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sudbury and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sudbury

Setting

Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Friable coarse-loamy eolian deposits over loose sandy glaciofluvial deposits

Typical profile

H1 - 0 to 9 inches: fine sandy loam
H2 - 9 to 18 inches: fine sandy loam
H3 - 18 to 25 inches: gravelly loamy sand
H4 - 25 to 60 inches: gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Ecological site: F144AY027MA - Moist Sandy Outwash

Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Hydric soil rating: No

Walpole

Percent of map unit: 5 percent
Landform: Terraces
Hydric soil rating: Yes

Agawam

Percent of map unit: 5 percent
Hydric soil rating: No

Ninigret

Percent of map unit: 5 percent
Hydric soil rating: No

305B—Paxton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2t2qp
Elevation: 0 to 1,570 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Paxton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge

Percent of map unit: 9 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury

Percent of map unit: 6 percent
Landform: Depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Toeslope, backslope, footslope
Landform position (three-dimensional): Base slope, head slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

305C—Paxton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w66y
Elevation: 0 to 1,320 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Paxton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands

Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 7 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge

Percent of map unit: 6 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury

Percent of map unit: 2 percent
Landform: Drumlins, drainageways, depressions, ground moraines, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

305D—Paxton fine sandy loam, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2w67j
Elevation: 0 to 1,450 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Paxton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 8 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge

Percent of map unit: 6 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury

Percent of map unit: 1 percent
Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope

Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

306B—Paxton fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w673
Elevation: 0 to 1,340 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Paxton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton, Very Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge, very stony

Percent of map unit: 8 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 4 percent
Landform: Drumlins, drainageways, depressions, hills, ground moraines
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Charlton, very stony

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

306C—Paxton fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w677
Elevation: 0 to 1,330 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Paxton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton, Very Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge, very stony

Percent of map unit: 8 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Charlton, very stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex

Across-slope shape: Convex
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 2 percent
Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

307B—Paxton fine sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w675
Elevation: 0 to 1,580 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Paxton, extremely stony, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton, Extremely Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Woodbridge, extremely stony

Percent of map unit: 10 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Charlton, extremely stony

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 4 percent
Landform: Drumlins, drainageways, depressions, ground moraines, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman, extremely stony

Percent of map unit: 1 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

307C—Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w676
Elevation: 0 to 1,490 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Paxton, extremely stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton, Extremely Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Charlton, extremely stony
Percent of map unit: 8 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge, extremely stony
Percent of map unit: 6 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, extremely stony
Percent of map unit: 1 percent
Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

307D—Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony

Map Unit Setting
National map unit symbol: 2w67l
Elevation: 0 to 1,570 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition
Paxton, extremely stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton, Extremely Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 10 inches: fine sandy loam
Bw1 - 10 to 17 inches: fine sandy loam
Bw2 - 17 to 28 inches: fine sandy loam
Cd - 28 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Charlton, extremely stony

Percent of map unit: 9 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge, extremely stony

Percent of map unit: 5 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave

Across-slope shape: Linear
Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 1 percent
Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

311B—Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2t2qr
Elevation: 0 to 1,440 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Woodbridge, very stony, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Very Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 9 inches: fine sandy loam
Bw1 - 9 to 20 inches: fine sandy loam
Bw2 - 20 to 32 inches: fine sandy loam
Cd - 32 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 19 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton, very stony

Percent of map unit: 10 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 8 percent
Landform: Hills, drainageways, drumlins, depressions, ground moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

312B—Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2t2qs
Elevation: 0 to 1,580 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Woodbridge, extremely stony, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Extremely Stony

Setting

Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 9 inches: fine sandy loam
Bw1 - 9 to 20 inches: fine sandy loam
Bw2 - 20 to 32 inches: fine sandy loam
Cd - 32 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 19 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton, extremely stony

Percent of map unit: 10 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 8 percent
Landform: Hills, drainageways, drumlins, depressions, ground moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave

Across-slope shape: Concave
Hydric soil rating: Yes

420B—Canton fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w81b
Elevation: 0 to 1,180 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Canton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Landform: Hills, moraines, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: gravelly fine sandy loam
2C - 26 to 65 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Scituate
Percent of map unit: 10 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Montauk
Percent of map unit: 5 percent
Landform: Moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Charlton
Percent of map unit: 4 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Swansea
Percent of map unit: 1 percent
Landform: Marshes, depressions, bogs, swamps, kettles
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

421C—Canton fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting
National map unit symbol: 2w814
Elevation: 0 to 1,160 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Canton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Moraines, ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Montauk, very stony

Percent of map unit: 6 percent
Landform: Recessionial moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Scituate, very stony

Percent of map unit: 5 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Chatfield, very stony

Percent of map unit: 3 percent
Landform: Hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Swansea

Percent of map unit: 1 percent
Landform: Marshes, depressions, bogs, swamps, kettles
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

422B—Canton fine sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w818
Elevation: 0 to 1,180 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton, extremely stony, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Extremely Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Scituate, extremely stony

Percent of map unit: 6 percent
Landform: Hills, ground moraines, drumlins
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Charlton, extremely stony

Percent of map unit: 6 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Montauk, extremely stony

Percent of map unit: 4 percent
Landform: Recessionial moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex

Hydric soil rating: No

Swansea

Percent of map unit: 4 percent
Landform: Marshes, depressions, bogs, swamps, kettles
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

422C—Canton fine sandy loam, 8 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w815
Elevation: 0 to 1,310 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Canton, extremely stony, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Extremely Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw1 - 5 to 16 inches: fine sandy loam
Bw2 - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Minor Components

Scituate, extremely stony

Percent of map unit: 6 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Montauk, extremely stony

Percent of map unit: 5 percent
Landform: Recessionial moraines, ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Charlton, extremely stony

Percent of map unit: 5 percent
Landform: Ridges, ground moraines, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Hollis, extremely stony

Percent of map unit: 4 percent
Landform: Ridges, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

600—Pits, gravel

Map Unit Setting

National map unit symbol: w3g6
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, gravel: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Gravel

Setting

Landform position (three-dimensional): Base slope
Parent material: Loose sandy and gravelly glaciofluvial deposits

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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.

Custom Soil Resource Report
Map—Hydrologic Soil Group

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 1:20,000.

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, Northeastern Part
Survey Area Data: Version 17, Sep 9, 2022

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
1	Water		0.6	0.3%
52A	Freetown muck, 0 to 1 percent slopes	B/D	2.3	1.3%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	11.4	6.2%
73A	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	D	6.8	3.7%
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	B	7.1	3.9%
245B	Hinckley loamy sand, 3 to 8 percent slopes	A	23.4	12.8%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	A	11.8	6.5%
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	B	6.5	3.5%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	C	1.3	0.7%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	C	3.8	2.1%
305D	Paxton fine sandy loam, 15 to 25 percent slopes	C	2.1	1.2%
306B	Paxton fine sandy loam, 0 to 8 percent slopes, very stony	C	8.4	4.6%
306C	Paxton fine sandy loam, 8 to 15 percent slopes, very stony	C	26.8	14.6%
307B	Paxton fine sandy loam, 0 to 8 percent slopes, extremely stony	C	1.2	0.6%
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	C	6.0	3.3%
307D	Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony	C	22.6	12.3%
311B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	C/D	2.1	1.2%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	C/D	5.9	3.2%
420B	Canton fine sandy loam, 3 to 8 percent slopes	B	2.8	1.5%
421C	Canton fine sandy loam, 8 to 15 percent slopes, very stony	B	11.9	6.5%
422B	Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	B	1.1	0.6%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	B	14.9	8.1%
600	Pits, gravel		2.5	1.4%
Totals for Area of Interest			**183.2**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Storm Water
Pollution Prevention Plan

Lots 1, 2, & 3
Muschopauge Road
Holden, MA

Site Owner/Operator
Simac Realty Trust
139 Turkey Hill Road
Rutland, MA 01543

Prepared by:
Land Planning, Inc.
214 Worcester St
N. Grafton, MA 01536

January 22, 2024

1.0 Site Evaluation, Assessment, and Planning

1.1 Project Information

The construction sites are Lots 1, 2, and 3 Muschopauge Road Holden. See Plan 95 of Plan Book 973 on record at the Worcester Registry of Deed. As previously stated the applicant intends to merge Lot 3 & 4 as shown on the record plan, herein referred to as Lot 3.

1.2 Contact Information / Responsible Parties

Project Manager or Site Supervisor

Name:_____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

SWPPP Contact

Name:_____

Company: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

SWPPP prepared by

Norman G. Hill, P.E.

Land Planning, Inc.

214 Worcester Street

N. Grafton, MA 01536

508-839-9526

Property Owner

Simac Realty Trust

139 Turkey Hill Road

Rutland, MA 01543

Phone: 413-210-5256

1.3 Nature and Sequence of Construction Activity

The three lots shall be developed for single-family residential uses. Soil disturbing activities will include but are not limited to: building construction, utility connection, clearing and grubbing, grading, and construction of septic system, driveway, and stormwater facilities.

1.4 Soils, Slopes, Vegetation, Drainage Patterns

The soils located within the area of analysis include Canton fine sandy loam, Paxton fine sandy loam., and Woodbridge fine sandy loam. Canton, Paxton, and Woodbridge soils belong to the hydrologic soil group “B”, “C”, and “C/D” respectively. (See attached NRCS soil report.)

The property slopes easterly toward Parsons Street. The runoff reaches a 12” culvert that is below Parsons Street and is discharged at the opposite side of said street.

The existing land use of the project sites is undeveloped woods.

This proposed land use will render the lot coverages of impervious pavement and roof, lawn, woodland, and areas of unmaintained shrub, weed, grass mix.

1.5 Construction Site Estimates

The following are estimates of the construction site:

Size of property	4.15 ac.
Construction site area to be disturbed	+/- 1.5 ft²
Percentage of preconstruction impervious area	0 %
Percentage of postconstruction impervious area	4.8%

1.6 Receiving Waters

Stormwater runoff from areas off the site do enter the project area. Drainage analysis has included these areas within the delineated watershed boundary.

1.7 Site Features and Sensitive Areas to be Protected

Natural features to be protected include the delineated bordering vegetated wetland located along the westerly edge of Parsons Street. No disturbance or contamination of these resource areas shall be permitted.

1.8 Potential Sources of Pollution

Potential sources of sediment to stormwater runoff include:

- Clearing and grubbing operations
- Grading and excavation operations
- Vehicle tracking
- Topsoil stripping and stockpiling
- Landscaping operations

Potential pollutants and sources, other than sediment, to stormwater runoff:

- Combined Staging Area – fueling activities, equipment maintenance, sanitary facilities, waste storage
- Materials Storage Area – general building materials, solvents, adhesives, paving materials, paints, aggregates, and trash.
- Construction Activity – building construction, paving, concrete pouring,

- Concrete Washout Area

See table below for potential construction site pollutants:

TRADE NAME MATERIAL	CHEMICAL/PHYSICAL DESCRIPTION	STORM WATER POLLUTANTS
Pesticides	Various colored to colorless liquid, powder, grains, or pellets	Chlorinated hydrocarbons, organophosphates, carbamates, arsenic
Fertilizer	Liquid or solid grains	Nitrogen, Phosphorous
Plaster	White granules or powder	Calcium sulphate, calcium carbonate, sulfuric acid
Cleaning solvents	Colorless, blue, or yellow-green liquid	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates
Asphalt	Black solid	Oil, petroleum distillates
Concrete	White solid	Limestone, sand
Glue, adhesives	White or yellow liquid	Polymers, epoxies
Paints	Various colored liquid	Metal oxides, stoddard solvent, talc, calcium carbonate, arsenic
Curing compounds	Creamy white liquid	Naphtha
Waste water from construction equipment washing	Water	Soil, oil and grease, solids
Wood preservatives	Clear amber or dark brown liquid	Stoddard solvent, petroleum distillates, arsenic, copper, chromium
Hydraulic oil/fluids	Brown oily petroleum hydrocarbon	Mineral oil
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethyl benzene, toluene, xylene, MTBE
Diesel fuel	Clear, blue-green to yellow liquid	Petroleum distillate, oil and grease, naphthalene, xylenes
Kerosene	Pale yellow liquid petroleum hydrocarbon	Coal oil, petroleum distillates
Antifreeze/coolant	Clear green/yellow liquid	Ethylene glycol, propylene glycol, heavy metals (copper, zinc, lead)
Sanitary toilets	Various colored liquid	Bacteria, parasites, and viruses

2.0 Erosion and Sedimentation Control BMPs

- **Minimize disturbed area and protect natural features and soil**

  Topsoil to be stripped from the construction area will be stockpiled on-site. The stockpile shall be surrounded by sediment barriers at its base.

- **Phase Construction Activity**

  The proposed site is too small for phased disturbance areas to be practical. To minimize erosion construction activities should be limited to the spring, summer, and fall seasons.

- **Control stormwater flowing onto and through the project**

  The runoff entering the site from the west should be diverted around the disturbed areas of the site.

- **Stabilize soils**

  Temporary Stabilization

  Hydromulching will provide immediate protection to exposed soils where construction will cease for more than 14 days and over the winter months. Straw mulch and wood fiber will be mixed with a tackifier (amount specified per manufacturer's instructions) and applied uniformly by machine with an application rate of 90–100 pounds (2–3 bales) per 1,000 square feet or 2 tons (100–200 bales) per acre. If the tackifier does not appear effective in anchoring the mulch to the disturbed soil, crimping equipment will be used to provide additional binding to the soil. The mulch will cover 75 to 90 percent of the ground surface. In areas, where hydromulching is inaccessible, straw mulch will be applied by hand with an application rate of 90–100 pounds (2–3 bales) per 1,000 square feet.

  Permanent Stabilization

  Permanent stabilization will be done immediately after the final design grades are achieved but no later than 14 days after construction ceases. Native species of plants will be used to establish vegetative cover on exposed soils. Permanent stabilization will be completed in accordance with the final stabilization procedures.

- **Establish perimeter controls and sediment barriers**

  Sediment barriers consisting of straw wattles and silt fence will be installed as indicated on the sediment and erosion control plan. See the detail provided on the Sedimentation & Erosion Control Plan for specifications and installation requirements of the sediment barrier.

- **Establish stabilized construction exits**

  Anti-tracking pads consisting of washed stone will be installed at the exit to each lot, as identified on the Sedimentation & Erosion Control Plan, to prevent the off-site transport of sediment by construction vehicles. The anti-tracking pads will be at least 35 feet long, a minimum of 10 feet wide, flared at the end closest to the road.

3.0 Good Housekeeping BMPs

3.1 Material Handling and Waste Management

- **Waste Materials**

  All waste materials will be collected and disposed of into metal trash dumpsters. Dumpsters will have a secure watertight lid, be placed away from stormwater conveyances and drains, and meet all federal, state, and municipal regulations. Only trash and construction debris from the site will be deposited in the dumpster. No construction materials will be buried on-site.

- **Hazardous Waste Materials**

  All hazardous waste materials such as oil filters, petroleum products, paint, and equipment maintenance fluids will be stored in structurally sound and sealed shipping containers, within the hazardous materials storage area. Hazardous waste materials will be stored in appropriate and clearly marked containers and segregated from other non-waste materials. Secondary containment will be provided for all waste materials in the hazardous materials storage area and will consist of commercially available spill pallets. Additionally, all hazardous waste materials will be disposed of in accordance with federal, state, and municipal regulations. Hazardous waste materials will not be disposed of into the on-site dumpsters.

- **Sanitary Waste**

  Temporary sanitary facilities (portable toilets) will be provided at the site throughout the construction phase. The toilets will be in the staging area. The portable toilets will be located away from a concentrated flow paths and traffic flow and will have collection pans underneath as secondary containment.

3.2 Equipment/Vehicle Fueling and Maintenance Practices

- **Fueling and Maintenance**

  Several types of vehicles and equipment will be used on-site throughout the project, including graders, scrapers, excavators, loaders, paving equipment, rollers, trucks and trailers, backhoes, and forklifts. All major equipment maintenance will be performed off-site. Vehicle fueling and minor maintenance will be performed outside of and, as far as practicable, away from the resource areas. Absorbent, spill-cleanup materials and spill kits will be available on-site.

3.6 Spill Prevention and Control

- **Spill Prevention and Control Procedures**

  I. Employee Training: All employees will be trained via monthly tailgate sessions.
  II. Vehicle Maintenance: Vehicles and equipment will be maintained off-site. All vehicles and equipment including subcontractor vehicles will be checked for leaking oil and fluids. Vehicles leaking fluids will not be allowed on-site.
  III. Hazardous Material Storage: Hazardous materials will be stored in accordance with Section 3 and federal and municipal regulations.
  IV. Spill Kits: Spill kits will be within the materials storage area and concrete washout areas.
  V. Spills: All spills will be cleaned up immediately upon discovery. Spent absorbent materials and rags will be hauled off-site immediately after the spill is cleaned up for proper disposal. Spills large enough to discharge to surface water will be reported to the National Response Center at 1-800-424-8802 and MassDEP Emergency Response Line at 1-888-304-1133.
  VI. Material safety data sheets, a material inventory, and emergency contact information will be maintained at the on-site project trailer.

4.0 Inspections

4.1 Inspection Schedule and Procedures

- Inspections of the site will be performed once every 7 days and within 24 hours of the end of a storm event of one-half inch or greater. The inspections will verify that all BMPs required in Sections 2 and 3 are implemented, maintained, and effectively minimizing erosion and preventing stormwater contamination from construction materials. For detailed inspection procedures, see Sections 2 and 3.

- A maintenance inspection report will be made after each inspection. A copy of the report form to be completed by the SWPPP Coordinator is provided Section 8. Completed forms will be maintained on-site throughout construction. Following construction, the completed forms will be retained at the site operators' office for a minimum of 1 year.

5.0 Recordkeeping and Training

5.1 Recordkeeping

- Records will be retained for a minimum period of at least 3 years after the Certificate of Compliance is issued.

5.2 Log of Changes to the SWPPP

No.	Description of Amendment	Date of Amendment	Amendment Prepared by

5.3 Training

- **General stormwater and BMP awareness training**

  The SWPPP Coordinator will conduct informal training for all staff, including subcontractors, on the site. The training will be conducted primarily via tailgate sessions and will focus on avoiding damage to stormwater BMPs and preventing illicit discharges. The tailgate sessions will be conducted monthly and will address the following topics: Erosion Control BMPs, Sediment Control BMPs, Non-Stormwater BMPs, Waste Management and Materials Storage BMPs, and Emergency Procedures specific to the construction site.

- **Detailed training for staff with specific stormwater responsibilities**

  The SWPPP Coordinator will provide formal training to all staff and subcontractors with specific stormwater responsibilities, such as installing and maintaining BMPs. The formal training will cover all design and construction specifications for installing the BMPs and proper procedures for maintaining each BMP. Formal training will occur before any BMPs are installed on the site.

6.0 Final Stabilization

6.1 Permanent Seeding

- **Seedbed Preparation**

a. In areas where disturbance results in subsoil or fill material being the final grade surface, topsoil will be spread over the finished area at minimum depth of 4 inches.

b. The seedbed will be free of large clods, rocks, woody debris and other objectionable materials.

c. Fertilizer and lime will be applied to the seedbed according to the manufacturer's recommendations or soil tests.

d. The top layer of soil will be loosened to a depth of 3–5 inches by raking, tilling, disking or other suitable means.

- **Grass Selection/Application**

a. Lawns will be stabilized with a mixture of Kentucky Blue Grass and Creeping Red Fescue at an application rate of 100 pounds per acre or 2.3 pounds per 1,000 square feet.

b. Seed will be applied uniformly by hydroseeding or broadcasting. Where broadcasting is used, the seed will be covered with .25 inch of soil or less.

- **Mulching**

a. Hydromulch will be applied immediately following seeding at an application rate of 90–100 pounds (2–3 bales) per 1,000 square feet.

7.0 SWPPP Coordinator and Duties

The construction site SWPPP Coordinator for the facility is:

Name: _____ Title: _____

Company: _____ Phone:_____.

The SWPPP Coordinator's duties include the following:

- Implement the SWPPP plan;
- Oversee maintenance practices identified as BMPs in the SWPPP;
- Implement and oversee employee training;
- Conduct or provide for inspection and monitoring activities;
- Identify other potential pollutant sources and make sure they are added to the SWPPP;
- Identify any deficiencies in the SWPPP and make sure they are corrected and
- Ensure that any changes in construction plans are addressed in the SWPPP.

8.0 Forms and Logs

Initial Inspection of Erosion and Sediment Control

DEP File Number: _____ Date:_____

Contractor/Representative:_____

Evaluated by SWPPP Coordinator:_____

A. Project Overview

- How Many Acres Total Does the Project Disturb? _____
- Project Start Date:_____ Project End Date:_____
- Phase I start date?_____

B. Paperwork

• *Does the project have a Order of Conditions?	Yes	No	N/A
• *Is the SWPPP Notebook onsite?	Yes	No	N/A

C. Site Preparation

• *Has the contractor installed temporary construction entrance(s) and are the vehicles using it?	Yes	No	N/A
• *Is there a place for concrete wash-out, is it clearly marked and do concrete trucks appear to be using it?	Yes	No	N/A
• *Is the site largely free of construction trash? (cups, lunch sacks, material packaging, etc.)	Yes	No	N/A
• *Have perimeter sediment controls been installed?	Yes	No	N/A
• *Have pre-construction controls been installed per the plan been installed?	Yes	No	N/A
• *Have easily recognizable indications of the construction limits been installed? (fencing, staking, physical barriers)	Yes	No	N/A

* Must be “yes” or N/A in order for inspection to be “satisfactory”.

Note: The local Conservation Commission must inspect and approve of the initial erosion and sediment controls, as installed, prior to the start of construction.

Erosion and Sediment Control Inspection Report Form

Project Name and Location

Weather:	**Pollution Control Measures (BMP) Checklist:**
Rain in last 24 hrs (inches):	____ Inlet Barrier (ie: filter bags) ____ Sediment Barriers (ie: wattles/silt fence) ____ Erosion Blankets, Hydromulch / Seed ____ Stabilized Construction Entrance ____ Diversion Berms ____ Seed / Sod Areas ____ Sediment Basins & Discharge ____ Borrow Areas ____ General Site Condition (trash, etc)
Owner / Permittee:	
A. Current Construction / Active Areas:	

B. Problem Areas / Special Observations(*Note problem areas ONLY below*):

BMP	Location	Observations, Effectiveness, & Corrective Actions Ordered

C. Listing of Areas where construction operations have permanently or temporarily stopped; stabilization measures initiated.

D. Have items noted on last inspection been corrected? Yes No (if No, Explain:)

Note: Inspection comments above indicate deficiencies only. Deficiencies must be corrected within 7 days, unless otherwise noted. All other BMP's on site are considered to be in good working condition.

Inspection Date **SWPPP Coordinator Signature**

BMP INSPECTION CHECKLIST

General notes about Inspections:
1) Site inspected weekly
2) Within 24 hours of the end of a storm with rain >0.5”
3) Deficiencies corrected within 7 calendar days of inspection

Key elements to look at during inspection
1) Proper installation
2) Operation
3) Maintenance

Inlet Barriers (ie:sand bags, filter bags, straw wattles)

- √ Is the structure deteriorating
- √ Is sediment >1/2 the height of structure?
- √ Evidence of water/sediment getting **around or under** barrier?
- √ Are there other structures that require inlet barriers?

Sediment Barriers (ie: silt fence/straw wattles)

- √ Are they trenched in or falling down?
- √ Evidence of sediment/water getting **around** or **under** barrier?
- √ Is sediment more than 1/3 height of structure?
- √ Are there areas where more sediment barriers are required or need extended?

Stabilized Construction Entrance

- √ Is gravel clean or getting filled with mud?
- √ Evidence of sediment being tracked off site onto public streets?

Final or temporary Stabilization area

- √ Mulches/Grasses-are areas thinning or have been disturbed? Re-application req’d?
- √ Straw Blankets-are they deteriorating and need replaced?

Borrow Areas

- √ When on site or offsite borrow areas, which include contractor furnished, are to be excavated below ground elevations, an earth berm must be constructed around the borrow area to prevent runoff from entering excavation area

Sediment Basin

- √ Note the basin depth. Is the basin more than ½ full of sediment from original design?
- √ Condition of basin side slopes
- √ Evidence of overtopping embankment
- √ Condition of outfall

General Site Conditions

- √ Trash barrels-any evidence of trash lying around site
- √ Location of porta potties
- √ Leaking vehicles
- √ Concrete Washouts Designated

Quality Assurance Field Review – Erosion and Sediment Control

DEP File Number: _____ Contractor/Representative:_____

Date:_____ Evaluated by SWPPP Coordinator:_____

A. Project Status: *(brief description of the current phase of construction; major items of work in progress; and general observations of effectiveness and maintenance of site controls, and stormwater discharge at outfalls).*

B. Deficiencies Noted *(List any specific deficiencies found during the review).*

C. Have weekly and rainfall-required inspections been conducted since the last compliance evaluation? Were noted deficiencies corrected within 7 days?

Notice to Contractor: All deficiencies must be corrected within 7 days unless otherwise noted. A record of corrected deficiencies must be maintained.

Final Inspection of Erosion and Sediment Control

DEP File Number: _____ Date:_____

Contractor/Representative:_____

Evaluated by SWPPP Coordinator:_____

Project Overview

- How Many Acres Total Does the Project Disturb? _____
- Project Start Date_____ Project End Date _____

Paperwork

• Is the SWPPP Notebook onsite?	Yes	No	N/A

Final Site Preparation*

• Has the concrete wash-out area been cleaned?	Yes	No	N/A
• Is the site free of construction trash? (cups, lunch sacks, material packaging, wood debris, etc.)	Yes	No	N/A
• Have perimeter sediment controls been taken down?	Yes	No	N/A
• Have indications of the construction limits been taken down? (fencing, staking, physical barriers)	Yes	No	N/A
• Has all the dirt on the site been covered?	Yes	No	N/A
• Have appropriate grasses/sod/trees been planted?	Yes	No	N/A
• Have the plants accepted?	Yes	No	N/A
• Have gutters and streets been cleaned of soil/trash?	Yes	No	N/A
• Have all erosion controls been removed?	Yes	No	N/A

* Must be “yes” or N/A in order for inspection to be “satisfactory”.

Stormwater Management
Operation & Maintenance Plan

Lots 1, 2, & 3
Muschopauge Road
Holden, MA

Prepared by:
Land Planning, Inc.
214 Worcester St
N. Grafton, MA 01536

January 22, 2024

Operation & Maintenance Plan

Property Owner
Simac Realty Trust
139 Turkey Hill Road
Rutlan MA

Site Operator
Simac Realty Trust
139 Turkey Hill Road
Rutlan MA

Facility Location

Lots 1, 2, & 3
Muschopauge Road
Holden MA

This Operation & Maintenance Plan is transferable to future property owners and operators. The above information shall be updated as required should a change in ownership or operation occur.

Non-Structural Controls and Housekeeping

Snow Removal

Snow shall be plied along the easterly side of the driveway as necessary.

Deicing Chemicals

Application of deicing chemicals shall be done sparingly as needed to ensure the safety of the vehicles and pedestrians. Exterior storage of deicing materials on the properties is prohibited.

Fertilizers, Pesticides, Herbicides

Organic, slow-release fertilizers should be used within the landscaped areas and maintained lawn areas. Use of pesticides and herbicides is discouraged. Outside storage of fertilizers, pesticides, and herbicides is forbidden.

Landscape Maintenance

Leaves, trimmings, and grass clippings shall be properly disposed of. If these materials are to be composted on-site, it shall be done outside of any wetland resource area or buffer zone.

Street Sweeping

The driveway shall be swept as necessary with a minimum frequency of twice per year. The first sweeping shall take place in early spring after the snow has melted. The second sweeping should be done in autumn.

Qualifying Pervious Areas

The qualifying pervious area shall be inspected annually for evidence of ponding, sediment deposition, and vegetation dieback.

- Deposited sediments within the pervious area shall be removed and disposed of outside of the qualifying area, resource areas and their buffer zones. Sediment barrier surrounding the base of the stockpile area is recommended.
- Ponding within the qualifying area is discouraged and shall be re-graded to promote sheet flow across the area. Eroded materials shall be replaced as needed.
- Areas of dead vegetation shall be replanted during the start of the next grow season.

Maintenance and Inspection Log

Inspections for year _____

By _____

BMP	Action	Date	Comment
Qualifying Permeable Area	Inspect		
	Sediment Removal		
	Re-vegetate		
	Re-grade		
Subsurface Infiltration System	Inspect		
	Inspect		
	Inspect		
	Inspect		
	Other		
	Other		
Driveway Storage Volume	Inspect		
	Inspect		
	Sediment Removal		
	Sediment Removal		