

**NOTICE OF INTENT
STORMWATER MANAGEMENT REPORT**

for

**Central Street & Reservoir Street
Roadway Improvement Project**

in

AVON, MASSACHUSETTS

July 20, 2022

Prepared by
GCG ASSOCIATES, INC.
84 Main Street, Wilmington, MA 01887

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- Central Street & Reservoir Street Roadway Improvement Project Plans, Dated: July 20, 2022, By: GCG Associates, Inc.



Massachusetts Department of Environmental Protection

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□ **Massachusetts Department of Environmental Protection**

Bureau of Resource Protection - Wetlands

WPA Form 3 - Notice of Intent

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File #:

eDEP Transaction #:1403118

City/Town:AVON

A.General Information

1. Project Location:

a. Street Address	RESERVOIR STREET				
b. City/Town	AVON	c. Zip Code	02322		
d. Latitude	42.10430N	e. Longitude	71.06091W		
f. Map/Plat #	B1	g.Parcel/Lot #	RESERVOIR STREET (RIGHT OF WAY)		

2. Applicant:

Individual Organization

a. First Name	WILLIAM	b.Last Name	FITZGERALD		
c. Organization	TOWN OF AVON, DPW				
d. Mailing Address	65 EAST MAIN STREET				
e. City/Town	AVON	f. State	MA	g. Zip Code	02322
h. Phone Number	508-588-0414	i. Fax	508-559-0209	j. Email	wfitzgerald@avon-ma.gov

3.Property Owner:

more than one owner

a. First Name	GREGORY	b. Last Name	ENOS		
c. Organization	TOWN OF AVON (TOWN ADMINISTRATOR)				
d. Mailing Address	65 EAST MAIN STREET				
e. City/Town	AVON	f.State	MA	g. Zip Code	02322
h. Phone Number	508-588-0414	i. Fax	508-588-6024	j.Email	genos@avon-ma.gov

4.Representative:

a. First Name	MICHAEL	b. Last Name	CARTER		
c. Organization	GCG ASSOCIATES, INC.				
d. Mailing Address	84 MAIN STREET				
e. City/Town	WILMINGTON	f. State	MA	g. Zip Code	01887
h.Phone Number	978-657-9714	i.Fax		j.Email	mike.carter@gcgassociates.net

5.Total WPA Fee Paid (Automatically inserted from NOI Wetland Fee Transmittal Form):

a.Total Fee Paid	0.00	b.State Fee Paid	0.00	c.City/Town Fee Paid	0.00
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6.General Project Description:

RECONSTRUCTION OF APPROXIMATELY 870 LF OF ROADWAY (STA 74+15 TO 82+84, AS SHOWN ON THE PLANS), WITH VARYING WIDTH, TO PROVIDE UNIFORM TRAVEL LANES AND INSTALL NEW VERTICAL GRANITE CURBING AND SIDEWALK, RELOCATION OF UTILITY GUY POLE, AND DRAINAGE IMPROVEMENTS.

7a.Project Type:

- | | |
|---|--|
| 1. <input type="checkbox"/> Single Family Home | 2. <input type="checkbox"/> Residential Subdivision |
| 3. <input type="checkbox"/> Limited Project Driveway Crossing | 4. <input type="checkbox"/> Commercial/Industrial |
| 5. <input type="checkbox"/> Dock/Pier | 6. <input type="checkbox"/> Utilities |
| 7. <input type="checkbox"/> Coastal Engineering Structure | 8. <input type="checkbox"/> Agriculture (eg., cranberries, forestry) |
| 9. <input type="checkbox"/> Transportation | 10. <input checked="" type="checkbox"/> Other |

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- a. total square feet b. square feet within 100 ft. c. square feet between 100 ft. and 200 ft.

5. Has an alternatives analysis been done and is it attached to this NOI? Yes No
 6. Was the lot where the activity is proposed created prior to August 1, 1996? Yes No

3.Coastal Resource Areas: (See 310 CMR 10.25 - 10.35)

Resource Area Size of Proposed Alteration Proposed Replacement (if any)

a. <input type="checkbox"/> Designated Port Areas	Indicate size under	Land under the ocean below,
b. <input type="checkbox"/> Land Under the Ocean	1. square feet	
	2. cubic yards dredged	
c. <input type="checkbox"/> Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes, below	
d. <input type="checkbox"/> Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. <input type="checkbox"/> Coastal Dunes	1. square feet	2. cubic yards dune nourishment
f. <input type="checkbox"/> Coastal Banks	1. linear feet	
g. <input type="checkbox"/> Rocky Intertidal Shores	1. square feet	
h. <input type="checkbox"/> Salt Marshes	1. square feet	2. sq ft restoration, rehab, crea.
i. <input type="checkbox"/> Land Under Salt Ponds	1. square feet	
	2. cubic yards dredged	
j. <input type="checkbox"/> Land Containing Shellfish	1. square feet	
k. <input type="checkbox"/> Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above	
	1. cubic yards dredged	
l. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	1. square feet	

4.Restoration/Enhancement

Restoration/Replacement

If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please entered the additional amount here.

- a. square feet of BVW b. square feet of Salt Marsh

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5. Projects Involves Stream Crossings

Project Involves Streams Crossings

If the project involves Stream Crossings, please enter the number of new stream crossings/number of replacement stream crossings.

a. number of new stream crossings

b. number of replacement stream crossings

C. Other Applicable Standards and Requirements

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage of Endangered Species program (NHESP)?

a. Yes No

If yes, include proof of mailing or hand delivery of NOI to:
Natural Heritage and Endangered Species
Program
Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

b. Date of map:08/01/2021

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18)...

c. Submit Supplemental Information for Endangered Species Review * (Check boxes as they apply)

1. Percentage/acreage of property to be altered:

(a) within Wetland Resource Area

percentage/acreage

(b) outside Resource Area

percentage/acreage

2. Assessor's Map or right-of-way plan of site

3. Project plans for entire project site, including wetland resource areas and areas outside of wetland jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

a. Project description (including description of impacts outside of wetland resource area & buffer zone)

b. Photographs representative of the site

c. MESA filing fee (fee information available at: <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/mass-endangered-species-act-mesa/mesa-fee-schedule.html>)

Make check payable to "Natural Heritage & Endangered Species Fund" and **mail to NHESP** at above address

Projects altering 10 or more acres of land, also submit:

d. Vegetation cover type map of site

e. Project plans showing Priority & Estimated Habitat boundaries

d. OR Check One of the following

1. Project is exempt from MESA review. Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, <http://www.mass.gov/eea/agencies/dfg/dfw/laws-regulations/cmr/321-cmr-1000-massachusetts-endangered-species-act.html#10.14>; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. Separate MESA review ongoing.

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Provided by MassDEP:

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a. NHESP Tracking Number

b. Date submitted to NHESP

3. Separate MESA review completed.

Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review...

2. For coastal projects only, is any portion of the proposed project located below the mean high waterline or in a fish run?

a. Not applicable - project is in inland resource area only

b. Yes No

If yes, include proof of mailing or hand delivery of NOI to either:

South Shore - Cohasset to Rhode Island, and the Cape & Islands:

North Shore - Hull to New Hampshire:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 S. Rodney French Blvd
New Bedford, MA 02744

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930

If yes, it may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional office.

3. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

a. Yes No

If yes, provide name of ACEC (see instructions to WPA Form 3 or DEP Website for ACEC locations). **Note:** electronic filers click on Website.

b. ACEC Name

4. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

a. Yes No

5. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L.c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L.c. 130, § 105)?

a. Yes No

6. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

a. Yes, Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

1. Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol.2, Chapter 3)

2. A portion of the site constitutes redevelopment

3. Proprietary BMPs are included in the Stormwater Management System

b. No, Explain why the project is exempt:

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Bureau of Resource Protection - Wetlands

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- 1. Single Family Home
- 2. Emergency Road Repair
- 3. Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department by regular mail delivery.

- 1. USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
- 2. Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.
- 3. Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s)).
- 4. List the titles and dates for all plans and other materials submitted with this NOI.

a. Plan Title: b. Plan Prepared By: c. Plan Signed/Stamped By: d. Revised Final Date: e. Scale:

CENTRAL STREET &
RESERVOIR STREET
ROADWAY
IMPROVEMENT
PROJECT

GCG ASSOCIATES,
INC.

MICHAEL J. CARTER, P.E. July 20, 2022

1"=20'

- 5. If there is more than one property owner, please attach a list of these property owners not listed on this form.
- 6. Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.
- 7. Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed.
- 8. Attach NOI Wetland Fee Transmittal Form.
- 9. Attach Stormwater Report, if needed.

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City/Town:AVON

E. Fees

1. Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

_____	_____
2. Municipal Check Number	3. Check date
_____	_____
4. State Check Number	5. Check date
_____	_____
6. Payer name on check: First Name	7. Payer name on check: Last Name

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

_____	_____
1. Signature of Applicant	2. Date
_____	_____
3. Signature of Property Owner(if different)	4. Date
_____	_____
5. Signature of Representative (if any)	6. Date

For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:

If the applicant has checked the "yes" box in Section C, Items 1-3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
WPA Form 3 - Notice of Wetland Fee Transmittal
Form
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
 MassDEP File #:
 eDEP Transaction #:1403118
 City/Town:AVON

A. Applicant Information

1. Applicant:

a. First Name	WILLIAM	b. Last Name	FITZGERALD		
c. Organization	TOWN OF AVON, DPW				
d. Mailing Address	65 EAST MAIN STREET				
e. City/Town	AVON	f. State	MA	g. Zip Code	02322
h. Phone Number	5085880414	i. Fax	5085590209	j. Email	wfitzgerald@avon-ma.gov

2. Property Owner:(if different)

a. First Name	GREGORY	b. Last Name	ENOS		
c. Organization	TOWN OF AVON (TOWN ADMINISTRATOR)				
d. Mailing Address	65 EAST MAIN STREET				
e. City/Town	AVON	f. State	MA	g. Zip Code	02322
h. Phone Number	5085880414	i. Fax	5085886024	j. Email	genos@avon-ma.gov

3. Project Location:

a. Street Address	RESERVOIR STREET	b. City/Town	AVON
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Are you exempted from Fee? (YOU HAVE SELECTED 'YES')

Note: Fee will be exempted if you are one of the following:

- City/Town/County/District
- Municipal Housing Authority
- Indian Tribe Housing Authority
- MBTA

State agencies are only exempt if the fee is less than \$100

B. Fees

Activity Type	Activity Number	Activity Fee	RF Multiplier	Sub Total
	City/Town share of filing fee	\$0.00	State share of filing fee	\$0.00
			Total Project Fee	\$0.00

1.0 PROJECT SUMMARY

Project Analysis Summary

The Town of Avon's Department of Public Works proposes to reconstruct approximately 900+/- linear feet of Reservoir Street (section from Town of Stoughton Town Line (Station 73+87+/-) to the City of Brockton Town Line (Station 82+84+/-). Reservoir Street in the Town of Avon is a collector street connecting to the City of Brockton abutting a residential high density zoning district (in Brockton).

This is a re-development and new-development (with new impervious surface) project that creates approximately 0.13 acres of new impervious surface by widening the existing roadway by less than a single lane to include a shared-use path/ sidewalk. Proposed stormwater management controls will be applied to the maximum extent practicable under the 310 CMR 10.53.3(f) limited project for the maintenance and improvement of existing public roadways, but limited to widening less than a single lane, adding shoulder, correcting substandard intersections, and improving inadequate drainage systems.

Deep sump catch basins with oil and debris traps are proposed within the reconstructed roadway area to provide TSS removal to the maximum extent practicable.

Existing Conditions

The roadway consists of two paved travel lanes oriented in north-south directions. The paved roadway width inconsistently varies between 22.5 feet to 26 feet and laid out approximately 9 feet off center closer to the west side of the 50 feet wide right-of-way. There are Cape Cod style hot mix asphalt berms on both sides of the pavement with breaks/opening to allow surface runoff sheet flow onto the adjacent wetlands. The road pavement is in extremely poor condition with major alligator cracks and potholes on the entire section of the road. The conditions are beyond repair or overlay, full depth reconstruction is warranted.

The roadway profile has a slight pitch (under 3%) southward to the Brockton City Line. Both roadside shoulders are wooded, with three curb cuts for residential driveway use. There are no drainage structures within this section of roadway. Surface runoff sheet flows off to the adjacent wetlands on both sides of the pavement. The southerly 300+/- feet of roadway surface runoff flows southerly toward the City of Brockton.

Based on the USDA web soil survey, the soil along the right-of-way consists of Hydrologic Soil Groups (HSG) 'A' and 'B' soils and are considered well drain soil.

Proposed Work

This project is the Phase III of the Central Street reconstruction project initiated by the Town of Avon. Over the past two construction seasons, the Avon Department of Public Works through their annual paving contractor had completed Phase I and Phase II of the project, which consists of approximately 7,450 linear feet of roadway and sidewalk/bike path construction and reconstruction in the Town of Avon and through the Town of Stoughton. Proposed Phase III consists of reclaim and full depth reconstruction of Reservoir Street (also known as Central Street by the Town of Stoughton), which continues from the end of Phase II at Station 74+00+/- near the Stoughton Town Line to the City of Brockton Town Line, Station 82+90+/-.

Central Street/Reservoir Street
Avon, MA
20103

roadway reconstruction consists of reclaiming approximately 900 linear feet of existing pavement with variable width, regrading, and repaving of the roadway with uniform 11-foot-wide travel lanes, and the addition of vertical granite curbing and a variable width multi-use path/sidewalk, as well as drainage improvements.

This project is a limited project under 310 CMR 10.53.3(f).

Massachusetts Stormwater Management Standards

Per Massachusetts Stormwater Handbook Standard 7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3 and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5 and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

This report presents a comparative analysis of the pre-development and post-development hydrologic characteristics of the site, and outlines the proposed measures to mitigate flow, provide groundwater recharge, and improve water quality from the site. The best management practices (BMPs) outlined in this report include measures to meet the municipal and the Massachusetts Department of Environmental Protection (DEP) requirements. Below is a summary of how the design complies with each applicable DEP standard with respect to the Massachusetts Stormwater Handbook Chapter 3 Volume 2 "Checklist for Redevelopment Projects."

Standard 1: No new stormwater conveyances (e.g. outfalls) may discharge untreated directly to or cause erosion in wetlands or waters of the Commonwealth.

- No new outfalls are proposed under this project.

Standard 2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

- This project is a limited project under 310 CMR 10.53.3(f) for maintenance and improvement of existing public roadways, but limited to widening less than a single lane, adding shoulders, correcting substandard intersections, and improving inadequate drainage systems. The Stormwater Management Standards will be applied to the Maximum Extent Practicable. The applicant has utilized all available right-of-way area within the project to control the stormwater runoff.
- This section of Reservoir Street consists of approximately 21,310 square feet of paved roadway with Cape Cod berm. The proposed roadway reconstruction will repave approximately 20,134 square feet of hot mix asphalt roadway and Cape Cod berm on the north side and a new 10 feet to 6 feet wide sidewalk/bike path with vertical granite curb along the south side of the roadway, with total impervious area of 27,241 square feet. A net increase of 5,931 square feet of impervious area. There will be slight increase of peak runoff due to the new paved sidewalk. There are limited shoulder area and unable to mitigate the increased runoff. Since this is an

improvement of existing roadway limited project and new construction of bikepath/sidewalk for pedestrian access, the Stormwater Management Standards should apply to the maximum extent practicable. The slight increases of surface runoff are unavoidable but meets the intend of maximum extent practicable requirements.

Standard 3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from the pre-development conditions based on soil type. This standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

- Limited Project Maximum Extent Practicable. Project created loss of recharge due to the net increase of impervious sidewalk/bikepath area. With the limited right-of-way width, installing any infiltration/recharge BMPs within the shoulder area will not meet the property line and wetland resource area setback requirements.

Standard 4: Stormwater management systems shall be designed to remove 80% of the average annual post construction load of Total Suspended Solids (TSS).

- TSS removal was provided with the proposed installation of deep sump catch basins with oil and debris traps pretreatment to the maximum extent practicable.

Standard 5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable.

- The project is not a Land Use with Higher Potential Pollutant Load (LUHPPL).

Standard 6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook.

- This project is not located within Zone II.

Standard 7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3 and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5 and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

- This is a Limited Project and qualifies as a Re-Development and New-Development Project with maximum extent practicable to treat and recharge stormwater runoff.

Standard 8: A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentations, and pollution prevention plan) shall be developed and implemented.

- Erosion control during construction is mitigated by the attached construction period pollution prevention and sedimentation control plan.

Standard 9: A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

- Long-term O&M Plan and Log for Central Street & Reservoir Street Roadway Improvement Project are included in this application. This project, along with the existing drainage system, is operated and maintained by the Avon DPW under their town-wide stormwater O&M Schedule.

Standard 10: All illicit discharges to the stormwater management system are prohibited.

- See attached Illicit Discharge Statement.

Resource Area Summary

Three wetland resource areas were delineated by Ivas Environmental, Environmental Sciences, Wetlands and Planning Services on December 21, 2021, and field located by this office in December 2021.

An isolated wetland (WF-A1 to WF-A14) in the Town of Avon was delineated along and within the east side of the Reservoir Street right-of-way between Stations 80+30+/- and 82+10+/- . This resource area is a bordering vegetated wetland (BVW) surrounding a ponding area that may have the volume of ¼ acre-foot six inches deep once a year for Isolated Land Subject to Flooding (ILSF) requirements.

The WF-A20 to WF-A32 series wetland area is located off the west side of the street right-of-way in the Town of Stoughton.

These two wetland resource areas are connected through a culvert underneath Reservoir Street to an existing drainage system that flows southerly towards the Brockton City Line.

The WF-A40 to WF-A46 series wetland area was also delineated on the west side of Reservoir Street in the Town of Stoughton, as shown on the plan. This BVW was identified as isolated wetland and non-jurisdiction. See attached Wetland Report by Ivas Environmental.

Conclusion

Sediment barriers consisting of straw wattle filter tubes and silt sacks are to be installed prior to site development to protect the drainage system and Resource Areas. Additionally, the construction specifications and requirements related to this project require the reconstruction process to adhere to Construction Best Management Practices regarding dewatering, erosion, and sedimentation control. The proposed deep sump catch basins with oil and debris traps are

designed to meet the maximum extent practicable for this limited project. Due to the restricted right-of-way area, constrained by existing utility poles and delineated resource areas, and the Massachusetts Stormwater Handbook (MSH) Standards the applicant believes they have achieved the maximum practicable intent of this project.

**APPENDIX A:
Project Maps**



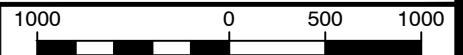
IMAGES OBTAINED FROM: "OFFICE OF GEOGRAPHIC AND ENVIRONMENTAL INFORMATION (MASSGIS), COMMONWEALTH OF MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS"

GCG ASSOCIATES, INC.
 84 MAIN STREET
 WILMINGTON,
 MASSACHUSETTS
 (978) 657-9714

USGS Site Locus Map

**Reservoir Street
 Avon, Massachusetts**

Plan Ref.



Scale: 1" = 1000' SCALE IN FEET

Date: 7/21/2022

Rev:

1

National Flood Hazard Layer FIRMette

71°03'57"W 42°06'30"N



Legend

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

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE)
Zone A, V, A99
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*

Future Conditions 1% Annual Chance Flood Hazard *Zone X*
 Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
 Area with Flood Risk due to Levee *Zone D*

OTHER AREAS OF FLOOD HAZARD

NO SCREEN *Zone X*
 Area of Minimal Flood Hazard *Zone X*
 Effective LOMRMs *Zone D*
 Area of Undetermined Flood Hazard *Zone D*

OTHER AREAS

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

Cross Sections with 1% Annual Chance Water Surface Elevation
 Coastal Transect
 Base Flood Elevation Line (BFE)
 Limit of Study

OTHER FEATURES

Jurisdiction Boundary
 Coastal Transect Baseline
 Profile Baseline
 Hydrographic Feature

Digital Data Available
 No Digital Data Available
 Unmapped

MAP PANELS



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **7/21/2022 at 10:25 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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



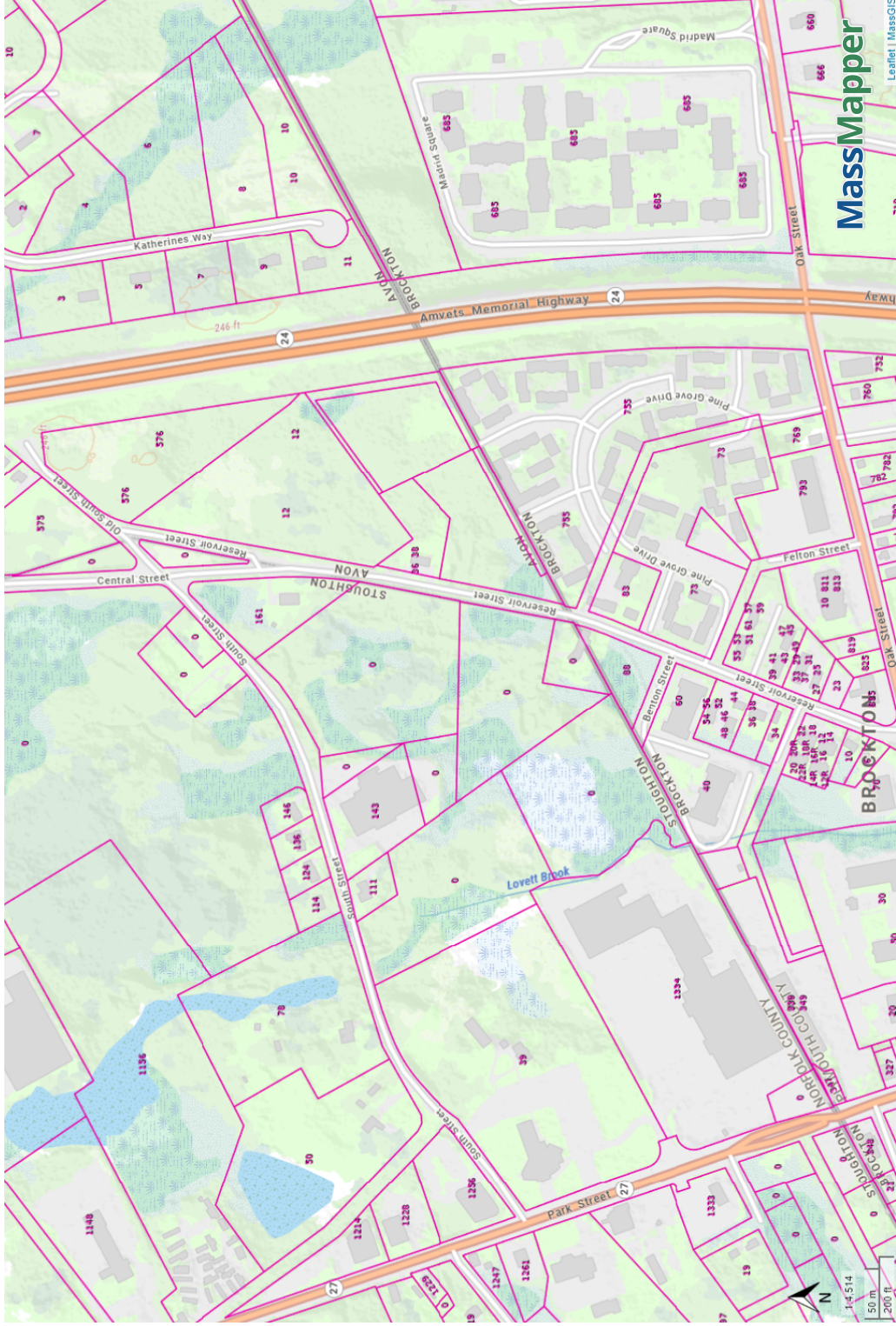
71°03'19"W 42°06'31"N



Basemap: USGS National Map; Orthoimagery: Data refreshed October, 2020

NHESP

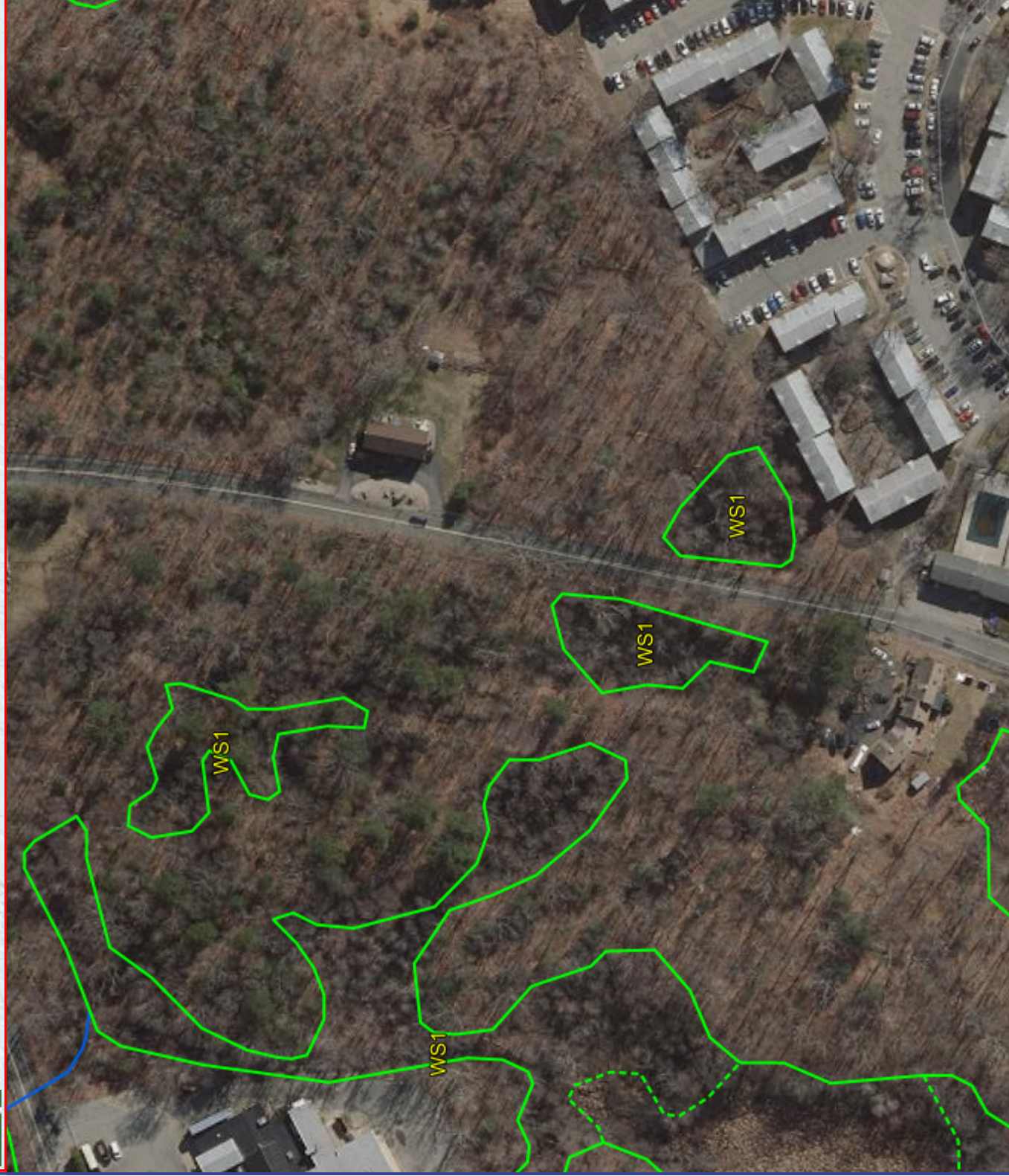
- NHESP Certified Vernal Pools *
- NHESP Ecoregions □
- NHESP Estimated Habitats of Rare Wildlife □
- NHESP Natural Communities □
- NHESP Priority Habitats of Rare Species □
- Property Tax Parcels □





MassDEP Online Map Viewer

Wetland and Wetland Change Areas Map

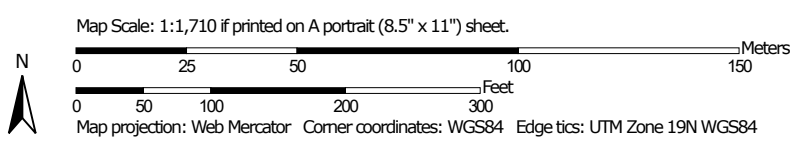


**APPENDIX B:
Soil Map & Classification**

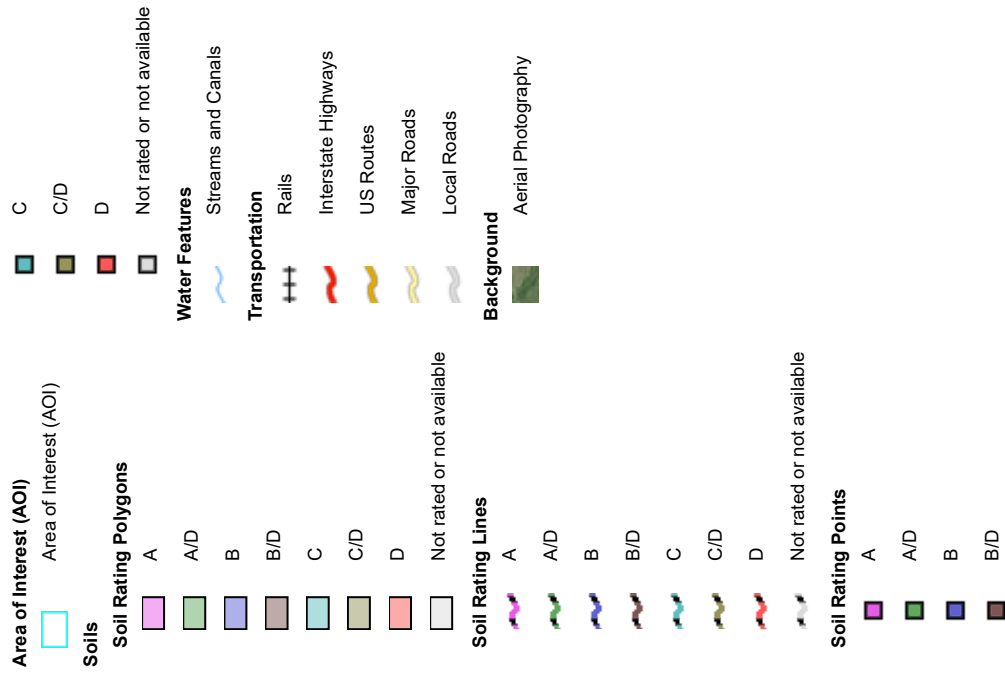
Hydrologic Soil Group—Norfolk and Suffolk Counties, Massachusetts, and Plymouth County, Massachusetts
(Reservoir Street, Avon, MA)



Soil Map may not be valid at this scale.



MAP LEGEND



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:25,000.

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

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

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

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

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
 Survey Area Data: Version 17, Sep 3, 2021

Soil Survey Area: Plymouth County, Massachusetts
 Survey Area Data: Version 14, Sep 2, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Sep 25, 2020—Oct 4, 2020

MAP LEGEND

MAP INFORMATION

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
245C	Hinckley loamy sand, 8 to 15 percent slopes	A	0.7	58.0%
260B	Sudbury fine sandy loam, 2 to 8 percent slopes	B	0.4	32.8%
420B	Canton fine sandy loam, 3 to 8 percent slopes	B	0.0	1.7%
Subtotals for Soil Survey Area			1.1	92.6%
Totals for Area of Interest			1.2	100.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	A/D	0.1	7.4%
Subtotals for Soil Survey Area			0.1	7.4%
Totals for Area of Interest			1.2	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

**APPENDIX C:
Stormwater Standards**



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 8²
- 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.



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.

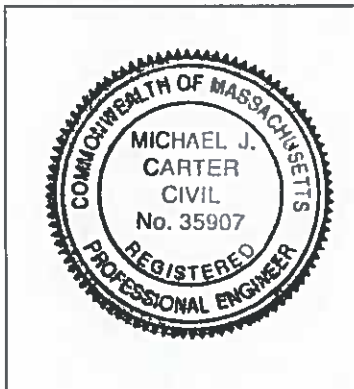
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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



Michael J. Carter

7/25/2022

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): Installation of deep sump catch basins with oil and debris traps/ hoods.

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 Field¹
- 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.

Site Soils

Drainage classes have been established based on soil maps provided by U.S. Department of Agriculture Natural Resources Conservation Service. Soil maps and descriptions are part of the “Norfolk and Suffolk Counties, Massachusetts, Soil Survey Area Data: Version 17, September 3, 2021” and “Plymouth County, Massachusetts, Soil Survey Area Data: Version 14, September 2, 2021.” On-site soils along the project length of Reservoir Street in Avon, Massachusetts are classified as:

Norfolk and Suffolk Counties Soil Survey Area

- 245C Hinckley loamy sand, 8 – 15% slopes: HSG A
- 260B Sudbury fine sandy loam, 2 – 8% slopes: HSG B
- 420B Canton fine sandy loam, 3 – 8% slopes: HSG B

Plymouth County Soil Survey Area

- 260B Sudbury fine sandy loam, 3 – 8% slopes, HSG A/D

As shown in the supporting USDA NRCS Soil Map the pre-development roadway area within the project is mostly HSG A/B.

On-Site Pre-Development Conditions

The existing roadway pre-development conditions consist of country drainage conditions with curb cuts along both the east and west roadway edges to allow for roadway runoff to travel over land to the wetlands located on either side of Reservoir Street.

Runoff within the delineated wetlands (Series WF-A1 to WF-A14 and Series WF-A20 to WF-A32) travel to concrete headwalls situated on both the east and west sides of the roadway, near STA 82+00, and travel through the existing closed drainage system on Reservoir Street towards the Brockton City Line.

Post Development Conditions

No reasonable areas along Reservoir Street are viable for drainage treatment and storage due to the close proximity of the roadway to the Town’s right-of-way and the delineated wetlands. TSS removal is provided with the proposed installation of deep sump catch basins with oil and debris traps, a minimum sump depth of 4 feet below the oil trap, to the maximum extent practicable.

STANDARD #8

CONSTRUCTION PERIOD POLLUTION PREVENTION AND SEDIMENTATION EROSION CONTROL PLAN

RESERVOIR STREET
AVON, MASSACHUSETTS

I. INTRODUCTION

The maintenance program below provides for a general construction plan with specific requirements for the Central Street & Reservoir Street Roadway Improvement Project and stormwater management controls. The program is based on the recommended standards presented in the DEP Stormwater Management Policy Handbook dated February 2008.

II. RESPONSIBILITY AND IMPLEMENTATION

The implementation and execution of this maintenance program shall be the responsibility of the construction period contractor.

Construction activities shall conform to the approved project construction plans referenced below and any other regulations or requirements of the Town of Avon. Mulch filter tubes and silt fence shall be installed prior to construction. All sediment controls shall be in place before construction shall begin and shall be properly maintained throughout the course of construction. During construction, silt laden runoff shall not be permitted.

All BMPs and sediment controls shall be inspected, by the contractor, on a weekly basis and within 24 hours of a rain event that generates more than ½" of rain in a 24-hour period.

Should any dewatering activities be required, the contractor shall make certain that all pumped water is free of sediment prior to discharging. The methods for removing any sediment shall be approved by the Town prior to any dewatering activities commencing.

III. MAINTENANCE AND INSPECTION SCHEDULE

Maintenance of Stormwater BMP's

The following temporary and permanent erosion and sediment control BMPs are to be implemented in the stormwater management system and shall be monitored and maintained to assure continuous and effective performance. All inspections shall be conducted in accordance with the required schedule indicated below. Maintenance and repair shall be performed as required or if the effectiveness of the BMP is diminished.

A. Catch Basins with Deep Sumps

Each catch basin shall be protected with silt sacks and stone, as shown on the details contained in the project plan set referenced below. All accumulated sediment, debris, etc., should be removed as necessary. All sediment and debris removed from the silt sacks or catch basins

shall be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations. Catch basins with deep sumps should also be inspected on a monthly basis. Any required maintenance or repairs noted during the inspection should be addressed immediately.

B. Compost Sock & Orange Construction Fence

Compost Socks shall be installed per project plan set referenced below and should be inspected regularly, as well as after each rainfall event, to ensure that they are intact and the area behind the tube is not filled with sediment. If there is excessive ponding behind the sock or accumulated sediments reach the top of the sock, an additional sock should be added on top or in front of the existing filter sock in these areas, without disturbing the soil or accumulated sediment. If the compost sock tube was overtopped during a storm event, the operator should consider installing an additional compost sock on top of the original, placing an additional compost sock further up the slope, or using an additional BMP, such as a compost blanket in conjunction with the tube(s). Construction fence shall be inspected regularly, and torn or damaged sections repaired immediately.

Maintenance requires the removal of sediment before it has accumulated to one-half of the above ground height of any perimeter control

C. Surface Stabilization

The surface of all disturbed areas shall be stabilized during and after construction. Temporary measures shall be taken during construction to prevent erosion and siltation. All disturbed slopes will be stabilized with a permanent vegetative cover. Some or all of the following measures will be utilized on this project as conditions may warrant.

- a. Temporary seeding (perform weekly if establishment is less than 80%)
- b. Temporary mulching
- c. Permanent seeding (perform weekly if establishment is less than 80%)
- d. Placement of sod
- e. Hydroseeding
- f. Placement of Hay
- g. Placement of Jute Netting

D. Preserve Natural Vegetation and Buffer Zones

Inspect limit of disturbance boundary for encroachment and Injury/exposure of tree roots. Inspections shall be conducted daily.

E. Dust Control

Apply/re-apply dust control measures to minimize dust from the site. Dust control activities shall be performed daily during dry weather.

Inspection Requirements

All temporary and permanent erosion and sediment controls shall be inspected by qualified personnel. Inspection Technician shall assess the conditions of the site, the effectiveness of any erosion and sediment controls and provide recommendations and directions to ensure effective control of stormwater runoff, and suitable water quality discharge from construction activity.

Inspections shall include the entire area within the limit of disturbance of construction activity and stockpile/staging areas. A report shall be prepared identifying all areas of erosion, sediment accumulation, the condition and of all BMP's (structural and non-structural) and identify those in need of repair.

Maintenance

The site contractor is responsible for the installation and maintenance of all construction period erosion and sedimentation controls and BMP's. Prior to acceptance and approval of the completed stormwater management system, the entire system shall be inspected and cleaned in order to ensure the system will function as designed.

If it is observed through the course of construction that modifications to the system are necessary to provide proper treatment the work shall be performed prior to the next storm event.

IV. REFERENCES

- Plan Set: Central Street & Reservoir Street Roadway Improvement Project. Plans prepared by GCG Associates, Inc., and dated July 20, 2022.

STANDARD #9

STORMWATER AND DRAINAGE OPERATION AND MAINTENANCE PLAN

RESERVOIR STREET AVON, MASSACHUSETTS

I. INTRODUCTION

The maintenance program below provides for a general construction plan with specific requirements for the Central Street & Reservoir Street Roadway Improvement Project Plan and stormwater management controls. The program is based on the recommended standards presented in the DEP Stormwater Management Policy Handbook dated February 2008.

II. RESPONSIBILITY AND IMPLEMENTATION

Owner/Operator: Avon Department of Public Works
Town Hall Offices
65 East Main Street
Avon, MA 02322

Owner Signature:

Date:

The property owner is the owner of all components of the drainage system as listed in Section III below, until property ownership is transferred, at which the drainage system becomes the property of the successive owner. The implementation, execution, and financing of this maintenance program and emergency repairs shall be the responsibility of the property owner until property ownership is transferred, at which time maintenance and repairs shall be the responsibility of the successive owner.

III. MAINTENANCE AND INSPECTION SCHEDULE

A. Catch Basin with Deep Sump System and Drainage Manhole

Catch basins with deep sumps and drainage manholes should be inspected four (4) times per year and after every major storm event. All accumulated sediment, debris, organic matter, etc., should be removed during this time. All sediment and debris removed from the catch basins should be properly handled and disposed of in accordance with local, state, and federal guidelines and regulations. Any required maintenance or repairs noted during the inspection should be addressed immediately. During each inspection, the drains should be inspected for evidence of clogging, and if necessary, any maintenance shall be performed so that it functions as designed. The catch basin shall be cleaned twice per year, and when sediment in the bottom of the sump reaches 24 inches below the bottom of the outlet pipe. At a minimum, inspection of the catch basin shall be performed during the last week of April and the first week of October each year.

B. Grassed Slope

Grassed slope area adjacent to the roadway (where possible) should be mowed weekly between the months of May to September and a minimum of once per year in March or early April. Regular maintenance tasks include mowing, fertilizing, watering, pruning, weeding, and pest control. Maintain an average grass height of 4-6 inches to maintain the depth necessary to serve as a conveyance. Re-seed periodically to maintain the dense growth of grass vegetation.

C. Street Sweeping

Driveway, associated parking areas, and sidewalks adjacent to the roadway (where possible) should be swept by a street sweeper a minimum of twice per year. Street sweeping four times per year is recommended. Vacuum street sweepers are recommended.

IV. YEARLY MAINTENANCE BUDGET

	Activity	Cost	Frequency/year	Total
A.	Catch Basins	\$500.00	2	\$1,000.00
F.	Grassed Slope Mowing	\$50.00	3	\$150.00
G.	Street Sweeping	\$300.00	2	\$600.00
	Total		=	\$1,750.00

V. REFERENCES

Plan Set: Central Street & Reservoir Street Roadway Improvement Project. Plans prepared by GCG Associates, Inc. and dated July 20, 2022.

Stormwater System Inspection Checklist

INSPECTOR'S NAME & DATE:

NAME & ADDRESS OF FACILITY:

GENERAL OBSERVATIONS (IS WATER FLOWING?):

WEATHER:

	Checked? (Y/N)	Maintenance Needed? (Y/N)	Maintenance Completed/ Observations & Remarks
Catch Basin with Deep Sump System and Drain Manhole <ul style="list-style-type: none"> • Inspect 4 times per year and after major storm events • Clean twice per year 			
Look for damage or cracks to frame, grate, basin walls, or bottom. If found, repair or replace.			
Look for sediment and trash in catch basin sump. Clean out if sediment fills 60% of the sump or comes within 24" of outlet pipe.			
Look for blockages and vegetation obstructing pipe inlets and outlets. Remove blockages.			
Remove trash blocking grates or inlets; replace if broken.			
Grassed Slope <ul style="list-style-type: none"> • Should be mowed weekly between the months of May to September. 			
Regular maintenance tasks include mowing, fertilizing, watering, pruning, weeding, and pest control. Maintain an average grass height of 4-6 inches to maintain the depth necessary to serve as a conveyance. Re-seed periodically to maintain the dense growth of grass vegetation.			
Street Sweeping <ul style="list-style-type: none"> • Street sweeping shall be performed at least 4 times per year. 			
Remove any accumulated sediment, debris, organic matter, etc. with standard street sweeping equipment. All sweepings removed must be handled and disposed of properly according to the federal, state, and local regulations.			

Standard #10: All illicit discharges to the stormwater management system are prohibited.

I. STATEMENT

This site as shown on the plan titled “Central Street & Reservoir Street Roadway Improvement Project”, prepared by GCG Associates, Inc. and dated July 20, 2022 does not contain any illicit discharges, this was confirmed using visual screening as required by standard 10 of the “Massachusetts Stormwater Handbook” Vol. 1, Ch. 1 page 25. The project proponent, owner, or lessee (in perpetuity) must comply with local, state, and federal regulations for the discharge of illicit discharges from the site. Illicit discharges are discharges that are not entirely comprised of storm water. Notwithstanding the foregoing, an illicit discharge does not include discharges from the following activities:

- Fire fighting
- Water line flushing
- Landscape irrigation
- Uncontaminated ground water
- Potable water sources
- Foundation drains
- Air conditioning condensation
- Footing drains
- Individual car washing
- Water used for street washing and water used to clean residential buildings without detergents

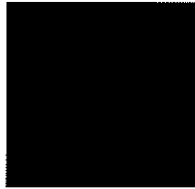
The project proponent, owner, or lessee (in perpetuity) shall adhere to this report on file with the Town of Avon Conservation Commission.

**APPENDIX D:
Project Abutter Information**

BOARD OF ASSESSORS
Warren B. Lane, Chairman
Cynthia A. Bernasconi, Clerk
Jonathan D. Madore

ASSISTANT ASSESSOR
Paul J. Sullivan, MAA 978

Town of Avon Massachusetts



Town Offices
Buckley Center
65 East Main Street
Avon, MA 02322
(508) 588-0414
FAX (508) 559-0209
www.avon-ma.gov

BOARD OF ASSESSORS

REQUEST FOR ABUTTERS LIST

APPLICANT INFORMATION NAME: Anthony Ma

ADDRESS: 84 Main Street, Wilmington, MA 01887

PHONE #: 978-657-9714 Ext. 207

REQUEST FOR ABUTTERS LIST OF PARCELS WITHIN 300 FEET OF PROPERTY

LOCATED AT Reservoir Street

MAP B1 BLOCK 1 LOT 1

REASON FOR REQUEST: Town of Avon, Conservation Commission, Notice of Intent filing

DATE OF REQUEST: 03 / 14 / 2022

APPLICANT SIGNATURE: Anthony Ma, P.E.

AMOUNT DUE WITH APPLICATION: \$25.00 Waiver requesting on behalf of the Town of Avon DPW.

ELECTRONIC COPY (EXCEL SPREADSHEET): TO **YOUR** FLASH DRIVE OR EMAILED TO YOU: AN ADDITIONAL \$5.00 CHARGE.

EMAIL ADDRESS: tma@gcgassociates.net

300' CERTIFIED ABUTTERS LIST

AVON ASSESSORS MAP B1-1-1
 FOR:
 GCG ASSOCIATES, INC.

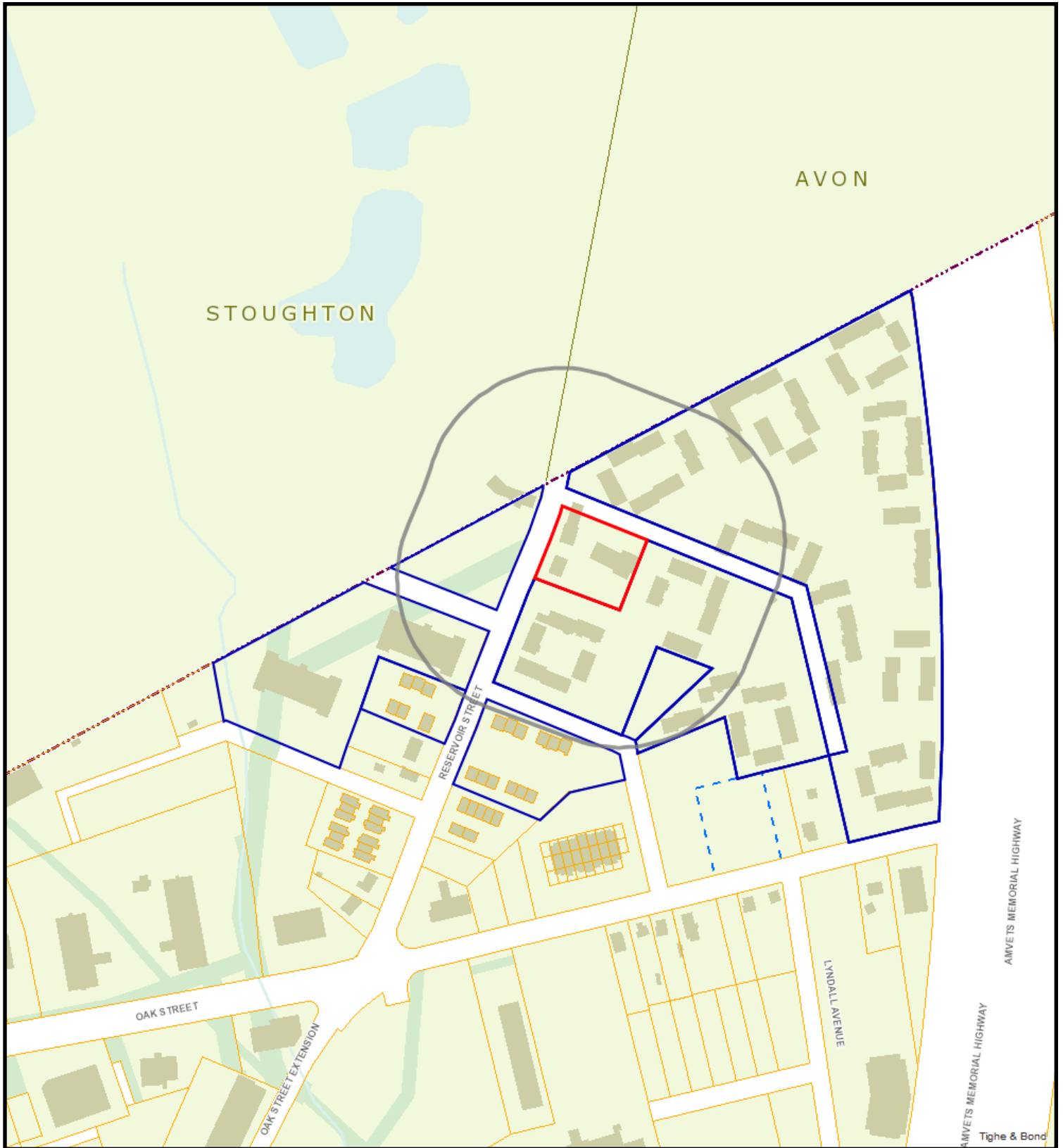
Board of Assessors

Certified Copy

Paul J. Sullivan

As of 12/31/21

Map	Block	Lot	Location	Owners Name	Mailing Address	City	St Zip
B1	1	2	Reservoir St.	Toan Realty Trust, Paul Annese, Tr.	6623 Robert Drive	S. Easton	MA 02375
B1	1	3	12 Reservoir St.	12 Reservoir St. Realty Trust, T.L. Edwards Realty LLC - Tr.	80 South St.	Avon	MA 02322
B1	1	5	36-38 Reservoir St.	Moniz, Adriano & Moniz, Maria A.	36-38 Reservoir St.	Avon	MA 02322
B1	1	6	Reservoir St.	Fonseca, Anna P.	36-38 Reservoir St.	Avon	MA 02322
B1	1	7	Reservoir St.	Fonseca, Anna P.	36-38 Reservoir St.	Avon	MA 02322



300' Abutters

3/10/2022 5:33:45 PM

Scale: 1"=300'

Scale is approximate

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



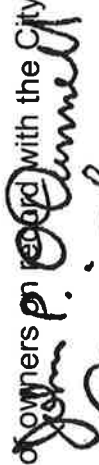
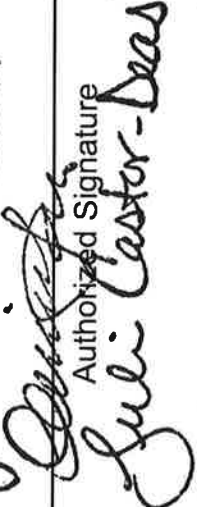
<i>Property Location</i>	<i>Owner Information</i>	<i>Address Information</i>	<i>Deed Information</i>
FELTON ST <u>Map/Route Plot</u> 014-028 3	LEVENTHAL ROBERT	TWO CENTER PLAZA STE 700 BOSTON MA 02108	Book 03665 Page 00305 Date
40 RESERVOIR ST <u>Map/Route Plot</u> 013-087 28	HAMILTON OAKS ASSOCIATES LLC	39 BRIGHTON AVE BOSTON MA 02134	Book 18156 Page 36 Date 19991223
73 RESERVOIR ST <u>Map/Route Plot</u> 014-027 5	PINE HOMES LIMITED PARTNERSHIP	TWO CENTER PLAZA STE 700 BOSTON MA 02108	Book 18155 Page 138 Date 19991223
73 RESERVOIR ST <u>Map/Route Plot</u> 014-027 5	PINE HOMES LIMITED PARTNERSHIP	TWO CENTER PLAZA STE 700 BOSTON MA 02108	Book 18155 Page 138 Date 19991223
73 RESERVOIR ST <u>Map/Route Plot</u> 014-027 5	PINE HOMES LIMITED PARTNERSHIP	TWO CENTER PLAZA STE 700 BOSTON MA 02108	Book 18155 Page 138 Date 19991223
83 RESERVOIR ST <u>Map/Route Plot</u> 014-025 1	BEACON PINE GROVE ASSOC I ETAL	TWO CENTER PLAZA STE 700 BOSTON MA 02108	Book 03813 Page 00574 Date

<i>Property Location</i>	<i>Owner Information</i>	<i>Address Information</i>	<i>Deed Information</i>
88 RESERVOIR ST <u>Map/Route Plot</u> 013-093 26	DEVONISH GWENDOLINE	88 RESERVOIR ST BROCKTON MA 02301	Book 46373 Page 259 Date 20151211
755 OAK ST <u>Map/Route Plot</u> 014-033 120	BEACON PINE GROVE ASSOC I ETAL	TWO CENTER PLAZA STE 700 BOSTON MA 02108	Book 03658 Page 00795 Date
755 OAK ST <u>Map/Route Plot</u> 014-033 120	BEACON PINE GROVE ASSOC I ETAL	TWO CENTER PLAZA STE 700 BOSTON MA 02108	Book 03658 Page 00795 Date
755 OAK ST <u>Map/Route Plot</u> 014-033 120	BEACON PINE GROVE ASSOC I ETAL	TWO CENTER PLAZA STE 700 BOSTON MA 02108	Book 03658 Page 00795 Date
49 RESERVOIR ST <u>Map/Route Plot</u> 013-511 9	MOLLOY JUDITH E TRUSTEE	49 RESERVOIR ST BROCKTON MA 02301	Book 41383 Page 1 Date 20120517
44 RESERVOIR ST # 56 <u>Map/Route Plot</u> 013-607-612 24			Book Page Date

<i>Property Location</i>	<i>Owner Information</i>	<i>Address Information</i>	<i>Deed Information</i>
44 RESERVOIR ST #52 <u>Map/Route Plot</u> 013-610 Null	STEWART DEWITT	44 RESERVOIR ST #52 BROCKTON MA 02302	Book 19066 Page 34 Date 20001114
44 RESERVOIR ST #54 <u>Map/Route Plot</u> 013-611 Null	LAURENTCOMEAU NAOMIE	44 RESERVOIR ST UNIT 54 BROCKTON MA 02301	Book 46058 Page 154 Date 20150918
44 RESERVOIR ST # 56 <u>Map/Route Plot</u> 013-612 Null	ALEXANDER FELICIA L	56 RESERVOIR ST BROCKTON MA 02301	Book 49200 Page 282 Date 20171120
51 RESERVOIR ST <u>Map/Route Plot</u> 013-500 Null	CALDER CLINTON A TR	19 LINDENPARK DR #68 RANDOLPH MA 02368	Book 47917 Page 39 Date 20161222
53 RESERVOIR ST <u>Map/Route Plot</u> 013-501 Null	ROBERSON SHAREL A	53 RESERVOIR ST BROCKTON MA 02301	Book 53916 Page 262 Date 20201201
55 RESERVOIR ST <u>Map/Route Plot</u> 013-502 Null	ANGLIN LAUREN L	55 RESERVOIR ST UNIT 55 BROCKTON MA 02301	Book 40453 Page 141 Date 20111017

Property Location	Owner Information	Address Information	Deed Information
57 RESERVOIR ST <u>Map/Route Plot</u> 013-503 Null	ODIERNO RANDY S	57 RESERVOIR ST UNIT 57 BROCKTON MA 02301	Book 29577 Page 51 Date 20041201
59 RESERVOIR ST <u>Map/Route Plot</u> 013-504 Null	ESPINO FRANK	59 RESERVOIR ST UNIT 59 BROCKTON MA 02301	Book 49868 Page 72 Date 20180601
61 RESERVOIR ST <u>Map/Route Plot</u> 013-505 Null	WILLIAMS GWENDOLYN S	61 RESERVOIR ST UNIT 6 BROCKTON MA 02301	Book 21289 Page 3 Date 20020104

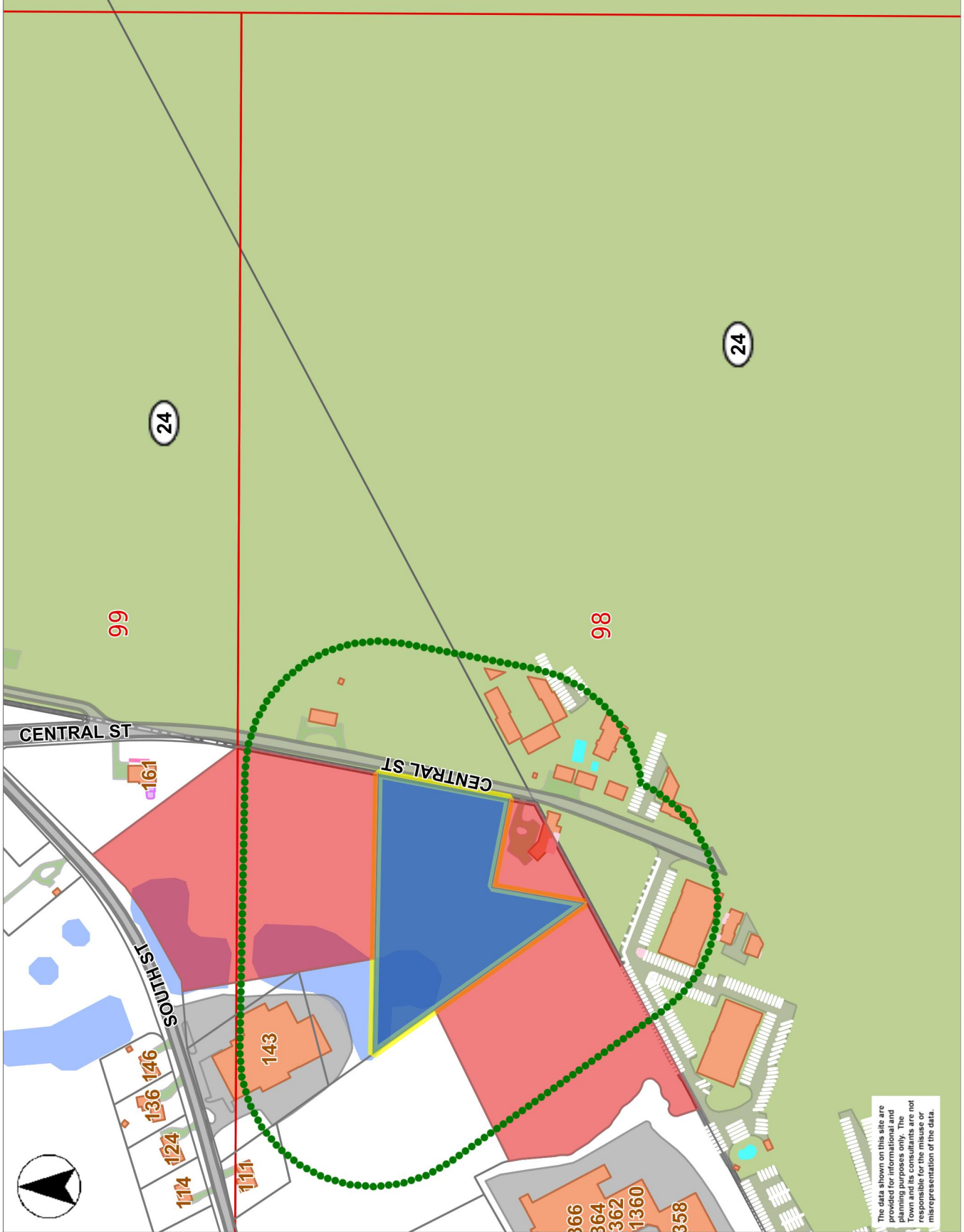
This report contains the certified list of owners recorded with the City of Brockton

John P. Dinnell

 Authorized Signature
 Julie Castor-Deas


Map/Route 014-025
 Plot: 1
 Property Location: 83 RESERVOIR ST



- Parcels
- Parcel_Grid_2018
- Buildings 2020
- Deck
- Construction
- Fuel Tank
- Mobile
- Pad-Patio
- Porch
- Pump Island
- Shed
- Water Tower
- Sport Areas 2021
- Walkways 2020
- Pools 2020
- Road Markings 2020
- Public Roads 2022
- State Owned
- Town Owned
- Private Roads 2022
- Private (Paved)
- Private (Unpaved)
- Un-Constructed Roads 2020
- Driveway October 2020
- Parking 2020
- Sidewalks 2022
- Police Station
- Fire Station
- Public Library
- MA Highways
- Interstate
- US Highway
- Numbered Routes
- Town Boundary
- Abutting Towns
- Abutting Town Labels
- Railroad



The data shown on this site are provided for informational and reference purposes only. The Town and its consultants are not responsible for the misuse or misrepresentation of the data.



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parcel id	abutters_owner1	abutters_owner2	abutters_address	abutters_town	state	zip
098 007 0	CULHANE AMANDA PAULINE	CULHANE DEREK PAUL	111 SOUTH STREET	STOUGHTON	MA	02072
099 016 0	PETERSON F H MACH CORP		143 SOUTH STREET	STOUGHTON	MA	02072
098 006 0	TOWN OF STOUGHTON		10 PEARL ST	STOUGHTON	MA	02072
098 001 0	R K PINE TREE PLAZA LLC	C/O RK CENTERS	50 CABOT STREET SUITE 200	NEEDHAM	MA	02494
099 015 0	PETERSON F H MACH CORP		143 SOUTH STREET	STOUGHTON	MA	02072
098 005 0	PETERSON F H MACH CORP		143 SOUTH STREET	STOUGHTON	MA	02072
098 004 0	URBAN STANLEY B & STEFANIE TRS	THE URBAN REALTY TRUST	28 WINNECUNNET DR	NORTON	MA	02766
098 003 0	URBAN STANLEY B TRUSTEE	URBAN REALTY TRUST	28 WINNECUNNET DR	NORTON	MA	02766
098 002 0	DEVONISH GWENDOLINE	LEWIS BETTY	88 RESERVOIR ST	BROCKTON	MA	02401

CERTIFIED COPY

**APPENDIX E:
Wetlands Report**



**Ivas Environmental
Environmental Sciences
Wetlands and Planning Services**

**315 Winter Street
Norwell MA 02061-1401
781.659.1690, spivas@comcast.net**

**Town of Avon Conservation Commission & Stoughton Conservation Commission
Avon Town Hall
65 East Main Street
Avon MA 02322**

22 Dec 21

**Stoughton Town Hall
10 Pearl Street
Stoughton MA 02072**

**Environmental Letter Report
A Reach of Reservoir Road in Avon and Central Street in Stoughton**

1. Introduction.

This letter report is written to summarize wetland resources adjacent to a reach of Reservoir Road in Avon and Central Street in Stoughton. The roadway is extant in the two towns, so it has two names. The report is written to support the filing of a Notice of Intent (NOI) under the Commonwealth's Wetlands Protection Act and its implementing regulations (310 CMR 10.00), and the Draft Avon Wetlands Rules and Regulations and the Stoughton Non-Zoning Wetlands Protection Bylaw, amended 12 Jul 12, and C. 91 of the Stoughton Town Code amended 10 Jul 2010. The proposed project is the construction of improvements to Reservoir St./Central St.

Four figures are attached. Fig. 1 shows the Site Locus. Fig. 2 shows the MassGIS 0.5-m Color Orthophoto with other data layers overlain. Fig. 3 shows Natural Heritage and Endangered Species data layers. Figure 4 provides the National Flood Hazard FEMA FIRM "Firmette" flood zones in the general area. A NRCS WebSoilSurvey report is also attached, that provides the Natural Resources and Conservation Services (NRCS) details of the soils in the area around Reservoir/Central Streets.

2. General Site Description.

The Streets are oriented close to north-south, and begin at the Brockton City Boundary. Stoughton is to the west and Avon is to the east. The reach also begins at the Brockton City Boundary.

There are three wetlands that are adjacent to the Streets: one is in Avon, on the east side of the streets, and two are in Stoughton, on the west side of the streets.

The east side parcel is B1-1, a 2.56 acre parcel just north of the City Boundary, and directly north of an apartment cluster at numbers 415 and 427 Pine Grove Drive, Brockton. The apartment cluster is directly adjacent to a Bordering Vegetated Wetland (BVW) that is connected to another BVW across the streets to the west through a culvert under the streets that drains from east to west.

In Stoughton, there are two separate parcels on the west side of the streets. These parcels are characterized as 98-3 and 98-4 from south to north, by the Town of Stoughton Assessors' Office. They have an area of 3.6 and 5.8 acres, respectively.

The streets appear to be in the Lovett Brook watershed, part of the greater Taunton River Watershed that flows south to Mt. Hope Bay.

The surrounding land use is undeveloped, some due to wetlands, and residential, with light industrial and commercial as one moves west into Stoughton. Multi-family residential is extant in the City of Brockton, and across the limited access highway (Route 24) to the east is Brockton Reservoir.

The site topography rises from the wetlands area to the roadways, that is constructed above the elevation of the wetlands. Please see the attached Fig. 1 for the general location of the roadways reach, and Fig. 2 for a more defined location.

3. Wetlands Resources Boundary Determination Methodology.

The extent of the Bordering Vegetated Wetland was determined through observations of the existing plant communities, soils, and hydrology in accordance with 310 CMR 10.55 (2) and the Handbook prepared by Massachusetts Department of Environmental Protection entitled *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act* (March 1995).

Specifically, the methodology utilized the "fifty percent criteria" to determine whether the area is dominated by wetland indicator plants or upland plant species. Notes were taken of overstory, shrub story, herbaceous story, and vine story at each flag location. The upland/wetland boundary of the IVW on the site is demarcated with blue surveyors' tape flags with an alpha-numeric beginning with IE (for Ivas Environmental), and then a sequential number, e.g, IE A14 is the last flag in the first BVW series.

3.1 Measurement of Floristic Characteristics.

3.1.1. Plant Species Identification.

Ivas Environmental identified plant species comprising 5% or greater of the vegetative cover in the existing BVW. Identifications were made to the species level when morphologically possible and were used in conjunction with topography, to define the boundary of BVW in accordance with definitions and criteria in 310 CMR 10.00.

3.1.2 Identification of Wetland Indicator Species.

The regional wetland indicator status of all identified plant species were obtained from the classification system described in the US Army Corps of Engineers Northcentral and Northeast 2014 Regional Wetland Plant List from the Cold Regions Research and Engineering Laboratory, although the *National List of Plant Species that Occur in Wetlands: Massachusetts* (Reed 1988), is listed within the Commonwealth's Wetlands Protection Act as the regulatory reference. The rationale for utilizing the more recent US Army Corps of Engineers list is that the science has progressed well during the past 25 years, and all wetland resource regulators and delineators should use the most recent and accepted science. The difference between the 2014 and 1988 lists is that the plus and minus modifiers have been removed from the wetland indicators of the 1988 List, and that some species have changed categories.

The system divides plant species into five categories ("wetland indicator status") based on the frequency of their occurrence in wetland habitat, and has been adopted by the Department of Environmental Protection (DEP) as the definitive source regarding the indicator status of wetland plants.

The indicators address the range of estimated probabilities of a species occurring in wetlands versus non-wetlands. These probabilities are expressed as percentages, and called a frequency of occurrence. There are five major categories: **Obligate (OBL)**, for those plants that almost always occur in wetlands (estimated probability of > 99%) under natural conditions; **Facultative Wetland (FACW)**, for those plants that usually occur in wetlands (67 - 99%); **Facultative (FAC)**, for those plants that are equally likely to occur in non-wetlands or wetlands (estimated probability of 34-66%); **Facultative Upland (FACU)**, those that usually occur in non-wetlands (estimated probability of 67-99%), but sometimes found in wetlands (estimated probability of 1 - 33%); and **Obligate Upland (UPL)** plants that may occur in wetlands in another region, but occur almost always in non-wetlands (estimated probability of 99%) under natural conditions in this State.

Additional information that assists in forming a delineation line are the condition regarding the presence or absence of hydric soils and/or obvious hydrology near the surface of the ground.

3.1.3. Wetlands Resource Area Delineation On Site.

The wetland resources delineation occurred on 21 Dec 21. Weather conditions were clear to hazy skies, no wind at ground level, temperatures in the low 40s, and rain two days previous. There was about a half-inch of ice on the open water areas within the various wetlands.

Please review the attached plan by CGC Assoc., Inc., for the locations of the Bordering Vegetated Wetland (BVW) flags.

3.2. Wetland Resource Areas.

There are two BVWs adjacent to the roadways reach, one east and one west. There is an Isolated Freshwater Wetland on the west side of the roadways. These resources are described in the following sections.

3.2.1. Bordering Vegetated Wetland (BVW).

BVWs are defined as *freshwater wetlands which border on creeks, rivers, streams, ponds, and lakes and where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants* [310 CMR 10.55(2)(a)]. The boundary of BVW is defined at 310 CMR 10.55 (2) (c) as the line within 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.

The issuing authority must evaluate vegetation and indicators of saturated or inundated conditions if submitted by a credible source, or may require credible evidence of saturated or inundated conditions when determining the boundary. Indicators of saturated or inundated conditions sufficient to support wetland indicator plants shall include one or more of the following:

- a. Groundwater, including the capillary fringe, within a major portion of the root zone;
- b. observation of prolonged or frequent flowing or standing water; and
- c. characteristics of hydric soils.

3.2.1.1 East Bordering Vegetated Wetland (BVW).

This BVW surrounds a ponding area that may have the volume of 1/4 acre-foot six inches deep once a year (ILSF requirements) that is just north of an apartment complex that is in the City of Brockton. The edge of the landscaped area north of the complex is at the top of the slope by the BVW. The roadways embankment forms the westerly edge of this wetland resource. An old woods road is extant along the northerly side of the site. Flags IE A1 through IE A14 ring a portion of the wetland.

The down-gradient overstory is a mix of red maple (*Acer rubrum*, FAC), ash (*Fraxinus* sp.), occasional yellow birch (*Betula alleghaniensis*, FAC) and tupelo (*Nyssa sylvatica*, FAC). The down-gradient sapling and shrub story is a mix of sweet pepperbush (*Clethra alnifolia*, FAC), common winterberry (*Ilex verticillata*, FACW), invasive common buckthorn (*Rhamnus frangula*, FAC), invasive Norway maple (*Acer platanoides*, UPL), and sparse yellow birch. The down-gradient herbaceous story, where extant (ice covered most of the area) is sweet pepperbush, common winterberry, common buckthorn, common greenbrier (*Smilax rotundifolia*, FAC), thick in some areas and absent in others, poison ivy

(*Toxicodendron radicans*, FAC) of both the tree-climbing form and the groundcover form, occasional cinnamon fern (*Osmunda cinnamomea*, FACW), and a few red maple seedlings. The liana story is poison ivy and Asian bittersweet (*Celastrus orbiculata*, FACU). Some Virginia creeper (*Parthenocissus quinquefolia*, FACU) is also present.

The up-gradient overstory present after the landscaping at the apartment complex and the roadways embankment management is sparse red maple, a few yellow birches, black oak (*Quercus velutina*, UPL), red oak (*Quercus rubra*, FACU) a few white oaks (*Quercus alba*, FACU), and some tupelo. The up-gradient shrub and sapling stories include common buckthorn, sweet pepperbush, American witch hazel (*Hamamelis virginiana*, FACU), invasive multiflora rose (*Rosa multiflora*, FACU), and a few northern red, black, and white oaks. The shrub and sapling stories are relatively open up-gradient. The up-gradient herbaceous story is similar to the shrub story up-gradient, and adds a few herbaceous species, e.g., invasive garlic mustard (*Alliaria petiolata*, FACU), one of the docks, deer-tongue grass (*Dichanthelium clandestinum*, FACW), both forms of poison ivy noted above, and the common greenbrier and sweet pepperbush. The liana story is poison ivy as well as Invasive Asian bittersweet, and Virginia creeper, all sparse.

In summary, the BVW is a Deciduous Forested Swamp, also known as a red maple swamp, and has the MA DEP designation of WS1, observable on Figure 2, attached in the green polygon outlined by blue near the Avon/Brockton Town/City line. The majority of the wetland area was under water (ice) on 21 Dec 21.

3.2.1.2 West Bordering Vegetated Wetland.

The westerly BVW has a bit different character - it does not have a shrub sapling, or overstory in its center, being mostly a sedge that is an emergent plant during December, 2021. There is much of it, and it appears healthy, so the elevation of the water has not affected it to date. This wetland resource is more linear along the roadways, and picks up some water from the first BVW through a culvert under the roadways at the southerly limit of the wetland area. Flags IE A20 through IE A32 ring the easterly portion of this wetland.

The down-gradient overstory here is a strip of red maple, tupelo, yellow birch, and a few eastern white pines (*Pinus strobus*, FACU) and black birch (*Betula lenta*, FACU). The sapling and shrub story has very sparse highbush blueberry (*Vaccinium corymbosum*, FACW), invasive common buckthorn, eastern white pines, and sweet pepperbush. The herbaceous story is a mix of common greenbrier, invasive common buckthorn, and sweet pepperbush, with a few sassafras (*Sassafras albidum*, FACU) and poison ivy (both the groundcover and liana form up trees). Tussock Sedge (*Carex stricta*, OBL) appear to be the sedge, however the water was too deep to approach it closely without a boot change and a struggle through the greenbrier thickets (thus it was not approached closely). The liana story is poison ivy, Asian bittersweet, and common greenbrier, that creates thickets in some areas.

The up-gradient overstory is red maple, black oak, red oak, invasive Norway maple, and black cherry (*Prunus serotina*, FACU), and yellow birch. The up-gradient sapling and shrub story (both quite open) are invasive common buckthorn, sweet pepperbush, and invasive Norway maple. The up-gradient herbaceous layer is sweet pepperbush, invasive common buckthorn, poison ivy, bracken fern (*Dennstaedtia punctilobula*, FACU), escaped periwinkle (*Vinca minor*, UPL), eastern white pine, some northern red oak, one of the spruces, and common greenbrier, dense in some areas, and absent in others. The liana story is poison ivy, Asian bittersweet, and common greenbrier.

This BVW is about half Deciduous Forested Swamp and half Open Marsh - it appears to have a higher value for wildlife due to the shallow open water portion that may serve as a stop for migrating waterfowl. Open Marshes are disappearing from the landscape, so it is an important wildlife area. It can be observed on Figure 2, attached, as the more linear green polygon surrounded by a blue line along the westerly side of the roadways.

3.2.2 Inland Isolated Freshwater Wetland.

This wetland area is not connected to any other wetland, and is a small area that does not qualify as an Isolated Land Subject to Flooding (ILSF). It is north of the previous BVW, separated from it by a approximately four-foot high ridge. It is along the westerly side of the roadways, which has a stone wall supporting an embankment for a portion of its reach. The wetland flags are labeled IE A40 through IE A46, and are set in a U-shaped configuration, with the bottom of the "U" along the roadways.

The down-gradient overstory is a mixed forest - tupelo, red maple, eastern white pine, and northern red oak. The down-gradient shrub and sapling stories are highbush blueberry, eastern white pine, sparse maleberry (*Lyonia ligustrina*, FACW), and sweet pepperbush, also mixed well. The herbaceous story that can be observed in December is cinnamon fern (more here than in the BVWs), maleberry, eastern white pine, and invasive common buckthorn.

The up-gradient overstory is a mix of eastern white pine and northern and black oak. The up-gradient sapling and shrub stories contain northern red oak, eastern white pine, American witch hazel, sassafras, and sweet pepperbush. The herbaceous story is a mix of American witch hazel, eastern white pine, invasive common buckthorn, bracken fern, white oak, sweet pepperbush, and princess-pine (*Lycopodium obscurum*, FACU).

This small isolated wetland is a much more mixed area. It is not large enough to be considered an Isolated Land Subject to Flooding, however a very small pooling area is extant in the middle, not more than about 15 feet in diameter, and a few inches deep (not deep enough to be considered a Potential Vernal Pool).

3.2.4 Bordering Land Subject to Flooding (BLSF)

BLSFs are defined at 310 CMR 10.57 (1) (a) as "...an area which floods from a rise in a bordering waterway or water body."

Bordering Land Subject to Flooding (BLSF) is defined at 310 CMR 10.57(2)(a) as "BLSF is an area with low, flat topography adjacent to an inundated by flood waters rising from creeks, rivers, streams, ponds or lakes. It extends from the banks of these waterways and water bodies; where a bordering vegetated wetland occurs, it extends from said wetland." The definition section continues: "The boundary of BLSF is the estimated maximum later extent of flood water which will theoretically result from the statistical 100-year frequency storm. Said boundary shall be that determined by reference to the most recently available flood profile data prepared for the community within which the work is proposed under the National Flood Insurance Program (NFIP, currently administered by the Federal Emergency Management Agency, successor to the U.S. Department of Housing and Urban Development).

Please review the attached Figure 4. The Flood Insurance Rate Map (FIRM) number 25021C0381E transferred to the Flood Emergency Management Agency (FEMA) Data layer shows a flood zone designation of "X", on all of the property directly adjacent to the reach of the roadways, which is defined as an area that has been determined to be outside the one percent and 0.2 percent (100- and 500-year return frequencies) floodplains.

Therefore, there is no BLSF on or adjacent to the roadways.

4. MA NHESP Program Designation - Habitats of Rare Species and Vernal Pools

4.1 Estimated and Priority Habitats

The Massachusetts Natural Heritage and Endangered Species Program (MA NHESP) 2021 Natural Heritage Atlas data layers for the Estimated Habitats of Rare Wildlife and the Priority Habitats of Rare Species are shown on the attached Figure 3.

The closest Estimated Habitat is EH 571, about 20,000 ft south and slightly east of the roadways site. The closest Priority Habitat is PH 772, about 10,000 ft south and west of the roadways. **Both of these are in other sub-watersheds, and work on the roadways can have no impact on the closest Estimated and Priority Habitats.**

4.2 Certified Vernal Pools (CVPs).

The closest Certified Vernal Pool is about 2,000+ feet to the northeast, across Rt. 24 and in another sub-watershed. Is labeled CVP 3354

Work on the subject roadways cannot affect this CVP.

5. Area Soils Description

Please see the attached NRCS Web Soil Survey Soils Report. **There are two types of soils map units on the parcel. These soil types are:**

<u>Soil Map Unit</u>	<u>Description</u>
256C	Hinckley loamy sand, 8 to 15 percent slopes
260B	Sudbury fine sandy loam, 2 to 8 percent slopes

Please see the NRCS Soils report, attached, for a detailed description of the soils. Note that neither the Hinckley nor the Sudbury soils are hydric: it is the landforms combined with near-urban runoff drainage patterns from impervious surfaces (an apartment complex) that appear to have created these wetland areas.

6. MassGIS Ortho-photo Figure 2 Description

Please review Fig. 2 - MassGIS Orthophoto and Data Layers around the reach of Reservoir Road/Central Street. The figure's background is the 2019 MassGIS/USGS 0.3-meter Color Orthophotos (19TCG225605.jp2 and 19TCG225590.jp2) with other data layers overlain. Also shown are the 2009 MA DEP Wetlands (madepwet_poly.shp and madepwet_arc_shp), in light green and blue lines, respectively), polygons and boundary lines; MassGIS Elevation Contours (hp18 and 285.shp, in orange, with orange labels showing elevations in feet), NRCS 2010 Norfolk County Soils (lines in white, with soil map units labeled with black outlined in white) and the approximate area of work bounded by magenta lines along the roadways.

7. Summary

The roadways site contains a two Bordering Vegetated Wetlands and an Isolated Freshwater Wetland that is too small to be an Isolated Land Subject to Flooding.

8. Wetlands and Uplands Conclusions and Recommendations

8.1 There are no Estimated Habitats of Rare Wildlife and a Priority Habitats of Rare Species on or adjacent to the subject site. The NOI will not be required to be copied to NHESP.

8.2 There are no Perennial or Intermittent Streams or Bordering Land Subject to Flooding (or FEMA A or worse Flood Zones) on or adjacent to the site

8.3 There are no Certified Vernal Pools on or adjacent to the site.

8.4 Two BVWs are adjacent to the roadways.

8.5 No non-manageable direct or indirect impacts to any wetland resource are anticipated from the proposed project on this site using typical erosion controls, control of excavated soils, and minimal impact construction techniques.

If you have any questions regarding the above or attached information, please contact me. Thank you kindly for your attention to this report.

Sincerely,



Steve Ivas, Principal

- Encl. Fig. 1 - Site Locus, USGS Topo Quad, Reservoir Street Reach, Avon - 21 Dec 21
Fig. 2 - 2019 MassGIS Orthophoto and Data Layers, Reservoir Street Reach, Avon - 21 Dec 21
Fig. 3 - NHESP Issues, Reservoir Street Reach, Avon - 21 Dec 21
Fig. 4 - FEMA FIRM "Firmette" Around Reservoir Street Reach, Avon - 21 Dec 21
NRCS WebSoilSurvey - Along a Reach of Reservoir Street, Avon - 21 Dec 21

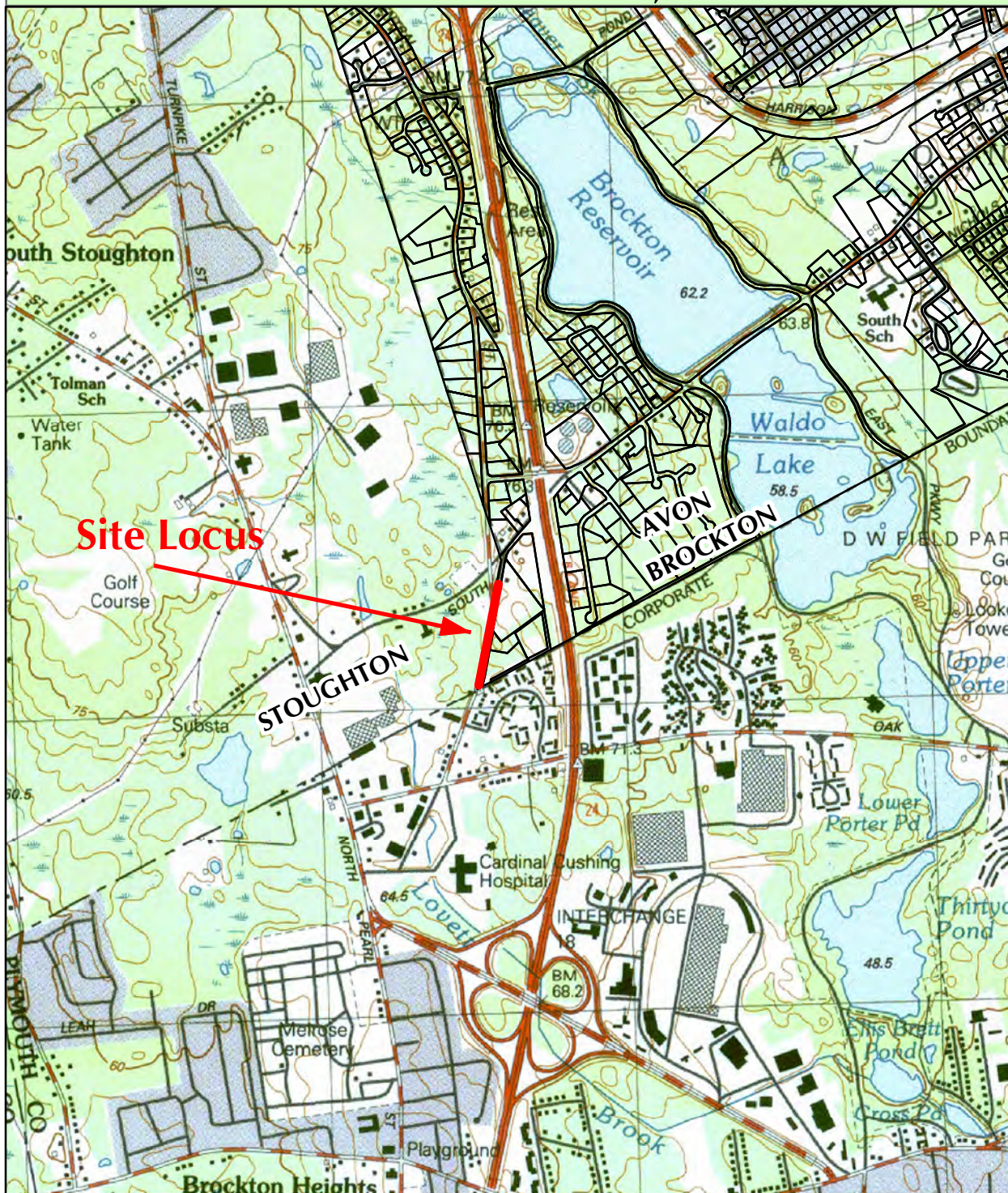
XC: J. Getherall, CGC Assoc. Inc., 94 Main Street, Wilmington MA 01887 (via email)

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Fig. 1 - Site Locus Reservoir Street Reach, Avon



- Reservoir St. Reach
- + Town of Avon Assessors' Tax Parcels

Ivas Environmental
 315 Winter St., Norwell MA 02061-1401
 781.659.1690, spivas@comcast.net

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Sources:
 USGS Seamless Topographic Quadrangles (usgs.sid)
 MassGIS / Avon Assessors' Parcels (par18.shp)
 NHESP 2021 Certified Vernal Pools (cvp.x1.shp)
 NHESP 2021 Estimated Habitats of Rare Wildlife (esthab_pol.shp)
 NHESP 2021 Priority Habitats of Rare Species (esthab_poly.shp)

Projection: Massachusetts State Plane NAD83 M

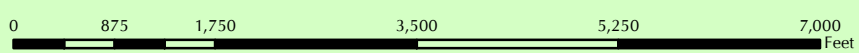
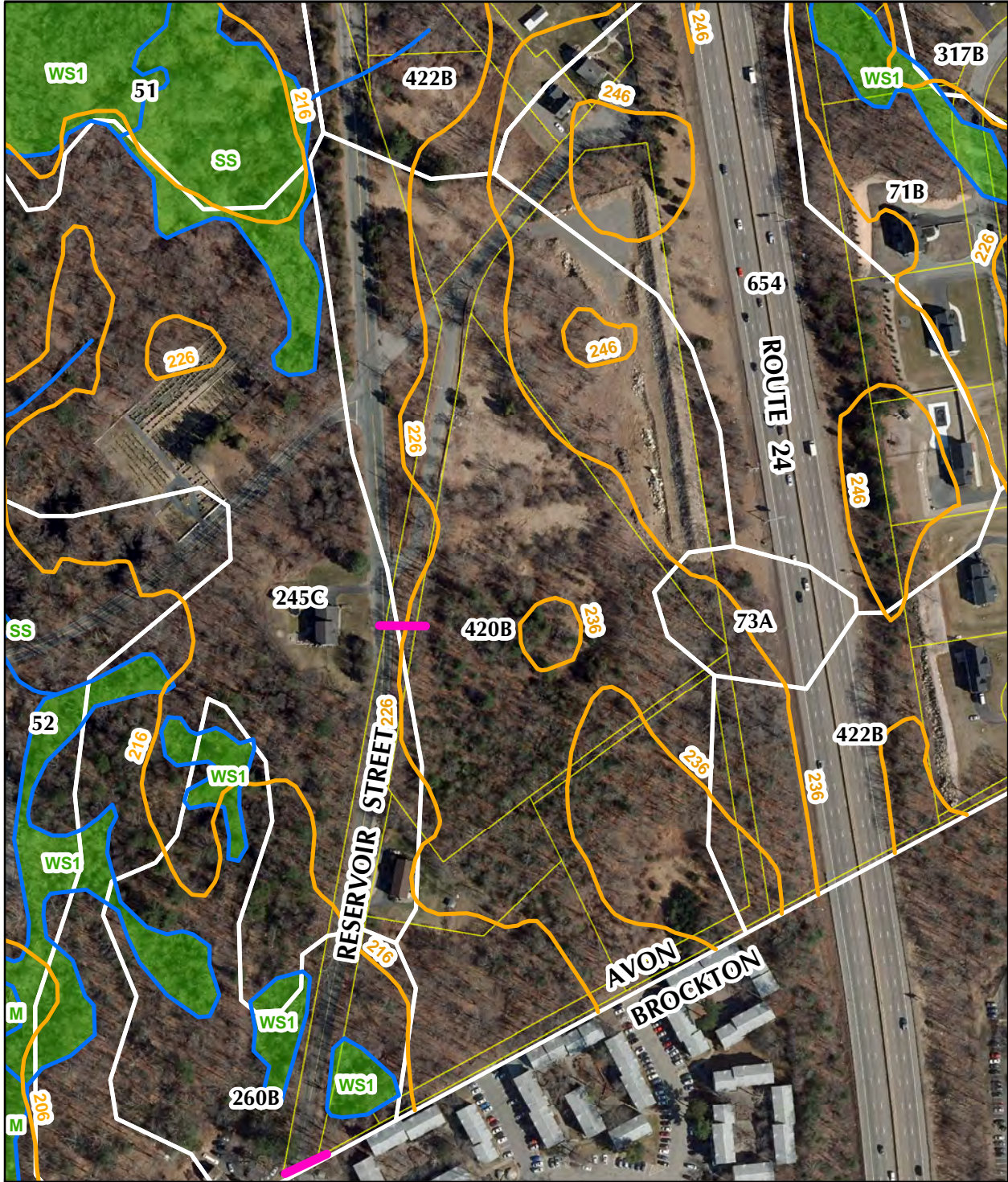




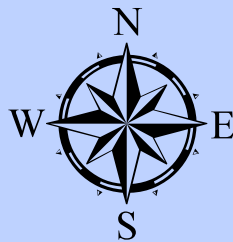


Fig. 2 - 2019 MassGIS Orthophoto & Data Layers Around Reservoir St., Avon



-  Limits of Proposed Work
 -  MA DEP 2009 Wetlands Boundaries
 -  MA DEP 2009 Wetlands Polygons
 -  NRCS Soil Map Units - Norfolk & Suffolk Cos.
 -  Town of Avon Assessors' Tax Parcels
 -  Elevation Contours, Feet
- M Marsh, Meadow, or Fen
 SS Scrub-shrub Marsh
 WS1 Deciduous Forested Swamp

Soils Map Unit Numbers:
 Less than or equal to 74: Hydric Soils
 More than 74: Upland Soils (w/exceptions)



Scale: 1:3,000



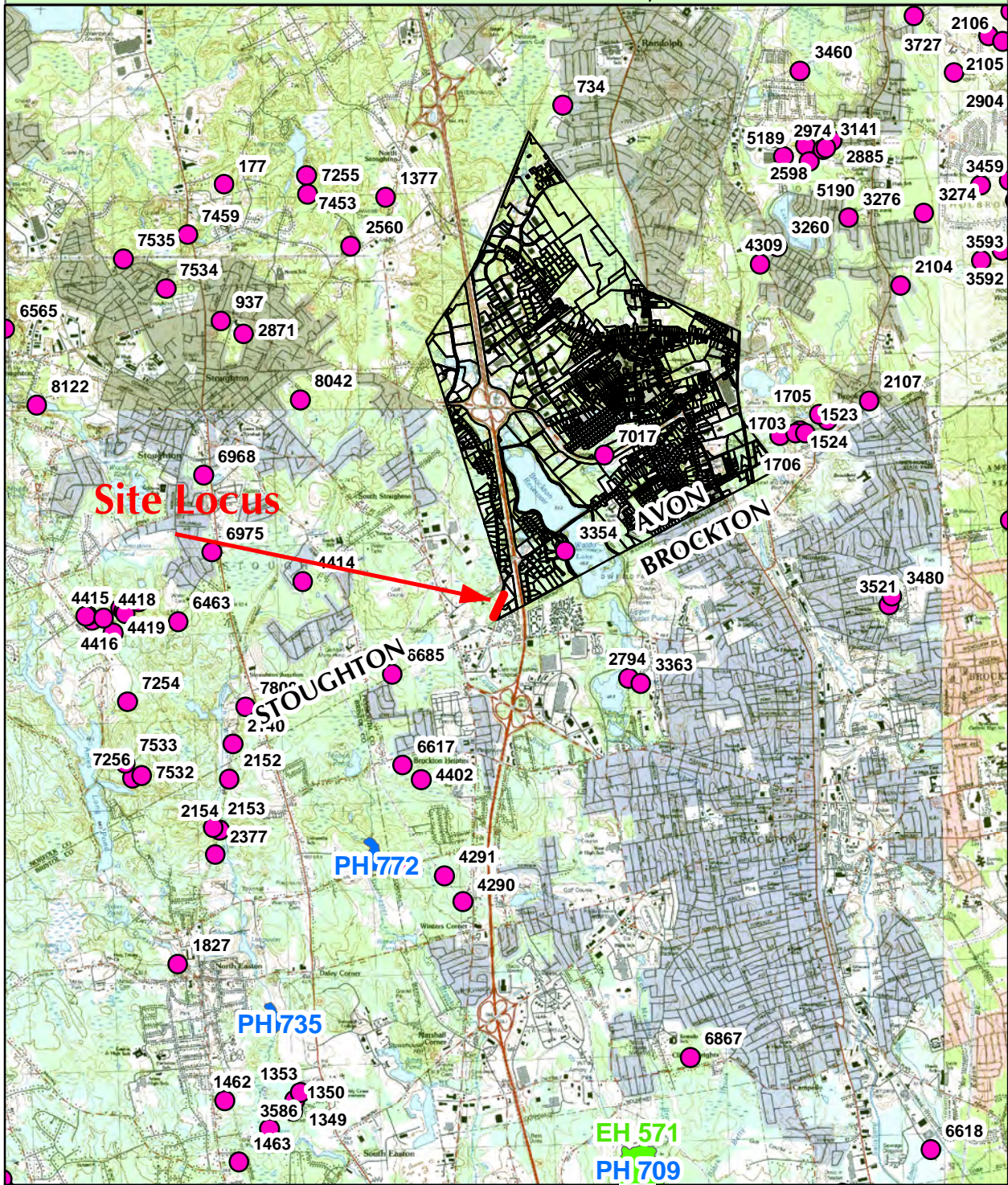
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- Sources:
- MassGIS / 2019 USGS Orthophotos
 - MA DEP Wetlands Polygons (depwetlands_poly.shp)
 - MA DEP Wetlands Boundaries (depwetlands_arc.shp)
 - MassGIS Ten-foot Contour Elevations (hp18.shp)
 - NRCS Norfolk & Suffolk Cos. Soils (soi_norsuf.shp)
 - MassGIS / Avon Assessors' Parcels (par18.shp)

Projection: Massachusetts State Plane NAD83 M

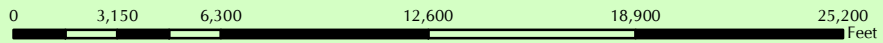
Fig. 3 - NHESP Issues Reservoir Street Reach, Avon



- Reservoir St. Reach
- NHESP 2021 Certified Vernal Pools
- NHESP 2021 Estimated Habitats of Rare Wildlife
- NHESP 2021 Priority Habitats of Rare Species
- Town of Avon Assessors' Tax Parcels



Scale: 1:70,000



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Sources:
USGS Seamless Topographic Quadrangles (usgs.sid)
MassGIS / Avon Assessors' Parcels (par18.shp)
NHESP 2021 Certified Vernal Pools (cvp.x1.shp)
NHESP 2021 Estimated Habitats of Rare Wildlife (esthab_pol.shp)
NHESP 2021 Priority Habitats of Rare Species (esthab_poly.shp)

Projection: Massachusetts State Plane NAD83 M

Figure 4

National Flood Hazard Layer FIRMette



71°13'50"W, 42°52'28"N



0 250 500 1,000 1,500 2,000 Feet 1:6,000

Site Locus by Ivas Environmental - 21 Dec 21 - 315 Winter St., Norwell MA 02061, 781.659.1690, spivas@comcast.net

Legend

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

- SPECIAL FLOOD HAZARD AREAS**
 - Without Base Flood Elevation (BFE) Zone A, V, A99
 - With BFE or Depth Zone AE, AO, AH, VE, AR
 - Regulatory Floodway
- OTHER AREAS OF FLOOD HAZARD**
 - 0.2% Annual Chance Flood Hazard, Area or 2% Annual chance flood with average depth less than one foot or with drainage areas of less than one square mile (Zone 2)
 - Future Flood Hazard Zone X
 - Chance Flood Hazard Zone X
 - Area with Reduced Flood Risk due to Levee, See Notes, Zone X
 - Area with Flood Risk due to Levee Zone D

- OTHER AREAS**
 - NO SCREEN
 - Area of Minimal Flood Hazard Zone X
 - Effective LOMRs
 - Area of Undetermined Flood Hazard Zone
- GENERAL STRUCTURES**
 - Channel, Culvert, or Storm Sewer
 - Levee, Dike, or Floodwall

- OTHER FEATURES**
 - Cross Sections with 1% Annual Chance Water Surface Elevation
 - Coastal Transect
 - Base Flood Elevation Line (BFE)
 - Limit of Study
 - Jurisdiction Boundary
 - Coastal Transect Baseline
 - Profile Baseline
 - Hydrographic Feature

- MAP PANELS**
 - Digital Data Available
 - No Digital Data Available
 - Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/21/2021 at 7:14 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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



United States
Department of
Agriculture

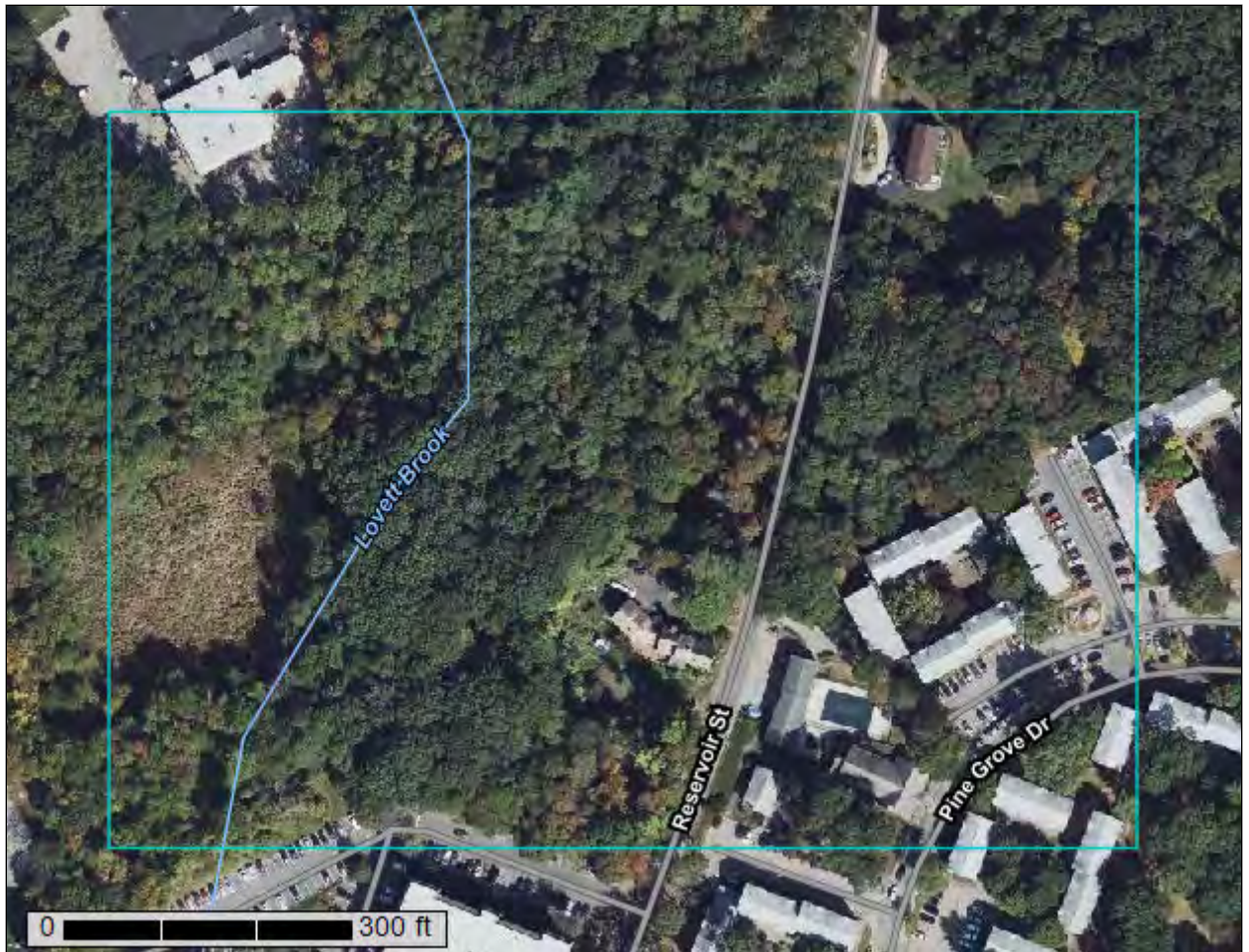
NRCS

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 Norfolk and Suffolk Counties, Massachusetts, and Plymouth County, Massachusetts

Along a reach of Reservoir St., Avon



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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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

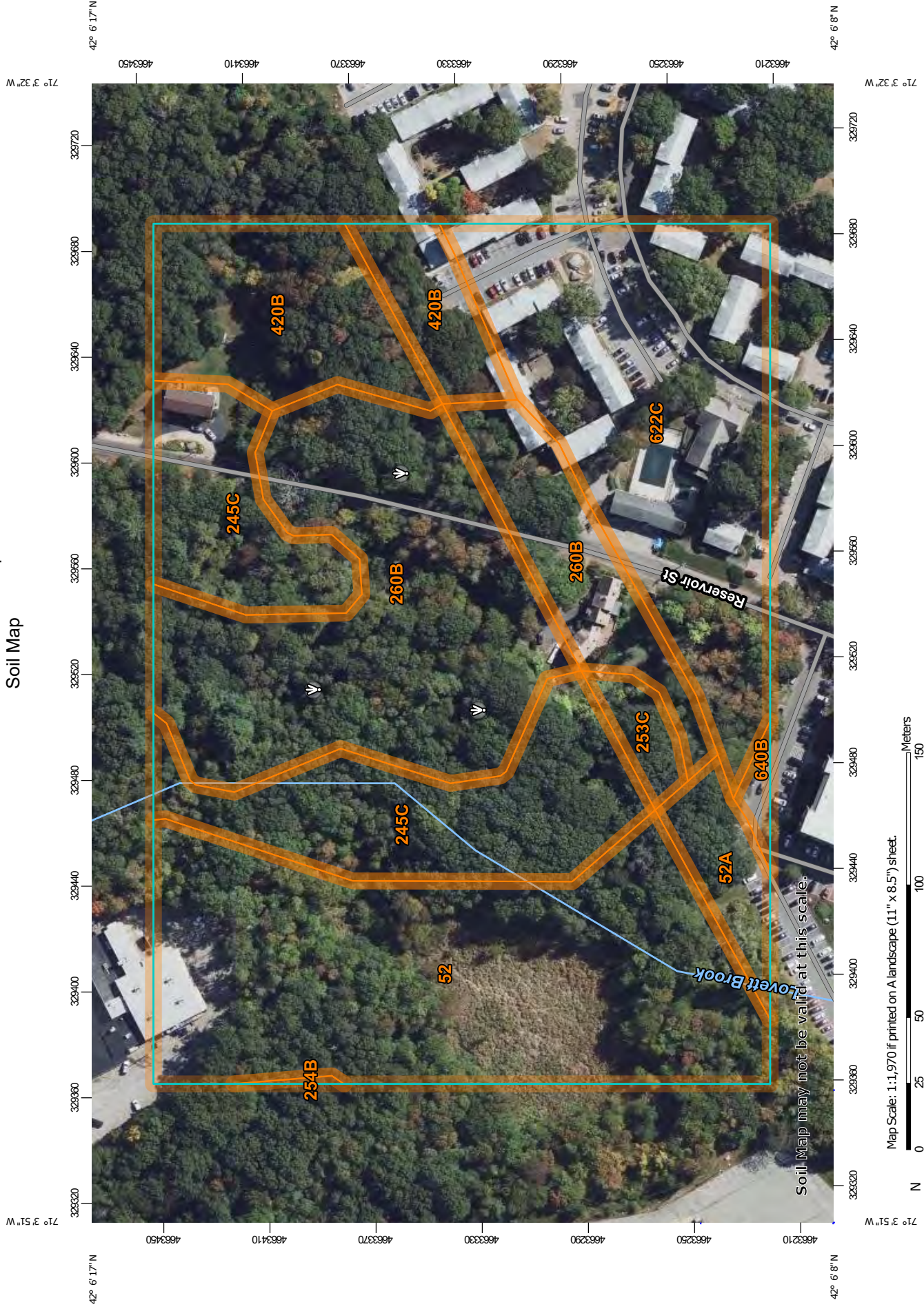
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

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: 1:1,970 if printed on A landscape (11" x 8.5") sheet.



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

MAP LEGEND

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

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:12,000 to 1:25,000.

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

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

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

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

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
 Survey Area Data: Version 17, Sep 3, 2021

Soil Survey Area: Plymouth County, Massachusetts
 Survey Area Data: Version 14, Sep 2, 2021

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

MAP LEGEND

MAP INFORMATION

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

Date(s) aerial images were photographed: Sep 25, 2020—Oct 4, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
52	Freetown muck, 0 to 1 percent slopes	4.6	24.6%
245C	Hinckley loamy sand, 8 to 15 percent slopes	3.0	16.0%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	0.0	0.1%
260B	Sudbury fine sandy loam, 2 to 8 percent slopes	3.7	19.7%
420B	Canton fine sandy loam, 3 to 8 percent slopes	1.4	7.6%
Subtotals for Soil Survey Area		12.7	68.0%
Totals for Area of Interest		18.8	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
52A	Freetown muck, 0 to 1 percent slopes	0.5	2.5%
253C	Hinckley loamy sand, 8 to 15 percent slopes	0.3	1.3%
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	1.0	5.5%
420B	Canton fine sandy loam, 3 to 8 percent slopes	0.5	2.9%
622C	Urban land-Paxton complex, 8 to 15 percent slopes	3.6	19.2%
640B	Urban land, till substratum, 0 to 8 percent slopes	0.1	0.5%
Subtotals for Soil Survey Area		6.0	32.0%
Totals for Area of Interest		18.8	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.

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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

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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.

Norfolk and Suffolk Counties, Massachusetts

52—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

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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

245C—Hinckley loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svm9
Elevation: 0 to 1,480 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

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, moraines, eskers, kames, outwash plains, kame terraces
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave

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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: 8 to 15 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: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

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

Windsor

Percent of map unit: 5 percent
Landform: Moraines, eskers, kames, outwash deltas, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Kames, outwash plains, outwash terraces, moraines, eskers

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Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

254B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
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: All areas are prime farmland

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: Outwash plains, outwash terraces, moraines, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Crest, side slope, 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: 3 to 8 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

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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

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
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

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: 3 percent
Landform: Outwash terraces, dunes, deltas, outwash plains
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Agawam

Percent of map unit: 2 percent
Landform: Outwash plains, outwash terraces, moraines, stream terraces, eskers, kames
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

260B—Sudbury fine sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: vky4
Elevation: 0 to 2,100 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Sudbury

Setting

Landform: Outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Riser
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 11 inches: sandy loam
H2 - 11 to 22 inches: sandy loam
H3 - 22 to 60 inches: gravelly coarse sand

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: 18 to 36 inches to strongly contrasting textural stratification
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: Low (about 4.0 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

Walpole

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

Deerfield

Percent of map unit: 5 percent
Landform: Outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Merrimac

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

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

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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

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Plymouth County, Massachusetts

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

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Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
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

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

253C—Hinckley loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svm9
Elevation: 0 to 1,480 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

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, moraines, eskers, kames, outwash plains, kame terraces
Landform position (two-dimensional): Shoulder, toeslope, footslope, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave

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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: 8 to 15 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: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

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

Windsor

Percent of map unit: 5 percent
Landform: Moraines, eskers, kames, outwash deltas, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, crest, side slope, nose slope, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Kames, outwash plains, outwash terraces, moraines, eskers

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Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope

Landform position (three-dimensional): Side slope, crest, head slope, nose slope, riser

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

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

Map Unit Setting

National map unit symbol: bczx

Elevation: 0 to 400 feet

Mean annual precipitation: 41 to 54 inches

Mean annual air temperature: 43 to 54 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: Terraces, outwash plains, depressions

Landform position (two-dimensional): Shoulder, footslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave

Parent material: Sandy and gravelly glaciofluvial deposits

Typical profile

O_i - 0 to 1 inches: slightly decomposed plant material

O_e - 1 to 2 inches: moderately decomposed plant material

A - 2 to 4 inches: fine sandy loam

Ap - 4 to 13 inches: fine sandy loam

Bw₁ - 13 to 18 inches: fine sandy loam

Bw₂ - 18 to 20 inches: fine sandy loam

2C₁ - 20 to 25 inches: loamy fine sand

2C₂ - 25 to 29 inches: sand

2C₃ - 29 to 39 inches: fine sand

2C₄ - 39 to 79 inches: 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

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Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(1.42 to 5.95 in/hr)

Depth to water table: About 16 to 24 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: A/D

Ecological site: F144AY027MA - Moist Sandy Outwash

Hydric soil rating: No

Minor Components

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

Deerfield

Percent of map unit: 5 percent

Landform: Deltas, terraces, outwash plains

Landform position (two-dimensional): Footslope, shoulder

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent

Landform: Outwash plains, kames, terraces

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Tread

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Massasoit

Percent of map unit: 3 percent

Landform: Drainageways, terraces, depressions

Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Mashpee

Percent of map unit: 2 percent

Landform: Terraces, drainageways, depressions

Landform position (two-dimensional): Toeslope, footslope

Landform position (three-dimensional): Tread

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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): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, crest, nose 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

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

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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): Backslope, footslope, summit
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): Backslope, shoulder, summit
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): Backslope, shoulder, summit
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

622C—Urban land-Paxton complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w67t
Elevation: 10 to 880 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

Urban land: 40 percent

Paxton and similar soils: 35 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 15 percent

Depth to restrictive feature: 0 inches to manufactured layer

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Hydric soil rating: Unranked

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

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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: 10 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: 5 percent
Landform: Ground moraines, hills, drumlins
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Udorthents

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

Ridgebury

Percent of map unit: 5 percent
Landform: Drumlins, depressions, ground moraines, hills, drainageways
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

640B—Urban land, till substratum, 0 to 8 percent slopes

Map Unit Composition

Urban land, till substratum: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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