

**NOTICE OF PUBLIC HEARING
SUDBURY CONSERVATION COMMISSION
Monday, May 8, 2023 at 6:45 PM
Virtual Meeting**

The Sudbury Conservation Commission will hold a public hearing to review the Notice of Intent filing to construct handicap accessible parking, walkways, and picnic areas within the 100-foot Buffer Zone, pursuant to the Wetlands Protection Act and Sudbury Wetlands Administration Bylaw, at 1 Liberty Ledge, Sudbury, MA. Andrew Sheehan, Applicant. The hearing will be held on Monday, May 8, 2023 at 6:45 pm, via remote participation.

Please see the Conservation Commission web page for further information.

<https://sudbury.ma.us/conservationcommission/meeting/conservation-commission-meeting-monday-may-8-2023/>

SUDBURY CONSERVATION COMMISSION
4/26/2023

April 21, 2023

Sudbury Conservation Commission
275 Old Lancaster Road
Sudbury, MA 01776



**Subject: Notice of Intent
Handicap Accessibility Improvements Project
Camp Sewataro, 1 Liberty Ledge**

Dear Commissioners,

Please find enclosed the following for inclusion on the next available Conservation Commission agenda for the subject project:

- Two (2) copies of the bound Notice of Intent with attached Certified List of Abutters
 - Two (2) full-size copies of the Site Plan Drawings (7 sheets) including 2 Survey Plans.
 - Three (3) reduced sized (11X17) copies of the plan set.
- An electronic (.pdf) copy of the above documents will be emailed to the Con. Comm. Office. Also, as the Applicant is the Town of Sudbury. Per MassDEP we understand that they are exempt from any application fees thus checks have not been provided with this submittal.

Project Summary

The proposed project is construction of handicap accessible parking, walkways, and picnic areas at 1 Liberty Lane in Sudbury MA. Stormwater improvements are prepared to achieve compliance with the Mass DEP Stormwater Standards for the proposed work.

Please note that per a previous Order of Conditions for the swimming pond, (DEP File #301-1366), the Commission concedes the pond is a resource area thus we have assumed a 100-foot buffer zone from the pond perimeter.

We look forward to discussing this project further with your office. If you have any questions concerning this application, please feel free to contact our office.

Respectfully Submitted,
Graves Engineering, Inc.


Keith Murray
Project Manager

cc: MassDEP-Central Region Office (under separate cover) – 1 set
Town of Sudbury, c/o Sandra Duran (email)
Camp Sewataro, c/o Emmy Ninimaki (email)

NOTICE OF INTENT

Handicap Accessibility Improvements

1 Liberty Ledge
Sudbury, MA 01776

Prepared for:

Camp Sewataro, LLC
1 Liberty Ledge
Sudbury, MA 01776

Date:

April 20, 2023

Prepared By:



E N G I N E E R I N G, I n c.

100 Grove Street
Worcester, MA 01605
T 508-856-0321
F 508-856-0357
gravesengineering.com

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- **Appendix A** Certified Abutters List, Sample Notification & Affidavit
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WPA Form 3
NOTICE OF INTENT



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

Provided by MassDEP:

WPA Form 3 – Notice of Intent

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

MassDEP File Number

Document Transaction Number

Sudbury

City/Town

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



Note:
Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

1 Liberty Ledge

a. Street Address

Sudbury

b. City/Town

01776

c. Zip Code

Latitude and Longitude:

42° 25' 00"

d. Latitude

-71° 25' 00"

e. Longitude

C08

f. Assessors Map/Plat Number

0143

g. Parcel /Lot Number

2. Applicant:

Andrew

a. First Name

Sheehan

b. Last Name

Town of Sudbury

c. Organization

275 Old Lancaster Road

d. Street Address

Sudbury

e. City/Town

MA

f. State

01776

g. Zip Code

(978) 639-3381

h. Phone Number

i. Fax Number

townmanager@sudbury.ma.us

j. Email Address

3. Property owner (required if different from applicant): Check if more than one owner

a. First Name

b. Last Name

c. Organization

d. Street Address

e. City/Town

f. State

g. Zip Code

h. Phone Number

i. Fax Number

j. Email address

4. Representative (if any):

Keith

a. First Name

Murray

b. Last Name

Graves Engineering, Inc.

c. Company

100 Grove Street

d. Street Address

Worcester

e. City/Town

MA

f. State

01605

g. Zip Code

(508) 856-0321

h. Phone Number

i. Fax Number

kmurray@gravesengineering.com

j. Email address

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

Exempt

a. Total Fee Paid

Exempt

b. State Fee Paid

Exempt

c. City/Town Fee Paid



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A. General Information (continued)

6. General Project Description:

The proposed project is construction of handicap accessible parking, walkways and picnic areas to the existing swimming and Liberty Lodge areas at Camp Sewataro.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

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

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.24 (coastal) or 310 CMR 10.53 (inland)?

1. Yes No If yes, describe which limited project applies to this project. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR 10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

Middlesex South

a. County

1551

c. Book

b. Certificate # (if registered land)

38

d. Page Number

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

- Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.
- Inland Resource Areas (see 310 CMR 10.54-10.58; if not applicable, go to Section B.3, Coastal Resource Areas).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.



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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

<u>Resource Area</u>	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
a. <input type="checkbox"/> Bank	1. linear feet _____	2. linear feet _____
b. <input type="checkbox"/> Bordering Vegetated Wetland	1. square feet _____	2. square feet _____
c. <input type="checkbox"/> Land Under Waterbodies and Waterways	1. square feet _____	2. square feet _____
	3. cubic yards dredged _____	

<u>Resource Area</u>	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
d. <input type="checkbox"/> Bordering Land Subject to Flooding	1. square feet _____	2. square feet _____
	3. cubic feet of flood storage lost _____	4. cubic feet replaced _____
e. <input type="checkbox"/> Isolated Land Subject to Flooding	1. square feet _____	
	2. cubic feet of flood storage lost _____	3. cubic feet replaced _____

- f. Riverfront Area
1. Name of Waterway (if available) - **specify coastal or inland** _____
 2. Width of Riverfront Area (check one):
 - 25 ft. - Designated Densely Developed Areas only
 - 100 ft. - New agricultural projects only
 - 200 ft. - All other projects
 3. Total area of Riverfront Area on the site of the proposed project: _____ square feet
 4. Proposed alteration of the Riverfront Area:

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)

Note: for coastal riverfront areas, please complete **Section B.2.f.** above.



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B. Buffer Zone & Resource Area Impacts (temporary & permanent) (cont'd)

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users:
 Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

<u>Resource Area</u>	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
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 Beach	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 _____
	<u>Size of Proposed Alteration</u>	<u>Proposed Replacement (if any)</u>
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., creation _____
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 _____	
i. <input type="checkbox"/> Land Subject to Coastal Storm Flowage	1. square feet _____	
4. <input type="checkbox"/> Restoration/Enhancement	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 enter the additional amount here.	
	a. square feet of BVW _____	b. square feet of Salt Marsh _____
5. <input type="checkbox"/> Project Involves Stream Crossings		
	a. number of new stream crossings _____	b. number of replacement stream crossings _____



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C. Other Applicable Standards and Requirements

- This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

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 and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

- 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**

MassGIS (current)

b. Date of map _____

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

- c. Submit Supplemental Information for Endangered Species Review*

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

2. Project plans for entire project site, including wetland resource areas and areas outside of wetlands 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

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see <https://www.mass.gov/mas-endangered-species-act-mesa-regulatory-review>).

Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.



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C. Other Applicable Standards and Requirements (cont'd)

- (c) MESA filing fee (fee information available at <https://www.mass.gov/how-to/how-to-file-for-a-mesa-project-review>).

Make check payable to "Commonwealth of Massachusetts - NHESP" 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

- (f) 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, <https://www.mass.gov/service-details/exemptions-from-review-for-projectsactivities-in-priority-habitat>; 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. a. NHESP Tracking # _____ 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.

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

- a. Not applicable – project is in inland resource area only b. Yes No

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

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

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 South Rodney French Blvd.
New Bedford, MA 02744
Email: dmf.envreview-south@mass.gov

North Shore - Hull to New Hampshire border:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930
Email: dmf.envreview-north@mass.gov

Also if yes, the project 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.

- c. Is this an aquaculture project? d. Yes No

If yes, include a copy of the Division of Marine Fisheries Certification Letter (M.G.L. c. 130, § 57).



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C. Other Applicable Standards and Requirements (cont'd)

Online Users:
Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. 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 MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.
- b. ACEC
5. 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
6. 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
7. 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. Check why the project is exempt:
1. Single-family house
 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

- This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

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.

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.



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D. Additional Information (cont'd)

3. Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.
4. List the titles and dates for all plans and other materials submitted with this NOI.

Handicap Accessibility Improvements

a. Plan Title

Graves Engineering, Inc.

Michael Andrade, P.E.

b. Prepared By

c. Signed and Stamped by

04-10-23

1"= 10'

d. Final Revision Date

e. Scale

f. Additional Plan or Document Title

g. Date

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.

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

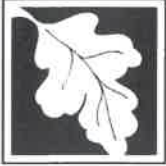
3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name



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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.

Andrew
Sheehan

Digitally signed by Andrew
Sheehan
Date: 2023.04.18 16:40:30 -04'00'

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 any part of Section C, Item 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.



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NOI Wetland Fee Transmittal Form
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

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



A. Applicant Information

1. Location of Project:

1 Liberty Ledge Sudbury
 a. Street Address b. City/Town
Exempt \$0
 c. Check number d. Fee amount

2. Applicant Mailing Address:

Andrew Sheehan
 a. First Name b. Last Name
Town of Sudbury
 c. Organization
275 Old Lancaster Road
 d. Mailing Address
Sudbury MA 01776
 e. City/Town f. State g. Zip Code
(978) 639-3381 townmanager@sudbury.ma.us
 h. Phone Number i. Fax Number j. Email Address

3. Property Owner (if different):

 a. First Name b. Last Name

 c. Organization

 d. Mailing Address

 e. City/Town f. State g. Zip Code

 h. Phone Number i. Fax Number j. Email Address

B. Fees

Fee should be calculated using the following process & worksheet. **Please see Instructions before filling out worksheet.**

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract \$12.50. To calculate the city/town share of the fee, divide the total fee in half and add \$12.50.

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).



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NOI Wetland Fee Transmittal Form
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Fee Exempt			0

Step 5/Total Project Fee: _____

Step 6/Fee Payments:

Total Project Fee:	0
State share of filing Fee:	0
City/Town share of filling Fee:	0
	a. Total Fee from Step 5
	b. 1/2 Total Fee less \$12.50
	c. 1/2 Total Fee plus \$12.50

C. Submittal Requirements

- a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
 Box 4062
 Boston, MA 02211

- b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

APPENDIX A

**CERTIFIED ABUTTERS LIST, SAMPLE NOTIFICATION &
AFFIDAVIT**

abutters_id_field	abutters_owner1	abutters_owner2	abutters_address	abutters_a	abutters_town	abutters_state	abutters_zi	abutters_bookpage	abutters_location
C08-0042	GILBERT JONATHAN M& MADALINE A		243 HAYNES ROAD		SUDBURY	MA	01776	61904-314	243 HAYNES RD
C08-0043	DISTEFANO FREDERICK M JR &	DISTEFANO COURTNEY G	235 HAYNES RD		SUDBURY	MA	01776	71128-150	235 HAYNES RD
C08-0044	GILBERTO RONALD V & KATHLEEN K		225 HAYNES ROAD		SUDBURY	MA	01776	35163-595	225 HAYNES RD
C08-0113	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY RD		SUDBURY	MA	01776	1551-38	LIBERTY LEDGE
C08-0114	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY RD		SUDBURY	MA	01776	1551-38	LIBERTY LEDGE
C08-0115	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	73541-408	LIBERTY LEDGE
C08-0115-A	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	LIBERTY LEDGE
C08-0116	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	73541- 408	LIBERTY LEDGE
C08-0117	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY RD		SUDBURY	MA	01776	1551-38	2 LIBERTY LEDGE
C08-0118	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	3 LIBERTY LEDGE
C08-0119	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY		SUDBURY	MA	01776	1551-38	LIBERTY LEDGE
C08-0120	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	GREYSTONE LN
C08-0121	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	GREYSTONE LN
C08-0134	RONAN JOHN J IV & LYND SAY		101 GREYSTONE LN		SUDBURY	MA	01776	1546-12	101 GREYSTONE LN
C08-0135	KNIGHTLY JOHN D & LAURA G		95 GREYSTONE LN		SUDBURY	MA	01776	1454-101	95 GREYSTONE LN
C08-0136	AYER JOHN B & DEBORAH P		87 GREYSTONE LANE		SUDBURY	MA	01776	1286-113	87 GREYSTONE LN
C08-0137	ALFILLE PAUL H & SHAPIRO LAURI E E		81 GREYSTONE LN		SUDBURY	MA	01776	204238	81 GREYSTONE LN
C08-0138	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	73541-408	GREYSTONE LN
C08-0139	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	LIBERTY LEDGE
C08-0140	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	LIBERTY LEDGE
C08-0141	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	4 LIBERTY LEDGE
C08-0142	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	LIBERTY LEDGE
C08-0143	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	1 LIBERTY LEDGE
C08-0144	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	LIBERTY LEDGE
C08-0145	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	GREYSTONE LN
C08-0146	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	GREYSTONE LN
C08-0147	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	GREYSTONE LN
C08-0148	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	GREYSTONE LN
C08-0149	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	GREYSTONE LN
C08-0150	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	GREYSTONE LN
C08-0151	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	BITTERSWEET CIR
C08-0152	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	BITTERSWEET CIR
C08-0154	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	73541-408	BITTERSWEET CIR
C08-0156	CAMPBELL SCOTT F & NICOLE B		49 GREYSTONE LN		SUDBURY	MA	01776	1587-190	49 GREYSTONE LN
C08-0157	MOORAJ HUSSAIN & JESSICA		43 GREYSTONE LN		SUDBURY	MA	01776	1545-97	43 GREYSTONE LN
C08-0158	MUNROE SCOTT W & STACY S		37 GREYSTONE LANE		SUDBURY	MA	01776	1492-61	37 GREYSTONE LN
C08-0159	TAYLOR MARK	TRUSTEE OF THE MARK TAYLOR	25 GREYSTONE LN		SUDBURY	MA	01776	1553-84	GREYSTONE LN
C08-0160	TAYLOR MARK & TAYLOR GODDARD	M JANETTE TRUSTEES MARK TAYLOR	25 GREYSTONE LN		SUDBURY	MA	01776	1505-38	25 GREYSTONE LN
C08-0161	TAYLOR MARK & TAYLOR GODDARD	M JANETTE TRUSTEES MARK TAYLOR	25 GREYSTONE LN		SUDBURY	MA	01776	1505-38	GREYSTONE LN
C08-0162	TAYLOR MARK & TAYLOR GODDARD	M JANETTE TRUSTEES MARK TAYLOR	25 GREYSTONE LN		SUDBURY	MA	01776	1505-38	GREYSTONE LN
C08-0163	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	6 LIBERTY LEDGE
C08-0164	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	1551-38	LIBERTY LEDGE
C08-0166	STEVENSON WILLIAM D &	JACQUELINE C	135 GREYSTONE LANE		SUDBURY	MA	01776	63095-50	135 GREYSTONE LN
C08-0167	VAN STEENBURG JENNIFER		125 GREYSTONE LANE		SUDBURY	MA	01776	50702-29	125 GREYSTONE LN
C08-0168	KARMAN JAMES B & SANDRA A		115 GREYSTONE LANE		SUDBURY	MA	01776	200985	115 GREYSTONE LN
C08-0169	MEHTA PARAS G		105 GREYSTONE LN		SUDBURY	MA	01776	1509-65	105 GREYSTONE LN
C08-0501	BRADLEY ALEXIS & ROBIN		27 JULIAN'S WAY		SUDBURY	MA	01776	75483-508	27 JULIAN'S WAY
C08-0502	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	73541-408	LIBERTY LEDGE
C08-0515	SAMPLE WILLIAM J & KAREN F		145 GREYSTONE LN		SUDBURY	MA	01776	67636-547	145 GREYSTONE LN
C08-0521	RAINES JASON W		73 GREYSTONE LN		SUDBURY	MA	01776	68194-12	73 GREYSTONE LN
C08-0522	KLINGER JOHN J & JULIE M TRS	GREYSTONE LANE REALTY TRUST	67 GREYSTONE LN		SUDBURY	MA	01776	79647-285	67 GREYSTONE LN

C08-0601	WHITLEDGE WILLIAM H & HOLLY D		4 COBBLESTONE PL	SUDBURY	MA	01776	1308-85	4 COBBLESTONE PL
C08-0606	TARINI MARK A & GERALDINE N		5 COBBLESTONE PL	SUDBURY	MA	01776	1426-111	5 COBBLESTONE PL
C09-0002	CUNNINGHAM KENNETH E TRS	THE 201 HAYNES ROAD REALTY TR	201 BEECH ST	ROSLINDALE	MA	02131	1480-124	201 HAYNES RD
C09-0006	VIDOS DIMITRIOS &	KALOUDI EVANGELIA	204 HAYNES RD	SUDBURY	MA	01776	1530-100	204 HAYNES RD
C09-0007	CASWELL GEORGE &	JOHNSTON LAURA	196 HAYNES RD	SUDBURY	MA	01776	1534-91	196 HAYNES RD
C09-0042	KOSS SHARON M &	MARDEN ANDREA LEIGH	22 JULIANS WAY	SUDBURY	MA	01776	1572-68	22 JULIAN'S WAY
C09-0044	MARCHIONNI MARK ANDREW &	DAWKINS CHANTEL	28 JULIANS WAY	SUDBURY	MA	01776	78906-361	28 JULIAN'S WAY
C09-0107	HU ZHONGWEI & DONG GUOZHEN		230 HAYNES ROAD	SUDBURY	MA	01776	1403-76	230 HAYNES RD
C09-0108	OTOOLE BRIAN & KATHERINE		220 HAYNES RD	SUDBURY	MA	01776	1475-111	220 HAYNES RD
C09-0109	WAGENAAR TIMOTHY &	GREBE KRISTIE	216 HAYNES RD	SUDBURY	MA	01776	1529-11	216 HAYNES RD
C09-0110	CHARTOFF SETH P & ALLISON J		210 HAYNES ROAD	SUDBURY	MA	01776	1565-82	210 HAYNES RD
C09-0112	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD	SUDBURY	MA	01776	1551 -38	213 HAYNES RD
C09-0165	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD	SUDBURY	MA	01776	73541 -408	LIBERTY LEDGE
D08-0502	MORTON CHARLES INGALLS IV &	FRICK LAUREN ELIZABETH TRS	35 JULIAN'S WAY	SUDBURY	MA	01776	74057-287	35 JULIAN'S WAY
D08-0503	GLENN MARION S & LEWIS		39 JULIAN'S WAY	SUDBURY	MA	01776	80278-477	39 JULIAN'S WAY
D08-0504	DALLAS MATTHEW & MARY		164 GREYSTONE LN	SUDBURY	MA	01776	75329-294	164 GREYSTONE LN
D08-0513	GREENBERG CHARLES J & DOROTHY B	TRUSTEES OF GREYSTONE NOMINEE	163 GREYSTONE LN	SUDBURY	MA	01776	39663-425	163 GREYSTONE LN
D08-0514	SANZONE ROBERT & LYNN		155 GREYSTONE LN	SUDBURY	MA	01776	73782-415	155 GREYSTONE LN
D08-0516	OPPENHEIM MARK J & MCALLEY	BONNIE L	141 GREYSTONE LANE	SUDBURY	MA	01776	65661-295	141 GREYSTONE LN
D08-0523	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD	SUDBURY	MA	01776	73541-408	GREYSTONE LN
D08-0524	TOWN OF SUDBURY	C/O BOARD OF SELECTMEN	278 OLD SUDBURY ROAD	SUDBURY	MA	01776	73541 -408	JULIAN'S WAY

Notification to Abutters Under the Massachusetts Wetlands Protection Act

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, you are hereby notified of the following.

- A. The name of the applicant is Town of Sudbury.
- B. The applicant has filed a Notice of Intent with the Conservation Commission for the municipality of Sudbury seeking permission to remove, fill, dredge or alter an Area Subject to Protection Under the Wetlands Protection Act (General Laws Chapter 131, Section 40)
- C. The address of the lot where the activity is proposed is Camp Sewataro, 1 Liberty Ledge.
- D. A brief description of the project proposed: The proposed project is construction of handicap accessible parking, walkways and picnic areas to the existing swimming and Liberty Lodge areas at Camp Sewataro.
- E. Copies of the application may be obtained from the applicant's representative, by calling this telephone number (508) 856-0321 between the hours of 8:30am and 4:30pm on the following days of the week: Monday through Friday.
- F. Information regarding the date, time, and place of the public hearing may be obtained from the Sudbury Conservation Commission by calling this telephone number (978) 440-5404 between the hours of 8:30 am and 2:00 pm on the following days of the week: Monday through Friday.

NOTE: Notice of the public hearing, including its date, time, and place, will be published at least seven (7) days in advance in the MetroWest Daily News.

NOTE: Agenda for the public hearing, including its date, time, and place, will be posted in the Town Hall not less than forty-eight (48) hours in advance.

NOTE: You also may contact the Sudbury Conservation Commission or the nearest Department of Environmental Protection Regional Office for more information about this application or the Wetlands Protection Act. To contact DEP, call:

MassDEP Northeast Region: 508-649-3200

AFFIDAVIT

Under the Massachusetts Wetlands Protection Act

I, Keith Murray, hereby certify under the pains and penalties of perjury that I gave notification to abutters on April 21, 2023 in compliance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, the DEP Guide to Abutter Notification dated April 8, 1994 and the Sudbury Conservation Commission, in connection with the following matter:

A Notice of Intent filed under the Massachusetts Wetlands Protection Act by Camp Sewataro, LLC with the Sudbury Conservation Commission filed on April 21, 2023 for the property located at 1 Liberty Ledge.

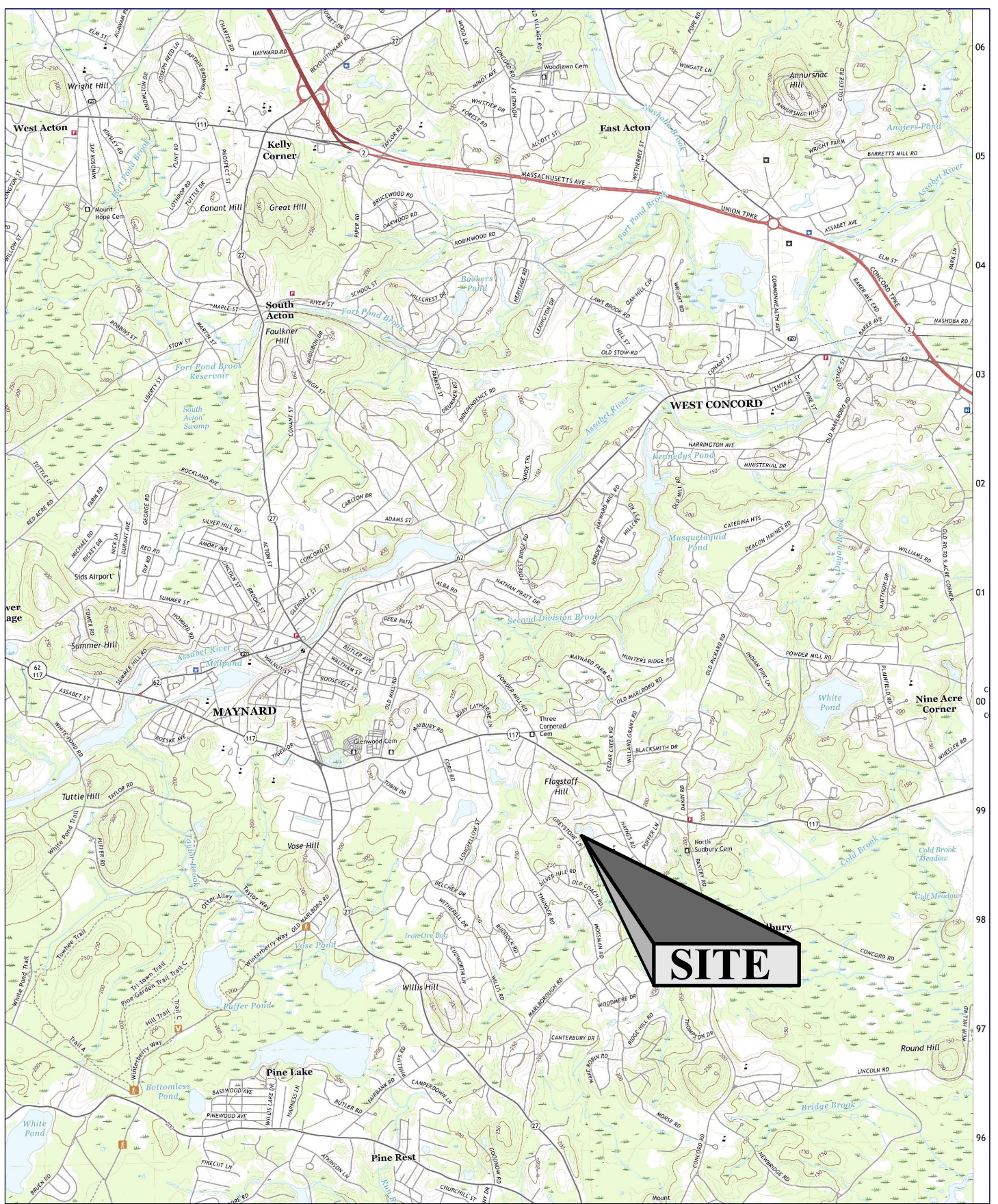
The form of the notification, and a list of the abutters to whom it was given and their addresses are attached within the Notice of Intent submittal package.


(signature)

April 21, 2023

(date)

APPENDIX B
USGS LOCUS MAP



100 GROVE STREET | WORCESTER MA 01605
 T 508-856-0321 | F 508-856-0357
 gravesengineering.com

DATE: 04/10/2023	CLIENT:
SCALE: 1"=500'	TOWN OF SUDBURY 275 OLD LANCASTER RD, SUDBURY MA 01776
DRW. BY: KPM	
CHK. BY: MRA	
PRJ. NO.: 22148	SHEET 1 OF 1

**USGS LOCUS
 CAMP SEWATARO**

HANDICAPP ACCESSIBILITLY IMPROVEMENTS
 1 LIBERTY LEDGE, SUDBURY, MA 01776

APPENDIX C

WETLAND RESOURCE EVALUATION

EcoTec, Inc.
ENVIRONMENTAL CONSULTING SERVICES
102 Grove Street
Worcester, MA 01605-2629
508-752-9666 – Fax: 508-752-9494

November 17, 2022

Mike Andrade, PE
Graves Engineering, Inc.
100 Grove Street
Worcester, MA 01605

RE: Wetland Resource Evaluation, 1 Liberty Ledge, Sudbury, Massachusetts

Dear Mr. Andrade:

On October 31, 2022, EcoTec, Inc. inspected the above-referenced property for the presence of wetland resources as defined by: (1) the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131, § 40; the “Act”) and its implementing regulations (310 CMR 10.00 *et seq.*; the “Regulations”); (2) the Town of Sudbury Wetlands Protection Bylaw and regulations; and (3) the U.S. Clean Water Act (i.e., Section 404 and 401 wetlands). Scott M. Morrison PWS conducted the inspection.

The subject site consists of an approximately 2-acre parcel located to the south of Liberty Ledge, north of the fish pond, and easterly of the swimming pond/pool. The upland portions of the site consist of existing lawn and landscaped areas. Plant species observed include northern red oak (*Quercus rubra*), eastern white pine (*Pinus strobus*), red maple (*Acer rubrum*), and sugar maple (*Acer saccharum*) trees and/or saplings; poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), and grape (*Vitis sp.*) climbing woody vines; honeysuckle (*Lonicera sp.*) and winged euonymus (*Euonymus alata*) shrubs; and grass (Gramineae sp.) ground cover. The wetland resources observed on the site are described below.

Methodology

The site was inspected, and areas suspected to qualify as wetland resources were identified. The boundary of Bordering Vegetated Wetlands or, in the absence of Bordering Vegetated Wetlands, Bank was delineated in the field in accordance with the definitions set forth in the regulations at 310 CMR 10.55(2)(c) and 310 CMR 10.54(2). Section 10.55(2)(c) states that “The boundary of Bordering Vegetated Wetlands is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.” Section 10.54(2)(c) states that “The upper boundary of Bank is the first observable break in the slope or the mean annual flood level, whichever is lower.” The methodology used to delineate Bordering Vegetated Wetlands is further described in: (1) the BVW Policy “*BVW: Bordering Vegetated Wetlands Delineation Criteria and Methodology*,”

issued March 1, 1995; and (2) *“Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act: A Handbook,”* produced by the Massachusetts Department of Environmental Protection, dated March 1995. The plant taxonomy used in this report is based on the *National List of Plant Species that Occur in Wetlands: Massachusetts* (Fish and Wildlife Service, U.S. Department of the Interior, 1988). Federal wetlands were presumed to have boundaries conterminous with the delineated Bank. The table below provides the Flag Numbers, Flag Type, and Wetland Types and Locations for the delineated wetland resources.

Flag Numbers	Flag Type	Wetland Types and Locations
Start A1 to A17 Stop	Blue Flags	Bank of the Fish Pond

Findings

Wetland A (i.e., flags A1 to A17) consists of a well-defined bank of an apparent man-made pond located in the southern portion of the site. No Bordering Vegetated Wetland (BVW) was observed along the edge of the pond. Accordingly, the pond would be regulated as Bank and Land Under Water Bodies and Waterways under the Act and Bylaw. A 100-foot Buffer Zone extends horizontally outward from the edge of Bank under the Act and Bylaw.

The swimming pond on the site consists of a concrete lined structure. Both the wetlands Protection Act regulations and the Town of Sudbury Wetlands Protection Bylaw exempt swimming pools and other impervious human-made basins. The swimming pond was evaluated and contains a concrete liner. As such, the swimming pond on the site would not be regulated under the Wetlands Protection Act or local Bylaw.

Bordering Land Subject to Flooding is an area that floods due to a rise in floodwaters from a bordering waterway or water body. Where flood studies have been completed, the boundary of Bordering Land Subject to Flooding is based upon flood profile data prepared by the National Flood Insurance Program. Section 10.57(2)(a)3. states that *“The boundary of Bordering Land Subject to Flooding is the estimated maximum lateral extent of flood water which will theoretically result from the statistical 100-year frequency storm.”* Based upon a review of the Flood Insurance Rate Map, Middlesex County, Massachusetts, Map Number 25017C0366F, Effective Date July 7, 2014, the site is mapped as Other Areas: Zone X, which is defined as areas located outside of the 0.2% annual chance flood (i.e., outside of 500-year floodplain). The project engineer should evaluate the most recent National Flood Insurance Program flood profile data to confirm that Bordering Land Subject to Flooding does not occur on the site. Bordering Land Subject to Flooding would occur in areas where the 100-year flood elevation is located outside of or upgradient of the delineated Bank boundary. Bordering Land Subject to Flooding does not have a Buffer Zone under the Act.

The Massachusetts Rivers Protection Act amended the Act to establish an additional wetland resource area: Riverfront Area. Based upon a review of the current USGS Map (i.e., Maynard

1 Liberty Ledge, Sudbury
November 17, 2022
Page 3.

Quadrangle, dated 1987, attached) and observations made during the site inspection, there are no mapped or unmapped streams located within 200 feet of the site. Accordingly, Riverfront Area would not occur on the site. Riverfront Area does not have a Buffer Zone under the Act.

The Regulations require that no project may be permitted that will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures set forth at 310 CMR 10.59. Based upon a review of the *Massachusetts Natural Heritage Atlas*, 15th edition, Priority Habitats and Estimated Habitats from the NHESP Interactive Viewer, valid from August 1, 2021, and Certified Vernal Pools from MassGIS, there are no Estimated Habitats [for use with the Act and Regulations (310 CMR 10.00 *et seq.*)], Priority Habitats [for use with Massachusetts Endangered Species Act (M.G.L. Ch. 131A; "MESA") and MESA Regulations (321 CMR 10.00 *et seq.*)], or Certified Vernal Pools on or in the immediate vicinity of the site. A copy of this map is attached.

The reader should be aware that the regulatory authority for determining wetland jurisdiction rests with local, state, and federal authorities. A brief description of my experience and qualifications is attached. If you have any questions, please feel free to contact me at any time.

Cordially,
ECOTEC, INC.



Scott M. Morrison, PWS
Senior Environmental Scientist

Attachments (4, 4 pages)

17/E/SudburyLibertyLedge1Report

EcoTec, Inc.

ENVIRONMENTAL CONSULTING SERVICES

102 Grove Street

Worcester, MA 01605-2629

508-752-9666 – Fax: 508-752-9494

Scott M. Morrison, PWS, CERP, RPSS, SE **Senior Environmental Scientist**

Scott Morrison is a Senior Environmental Scientist with EcoTec, Inc. Since joining EcoTec in 2000, Mr. Morrison's project experience include wetland resource evaluation, delineation, and permitting at the local, state, and federal levels; wildlife habitat evaluation; pond and stream evaluation; vernal pool evaluation, monitoring, and certification; wetland replacement, replication, and restoration area design, construction, and monitoring; soil evaluations to determine infiltration rates and seasonal high groundwater elevations for detention basin construction; environmental sampling and analysis tasks, including soil and groundwater sample collection and handling; and expert testimony preparation. He has conducted rare species habitat assessments for the eastern box turtle, wood turtle, Blanding's turtle, spotted turtle, and marbled salamander. He has participated in rare species studies for rare species including the marbled salamander, piping plover, eastern box turtle, and northern diamondback terrapin and developed mitigation strategies for the marbled salamander, spotted turtle, eastern box turtle and wood turtle. He has participated in visual preconstruction sweeps for the wood turtle and both preconstruction and research projects for the eastern box turtle. He has served as a consultant to municipalities, conservation commissions, engineering and survey firms. He has completed numerous wetland related projects including environmental impact assessments for proposed development, erosion control and environmental monitoring for subdivisions, commercial developments, golf courses and landfills. He has prepared Massachusetts Environmental Policy Act (MEPA) documentation, including Environmental Notification Forms (ENFs), Notice of Project Changes (NPCs), and Draft and Final Environmental Impact Reports (EIRs) including Green House Gas Assessments for various projects including subdivisions, commercial buildings, and dredging projects. Prior to joining EcoTec, Inc. Mr. Morrison worked for the Massachusetts Department of Environmental Management (currently the Department of Conservation and Recreation) where he was involved with the monitoring and protection of endangered species and rare old growth forest. He was an active member of the Spencer Conservation Commission from 1998 to 2000 where he provided oversight of proposed wetland replication projects and review of projects submitted for wetland permitting. His educational background includes courses in forestry, ecology, chemistry, soils, and natural resource policy. His prior research experience includes research on forest succession and field research on nesting piping plovers, an endangered coastal shore bird.

Education:

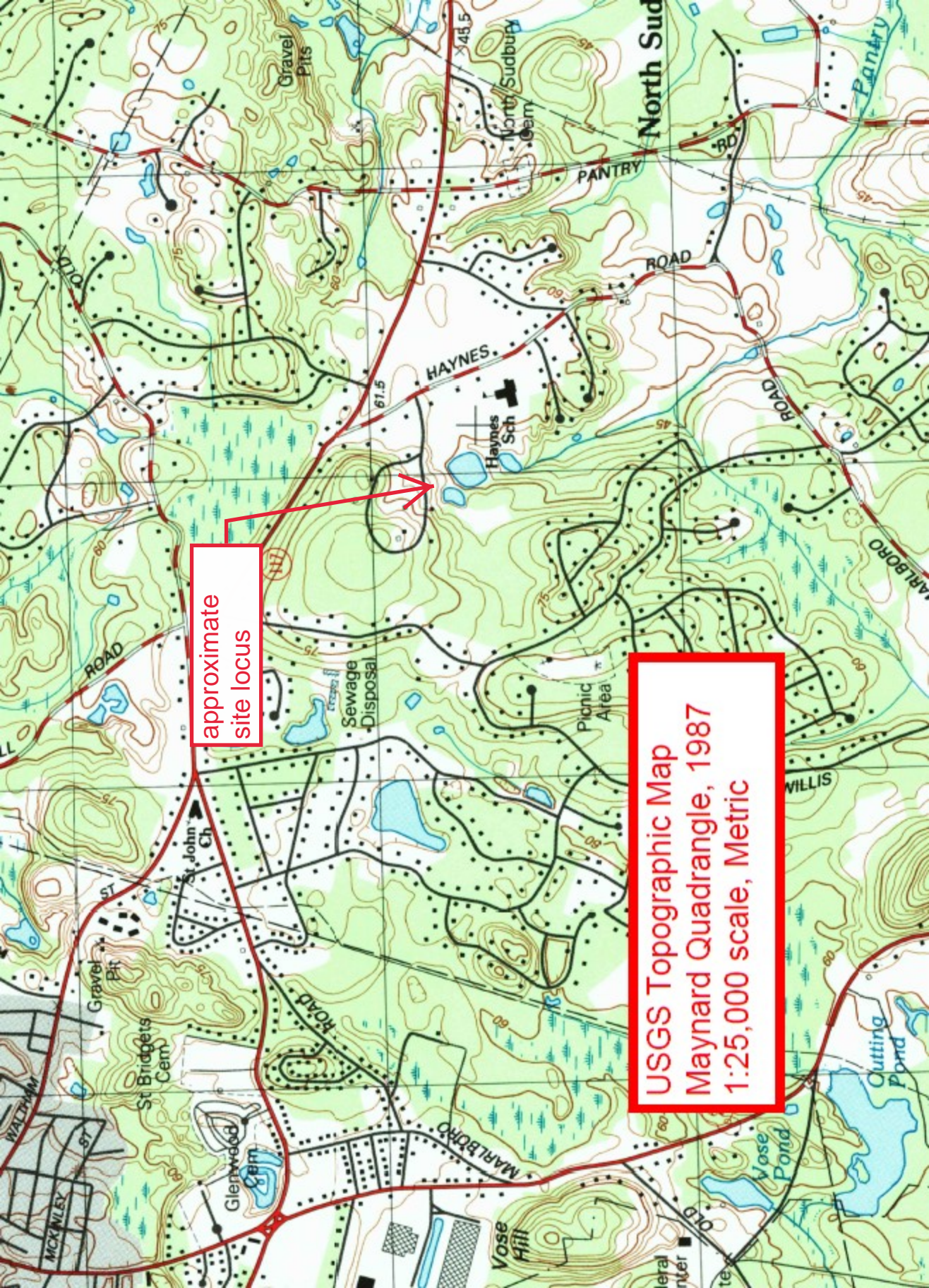
Graduate Soil Science Certificate Program
University of Massachusetts at Amherst, 2006
Bachelor of Science: Natural Resource Studies
University of Massachusetts at Amherst, 1998
Associate of Science: Business Administration
Quinsigamond Community College, 1996

Professional Affiliations:

Registered Professional Soil Scientist, Society of Soil Scientists of
Southern New England (SSSSNE)
Massachusetts Association of Conservation Commissioners
Association of Massachusetts Wetland Scientists
Society of Wetland Scientists
Society for Ecological Restoration-

Certifications:

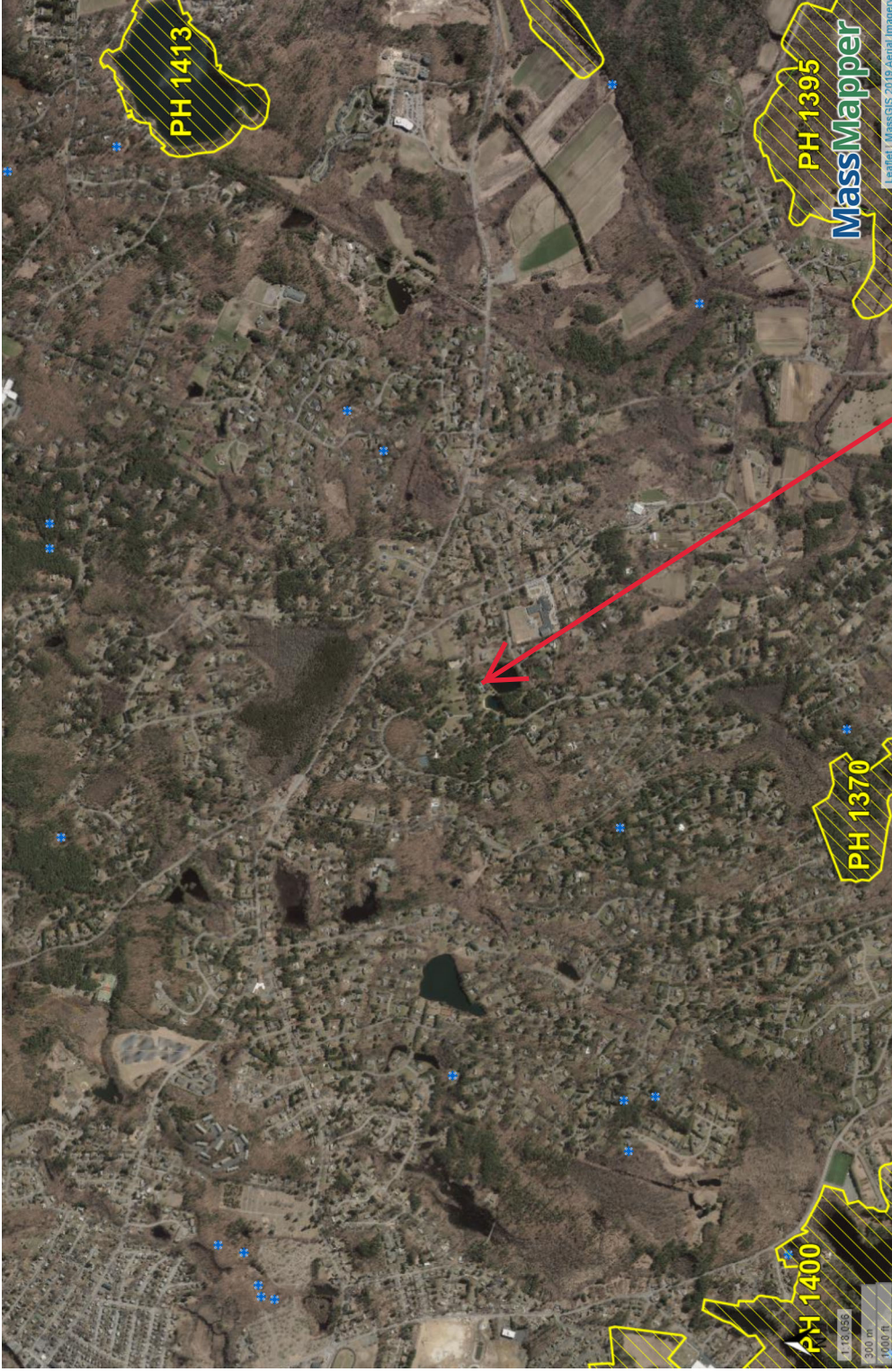
Society of Wetlands Scientists Professional Wetland Scientist,
Certification Number 2583
Massachusetts Department of Environmental Protection Soil Evaluator,
Certification Number SE 13766
Society for Ecological Restoration-Certified Ecological Restoration Practitioner
Certification Number 0648
OSHA Health and Safety Training, 40-Hour, 29 CFR 1910.120
University of Massachusetts Extension, Invasive Species Management



approximate
site locus

USGS Topographic Map
Maynard Quadrangle, 1987
1:25,000 scale, Metric

1 Liberty Ledge, Sudbury, NHESP



- NHESP Priority Habitats of Rare Species
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Certified Vernal Pools

Natural Heritage Atlas
Online Data Viewer, 15th
edition, valid August 1st,
2021
created: 10/24/2022
1 Liberty Ledge, Sudbury

approximate
site locus

National Flood Hazard Layer FIRMette

71°25'26"W 42°25'17"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 LOMR *Zone D*

Area of Undetermined Flood Hazard *Zone D*

OTHER AREAS

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

GENERAL STRUCTURES

Cross Sections with 1% Annual Chance Water Surface Elevation

Coastal Transect

Base Flood Elevation Line (BFE)

Limit of Study

OTHER FEATURES

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 10/24/2022 at 10:59 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°24'49"W 42°24'50"N

Feet 1:6,000

0 250 500 1,000 1,500 2,000

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

HANDICAP ACCESSIBILITY IMPROVEMENTS

CAMP SEWATARO

1 LIBERTY LEDGE, SUDBURY, MA 01776

SHEET INDEX

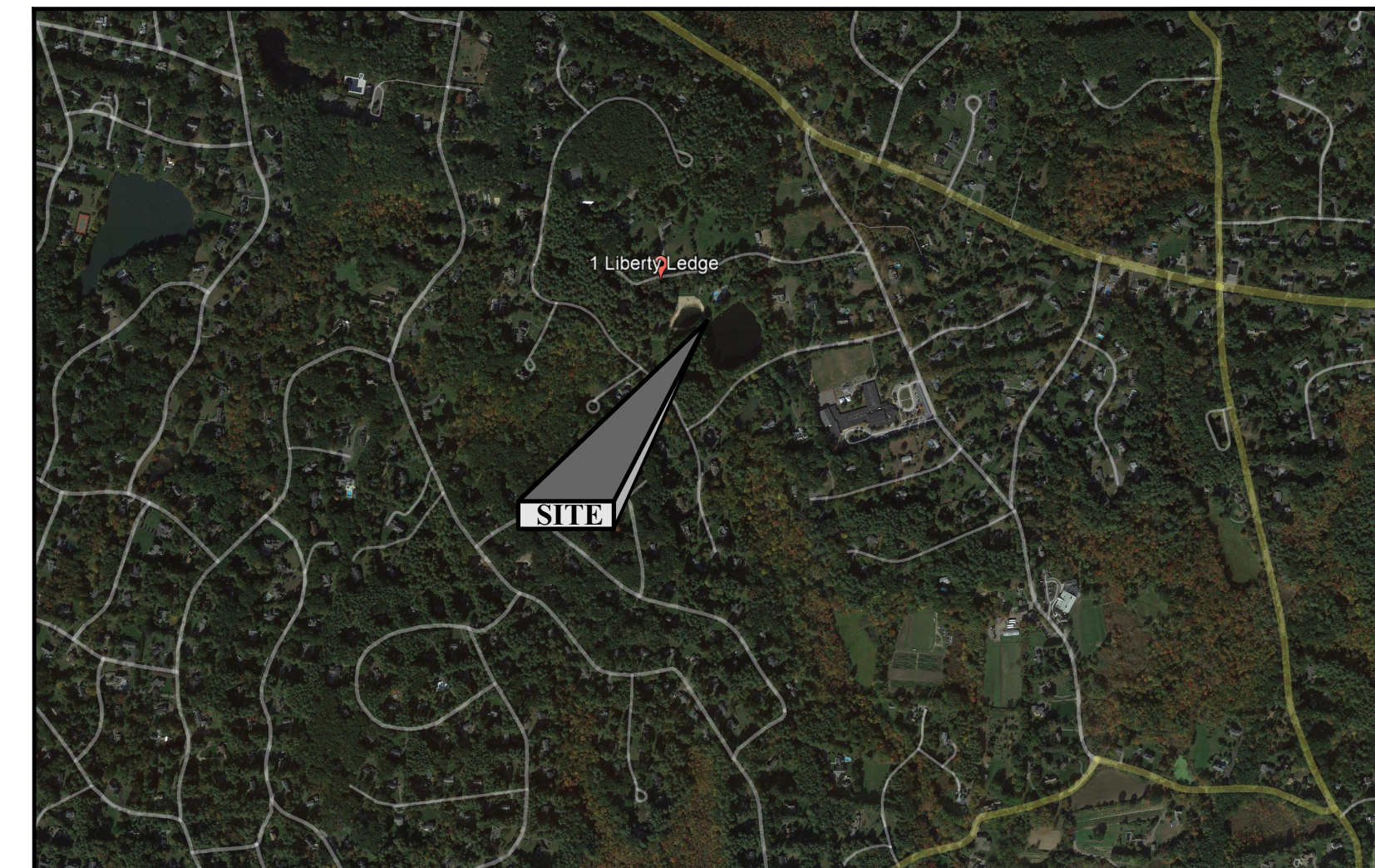
No.	Title	Issue Date
C001	Cover Sheet	April 10, 2023
C101	Site Plan - Swimming Area	April 10, 2023
C102	Site Plan - Liberty Lodge	April 10, 2023
C501	Site Details - 1	April 10, 2023
C502	Site Details - 2	April 10, 2023

REVISIONS/ISSUES

No.	Note	Date
1	Issued for Permitting	April 10, 2023

REFERENCE PLAN INDEX

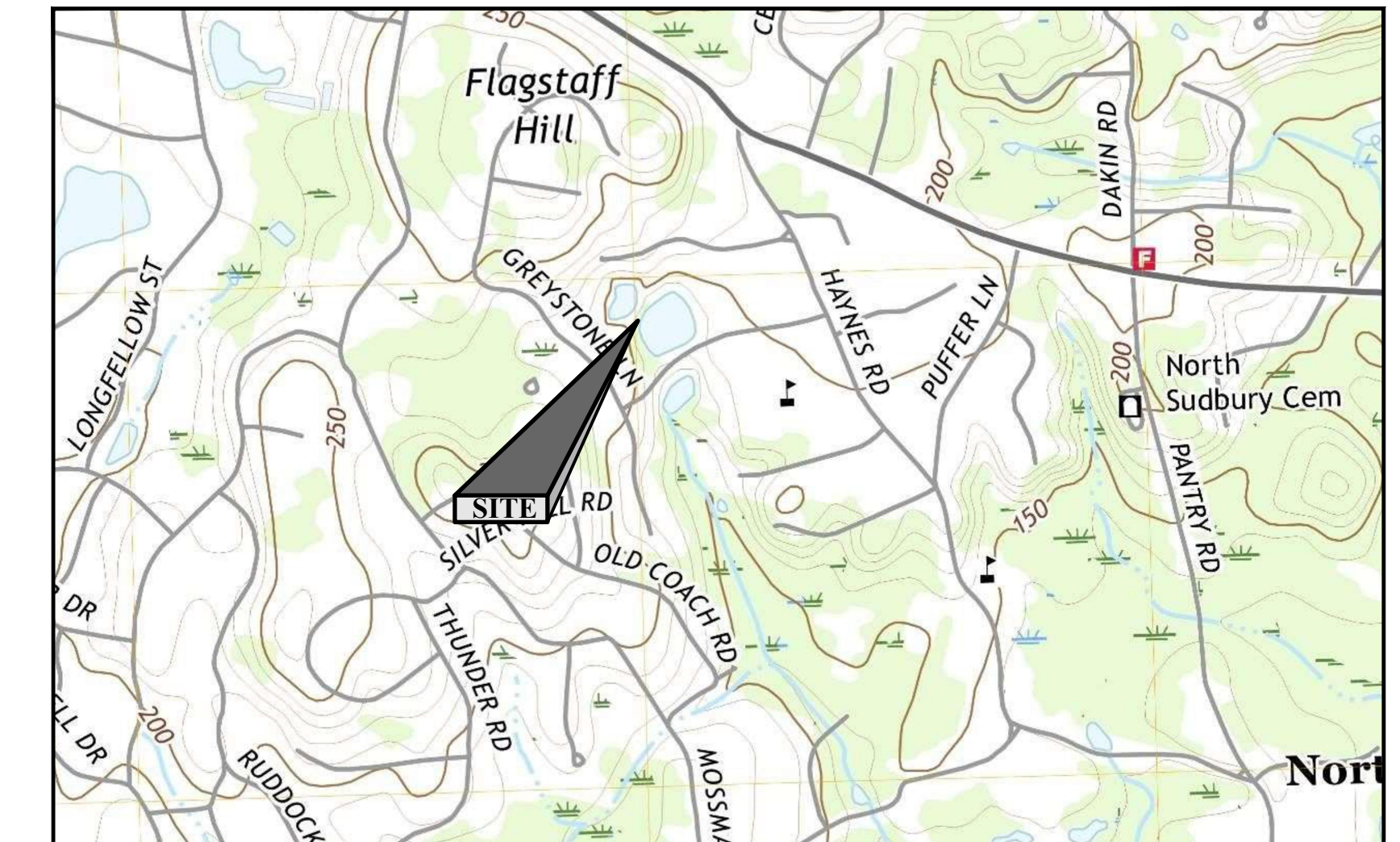
No.	Title	Issue Date
-	Topographic Plan (Feldman Geospatial) - 2 Sheets	December 20, 2022



LOCUS PLAN - AERIAL

SOURCE: GOOGLE EARTH

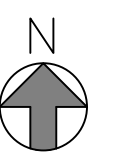
SCALE: 1"=1,000'



LOCUS PLAN - USGS

SOURCE: MASS GIS

SCALE: 1"=1,000'



OWNER

Town of Sudbury
275 Old Lancaster Road
Sudbury, MA 01776

SURVEYOR

Feldman Geospatial
27 Mechanic Street
Worcester, MA 01608

APPLICANT

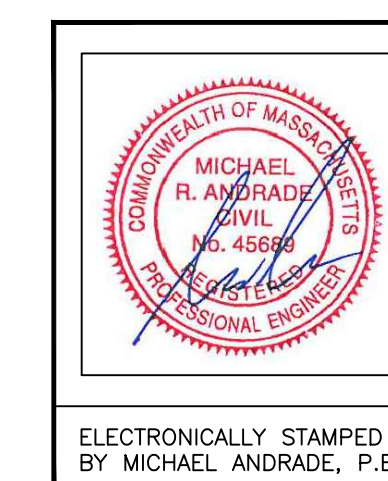
Town of Sudbury
275 Old Lancaster Road
Sudbury, MA 01776

WETLAND CONSULTANT

EcoTec, Inc.
201 Grove Street
Worcester, MA 01605



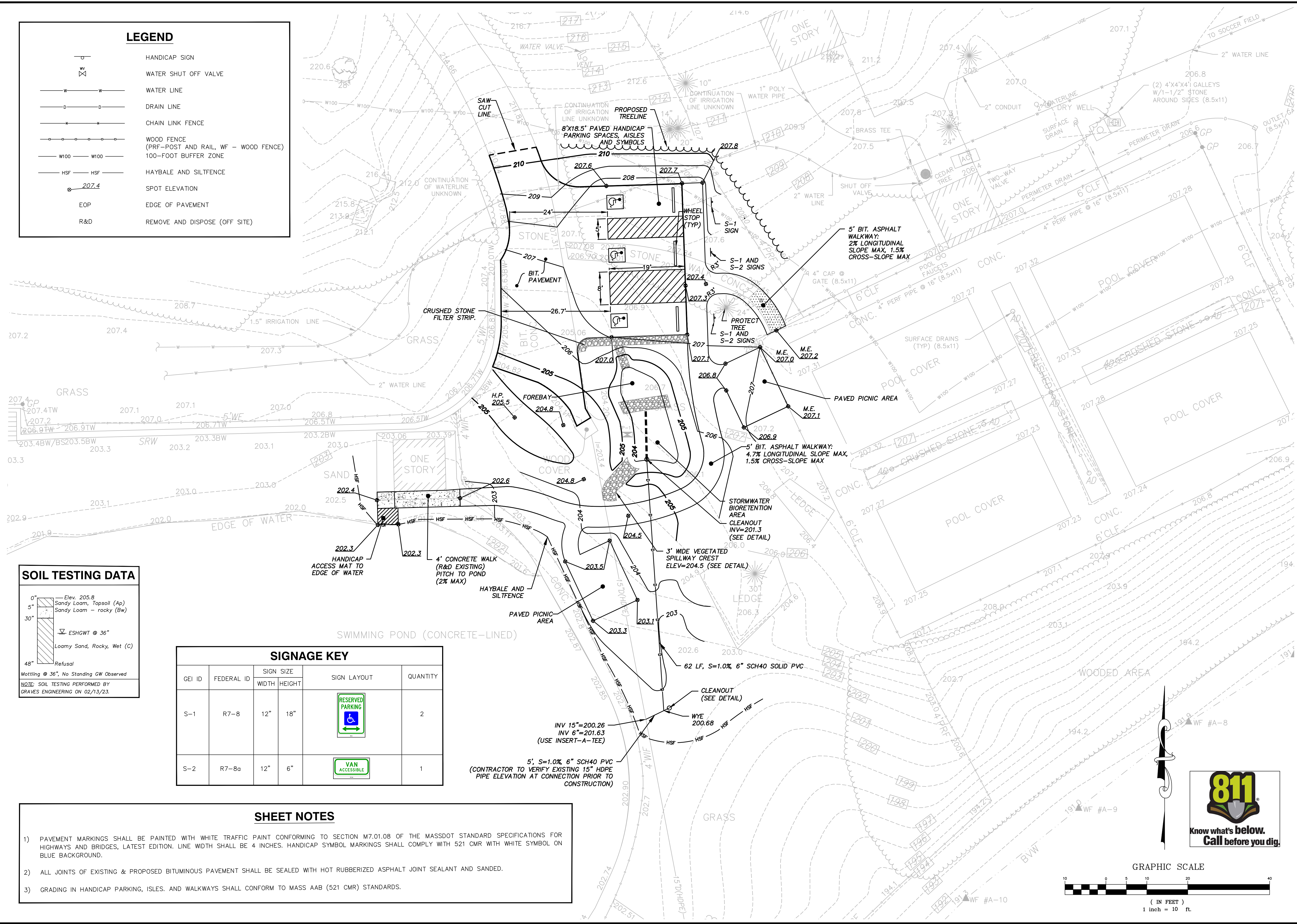
100 GROVE STREET | WORCESTER MA 01605
T 508-856-0321 | F 508-856-0357
gravesengineering.com



ELECTRONICALLY STAMPED
BY MICHAEL ANDRADE, P.E.

LEGEND

	HANDICAP SIGN
	WATER SHUT OFF VALVE
	WATER LINE
	DRAIN LINE
	CHAIN LINK FENCE
	WOOD FENCE (PRF-POST AND RAIL, WF - WOOD FENCE)
	100-FOOT BUFFER ZONE
	HAYBALE AND SILTFENCE
	SPOT ELEVATION
	EDGE OF PAVEMENT
	REMOVE AND DISPOSE (OFF SITE)



SOIL TESTING DATA

0" - Elev. 205.8
Sandy Loam, Topsoil (Ap)
Sandy Loam - rocky (Bw)
ESHWGT @ 36"
Loamy Sand, Rocky, Wet (C)
48" Refusal
Mottling @ 36", No Standing GW Observed
NOTE: SOIL TESTING PERFORMED BY GRAVES ENGINEERING ON 02/13/23.

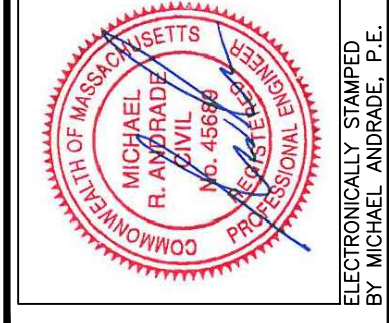
SIGNAGE KEY

GEI ID	FEDERAL ID	SIGN SIZE		SIGN LAYOUT	QUANTITY
		WIDTH	HEIGHT		
S-1	R7-8	12"	18"		2
S-2	R7-8a	12"	6"		1

- ### SHEET NOTES
- PAVEMENT MARKINGS SHALL BE PAINTED WITH WHITE TRAFFIC PAINT CONFORMING TO SECTION M7.01.08 OF THE MASSDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, LATEST EDITION. LINE WIDTH SHALL BE 4 INCHES. HANDICAP SYMBOL MARKINGS SHALL COMPLY WITH 521 CMR WITH WHITE SYMBOL ON BLUE BACKGROUND.
 - ALL JOINTS OF EXISTING & PROPOSED BITUMINOUS PAVEMENT SHALL BE SEALED WITH HOT RUBBERIZED ASPHALT JOINT SEALANT AND SANDED.
 - GRADING IN HANDICAP PARKING, ISLES, AND WALKWAYS SHALL CONFORM TO MASS AAB (521 CMR) STANDARDS.

GRAVES ENGINEERING, Inc.
100 GROVE STREET | WORCESTER MA 01605
T 508-856-0321 | F 508-856-0357
gravesengineering.com

NO.	DATE	BY	DESCRIPTION
1	04/10/23	KPM	ISSUED FOR PERMITTING

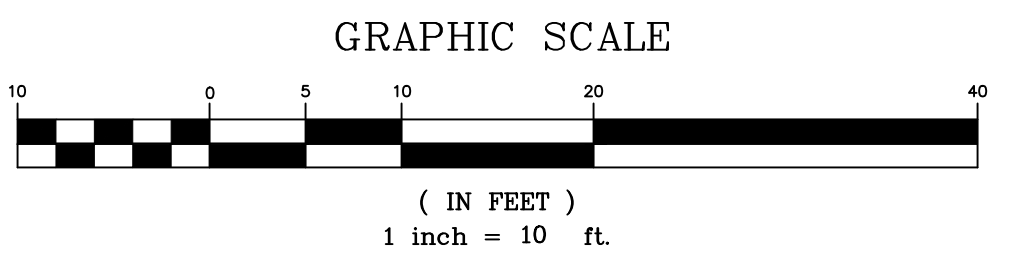




**SITE PLAN - SWIMMING AREA
HANDICAP ACCESSIBILITY IMPROVEMENTS
CAMP SEWATARO, 1 LIBERTY LEDGE, SUDBURY, MA 01776**

PREPARED FOR: CAMP SEWATARO, LLC
1 LIBERTY LEDGE, SUDBURY, MA 01776

DES. BY: KPM | DRW. BY: KPM | CHK. BY: MRA | PRJ. NO.: 22148
DATE: 04/10/23 | SCALE: 1"=10'

C101

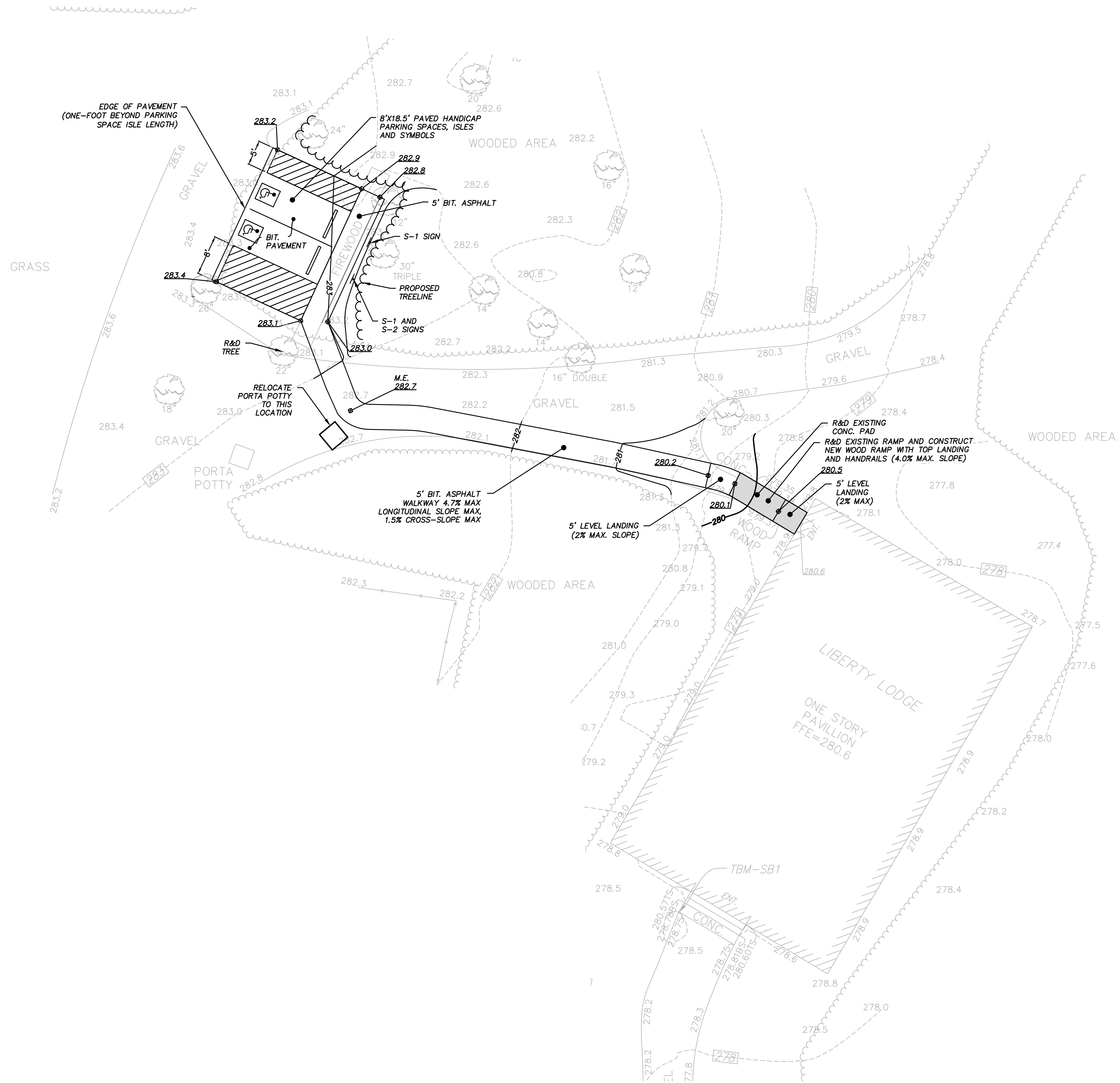


SIGNAGE KEY					
GEI ID	FEDERAL ID	SIGN SIZE		SIGN LAYOUT	QUANTITY
		WIDTH	HEIGHT		
S-1	R7-8	12"	18"		2
S-2	R7-8a	12"	6"		1

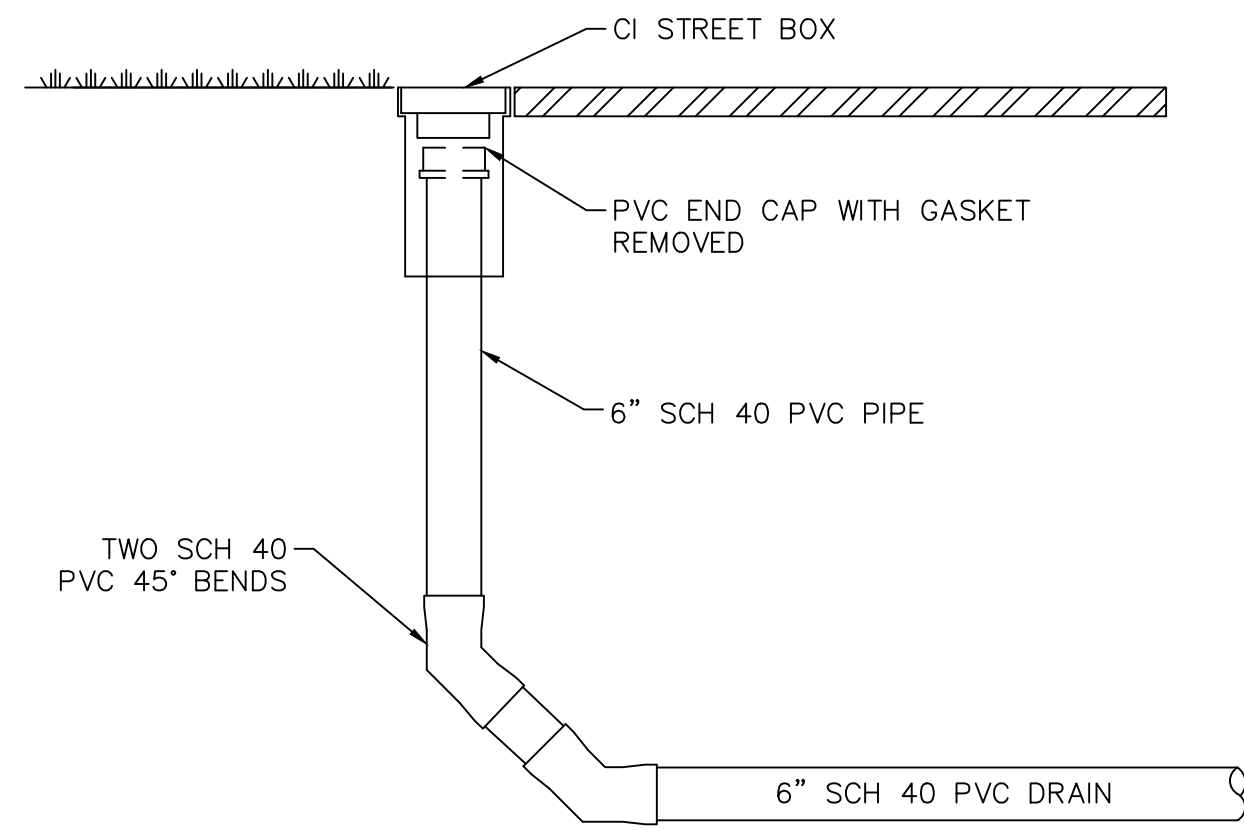
REVISIONS				
NO.	DATE	BY	DESCRIPTION	
1	04/10/23	KPM	ISSUED FOR PERMITTING	



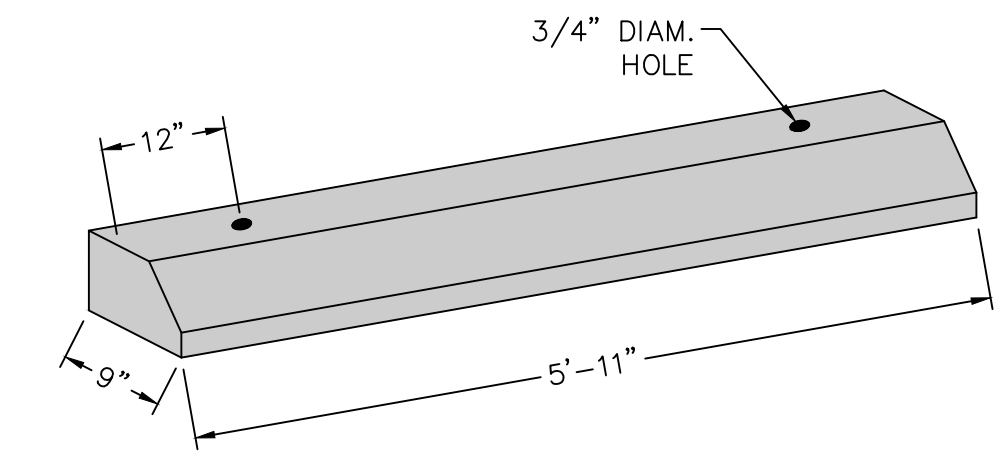
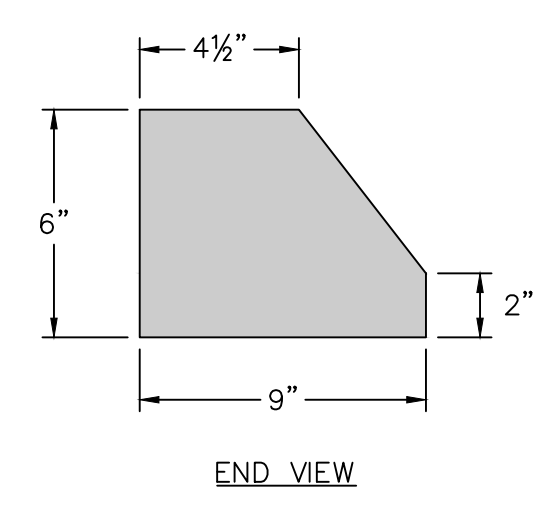
PREPARED FOR:	CAMP SEWATARO, LLC
DATE:	04/10/23
SCALE:	1"=10'
DES. BY:	KPM
DRW. BY:	KPM
CHK. BY:	MRA
PRJ. NO.:	22148



**SITE PLAN - LIBERTY LODGE
 HANDICAP ACCESSIBILITY IMPROVEMENTS
 CAMP SEWATARO, 1 LIBERTY LEDGE, SUDBURY, MA 01776**

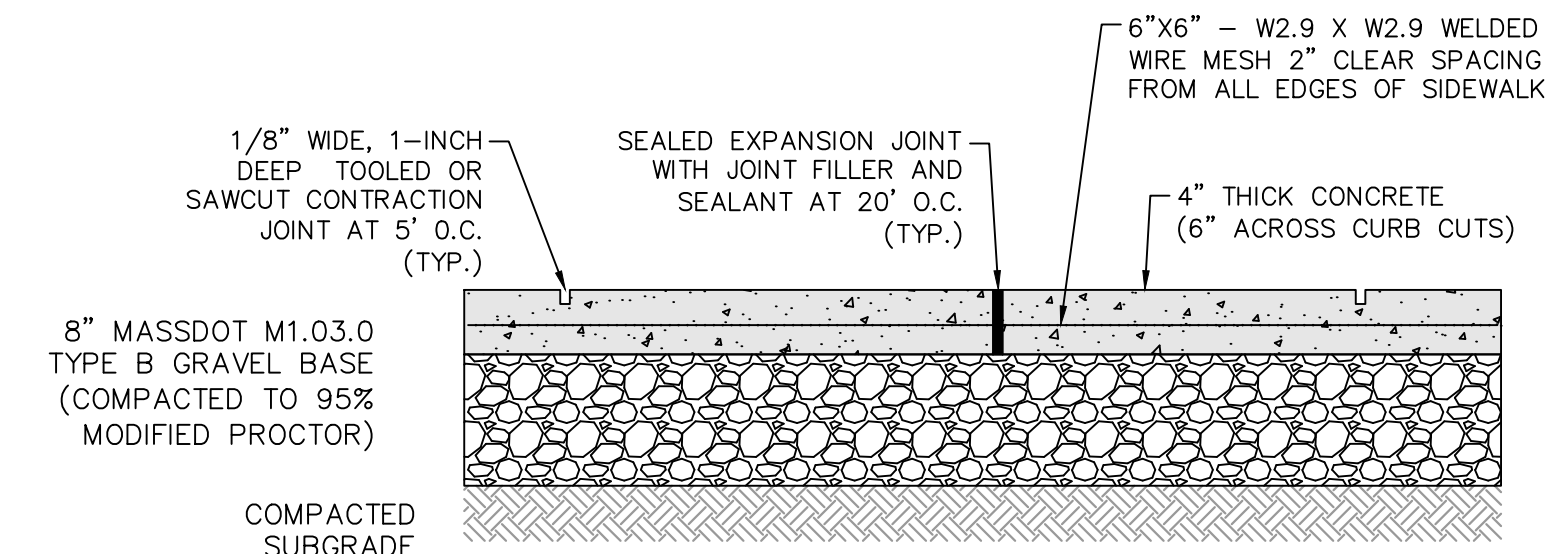


DRAIN CLEANOUT DETAIL NTS



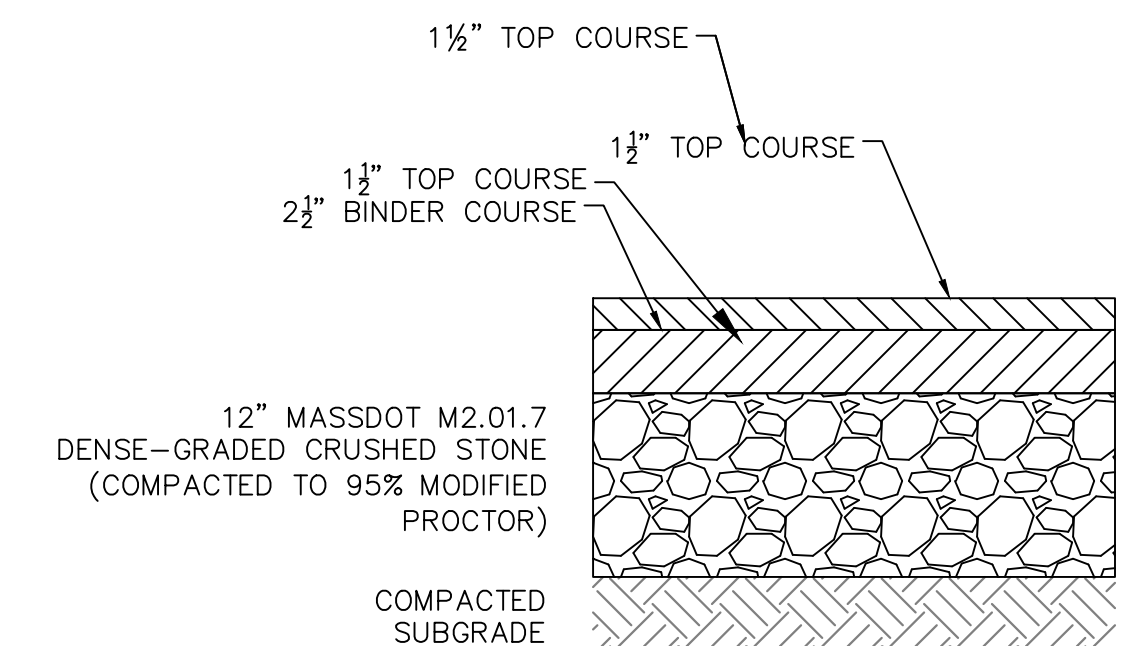
WHEEL STOP NTS

- NOTES:**
- 1) WHEEL STOPS SHALL BE CONSTRUCTED OF 4,000 PSI CONCRETE (28 DAYS) AND SECURED TO THE GROUND WITH STEEL PINS.
 - 2) RUBBER OR OTHER MATERIAL WHEEL STOPS MAY BE SUBSTITUTED WITH THE APPROVAL OF THE ENGINEER.



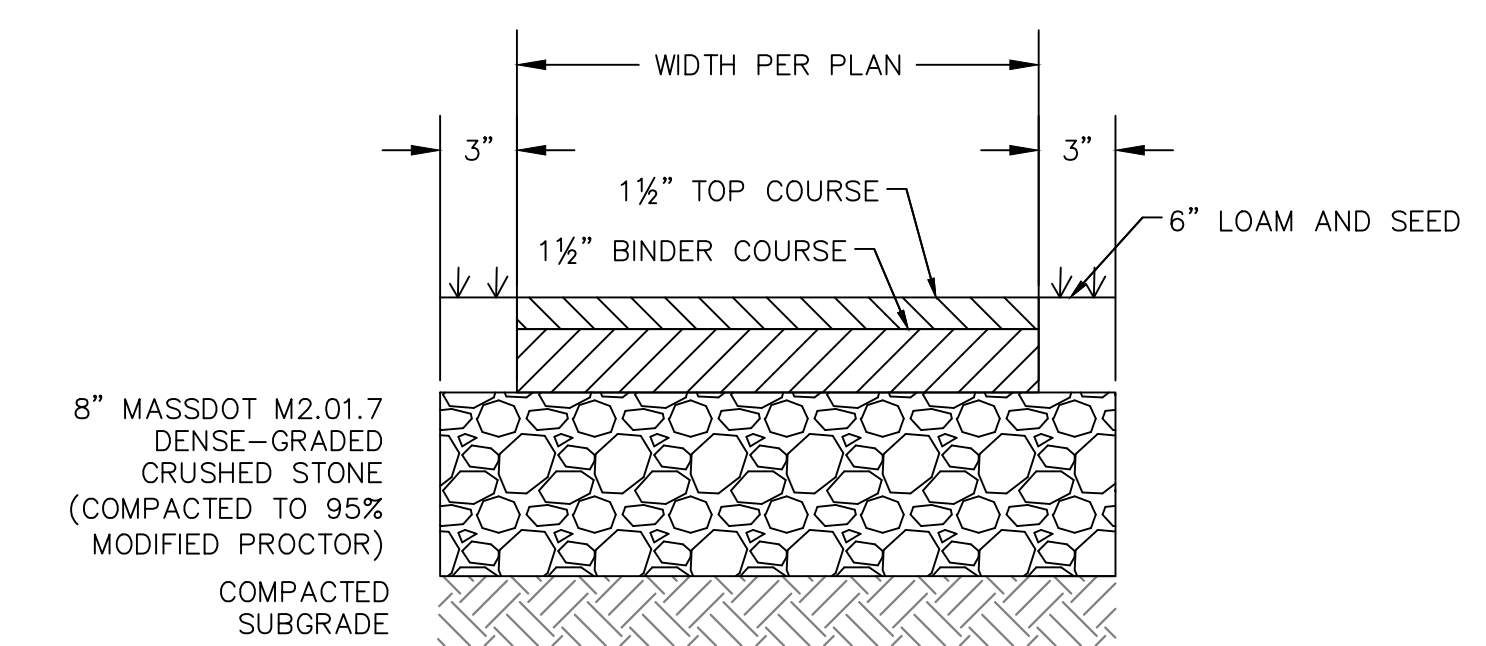
CONCRETE SIDEWALK NTS

- NOTES:**
- 1) CONCRETE MIX DESIGN SHALL BE FOR EXTERIOR USE; AIR-ENTRAINED, 4,000 PSI MIN. (28-DAY), 3/4" AGGREGATE.
 - 2) WHEN THE WALKWAY ABUTS A STRUCTURE OR EXISTING HARD SURFACE (CONCRETE, ETC.), INSTALL AN EXPANSION JOINT ACROSS THE ENTIRETY OF THE ABUTTING FACE WITH PREFORMED FIBER JOINT FILLER AND FILL WITH 1" DEEP OF POLYURETHANE JOINT SEALANT.
 - 3) WALKWAYS SHALL HAVE A LIGHT BROOM FINISH PERPENDICULAR TO THE DIRECTION OF FOOT TRAFFIC. THERE SHALL BE NO SMOOTHED TOOL JOINTS; BROOM FINISH SHALL EXTEND TO THE EDGES OF THE PAD AND ACROSS ANY JOINTS.



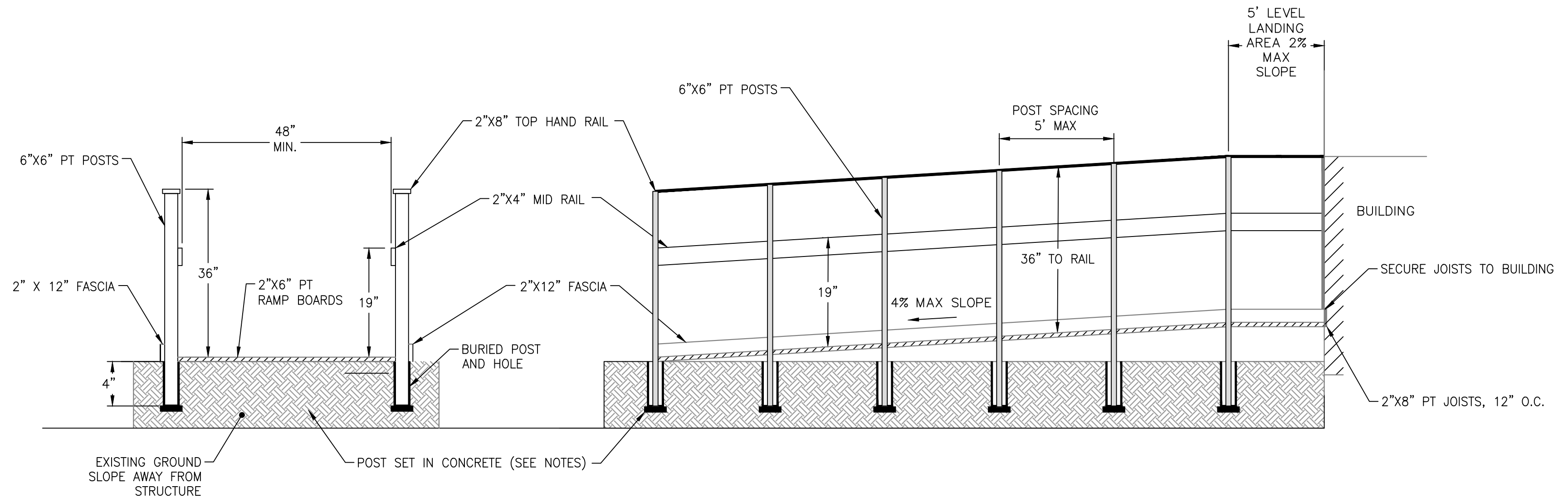
PAVEMENT SECTION NTS

- NOTES:**
- 1) TAMP ALL ASPHALT EDGES THAT ABUT LAWN, LANDSCAPED OR OTHER SOFT SURFACE.
 - 2) **BINDER COURSE:** - MASSDOT M3.11.03, TABLE A, "HMA INTERMEDIATE COURSE DENSE BINDER" OR SUPERPAVE INTERMEDIATE COURSE - 19.0MM (MIXTURE DESIGNATION SIC - 19.0).
 - 3) **TOP COURSE:** - MASSDOT M3.11.03, TABLE A, "SURFACE COURSE STANDARD TOP" OR SUPERPAVE SURFACE COURSE - 12.5MM (MIXTURE DESIGNATION SSC - 12.5).



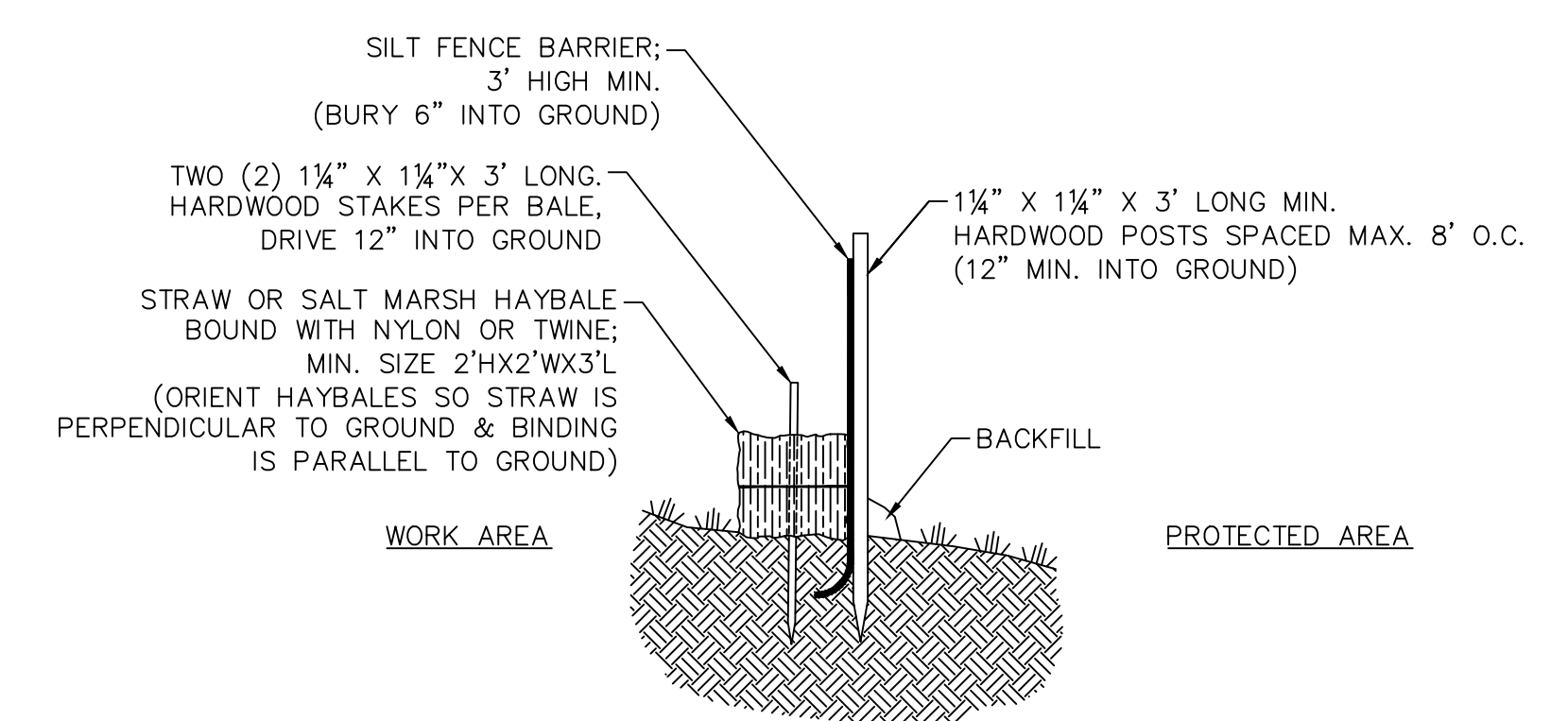
BITUMINOUS WALKWAY SECTION NTS

- NOTES:**
- 1) DO NOT EXTEND BASE GRAVEL AS SHOWN WHEN WALKWAYS AREA ABUTTING ROAD, WALKWAY, OR OTHER HARD SURFACE.
 - 2) **BINDER COURSE:** - MASSDOT M3.11.03, TABLE A, "HMA INTERMEDIATE COURSE DENSE BINDER" OR SUPERPAVE INTERMEDIATE COURSE - 19.0MM (MIXTURE DESIGNATION SIC - 19.0).
 - 3) **TOP COURSE:** - MASSDOT M3.11.03, TABLE A, "SURFACE COURSE STANDARD TOP" OR SUPERPAVE SURFACE COURSE - 12.5MM (MIXTURE DESIGNATION SSC - 12.5).



HANDICAP ACCESSIBLE RAMP NTS

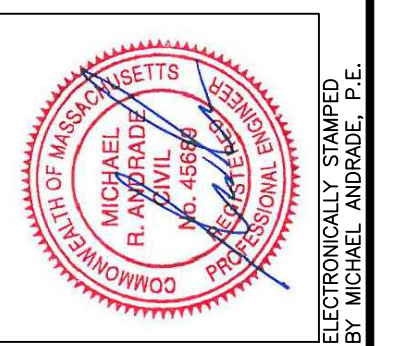
- NOTES:**
- 1) HANDRAILS SHALL COMPLY WITH THE MA ARCHITECTURAL ACCESS BOARD REGULATIONS (MA AAB). IN THE EVENT OF A DISCREPANCY BETWEEN MA AAB AND THESE DRAWINGS, MA AAB SHALL GOVERN.
 - 2) SET POSTS ON 8" DIAMETER CONCRETE FOOTING AT 2' MINIMUM DEPTH.
 - 3) ALL WOOD SHALL BE PRESSURE TREATED PINE SUITABLE FOR GROUND CONTACT.
 - 4) CONTRACTOR MAY MODIFY DESIGN AS NECESSARY TO ENSURE COMPLIANCE WITH APPLICABLE CODES.



HAYBALE & SILTFENCE NTS

- NOTE:**
- 1) PROVIDE A 3' TO 6' LEVEL AREA BETWEEN THE HAYBALE AND THE TOE OF ANY SLOPE TO PROVIDE AREA FOR SEDIMENT ACCUMULATION.

NO.	DATE	BY	DESCRIPTION
1	04/10/23	KPM	ISSUED FOR PERMITTING



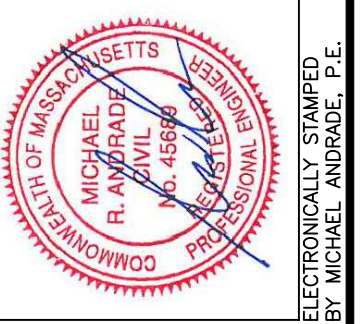
SITE DETAILS - 1

HANDICAP ACCESSIBILITY IMPROVEMENTS
 CAMP SEWATARO, 1 LIBERTY LEDGE, SUDBURY, MA 01776

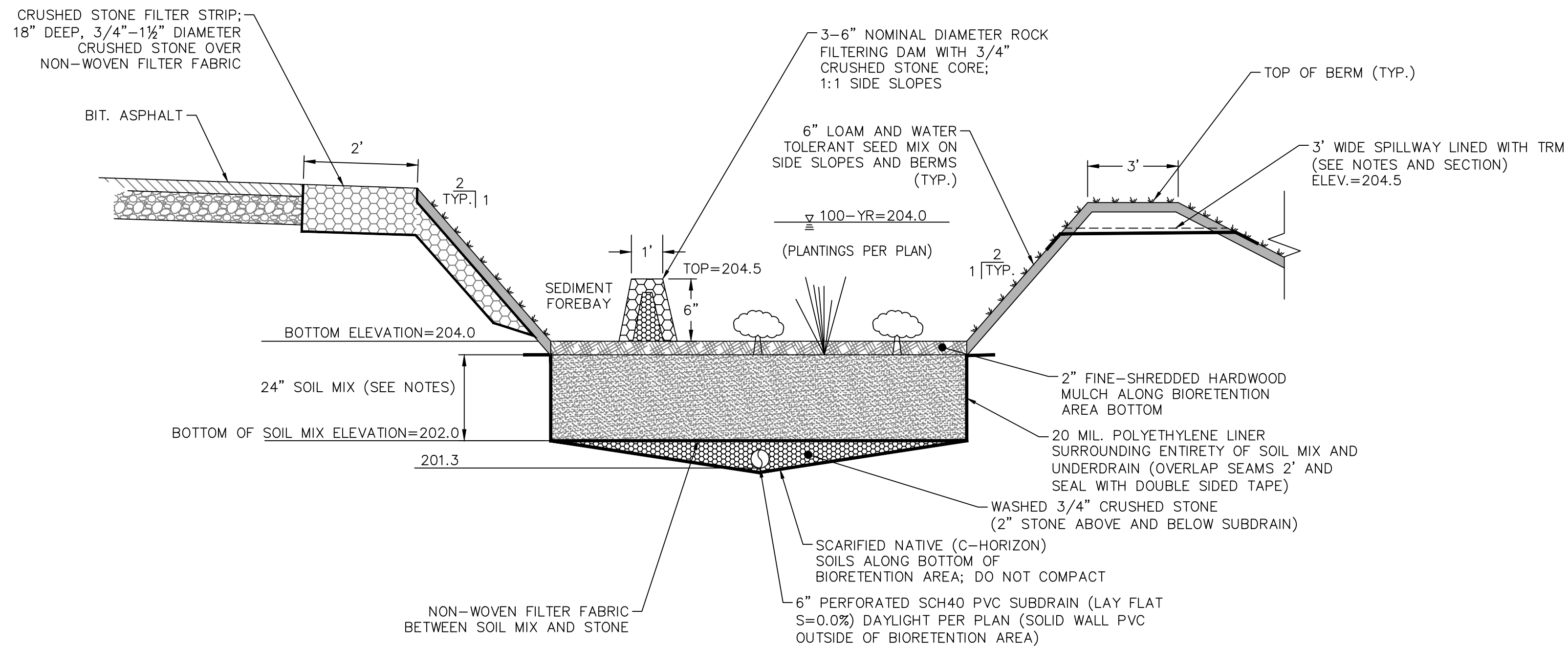
PREPARED FOR: CAMP SEWATARO, LLC
 1 LIBERTY LEDGE, SUDBURY, MA 01776

DATE: 04/10/23
 SCALE: 1"=NTS
 DES. BY: KPM
 DRW. BY: KPM
 CHK. BY: MIRA
 PRJ. NO.: 22148

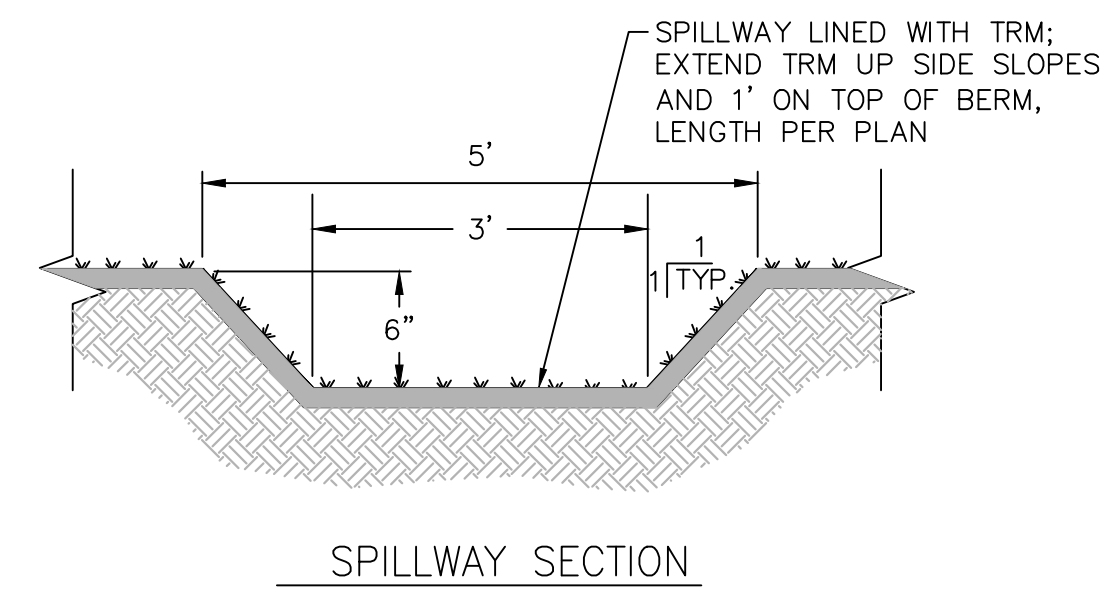
NO.	DATE	BY	DESCRIPTION
1	04/10/23	KPM	ISSUED FOR PERMITTING



PREPARED FOR:	CAMP SEWATARO, LLC 1 LIBERTY LEDGE, SUDBURY, MA 01776
SCALE:	1"=NTS
DATE:	04/10/23
DES. BY:	KPM
DRW. BY:	KPM
CHK. BY:	MRA
PRJ. NO.:	22148



STORMWATER BIORETENTION AREA

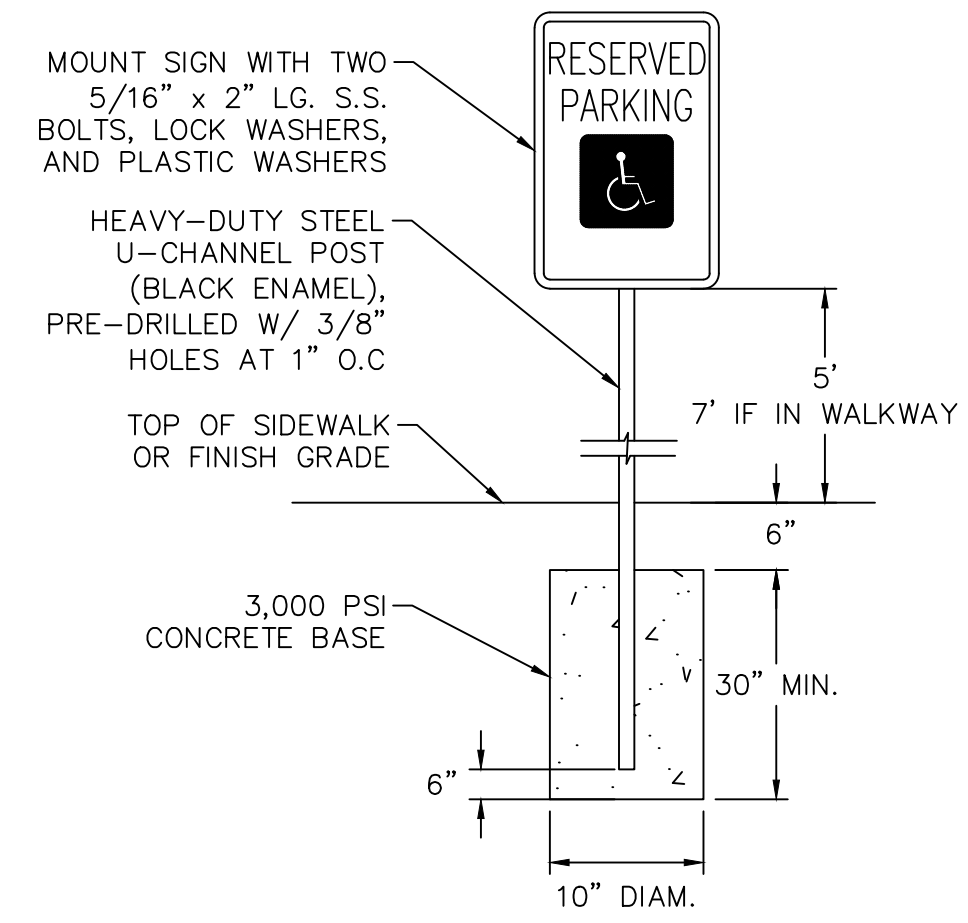


SPILLWAY SECTION

STORMWATER BIORETENTION AREA NOTES

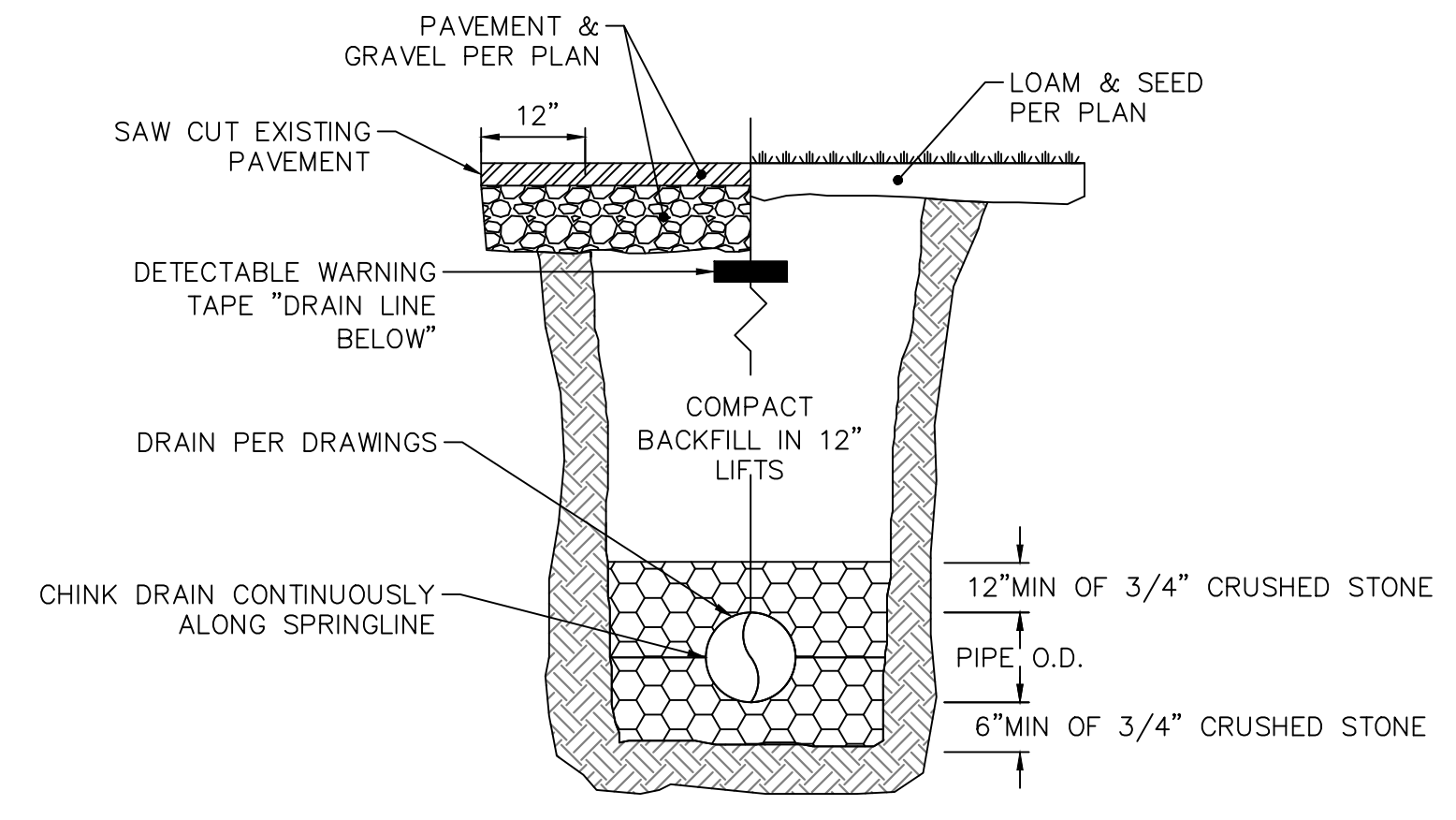
- PLANTINGS WITHIN THE BIORETENTION AREA MAY BE SUBSTITUTED WITH MORE READILY AVAILABLE SPECIES APPROVED BY GRAVES ENGINEERING, INC. ALL PLANT SPECIES MUST BE NATIVE TO MASSACHUSETTS AND A NON-INVASIVE SPECIES. PLANTINGS SHALL BE ARRANGED IN A NATURAL MANNER; ENGINEER SHALL APPROVE A PLANTING PLAN PREPARED BY THE CONTRACTOR PRIOR TO PLANTING.
- BIORETENTION SOIL MIX SHALL BE A MIX OF SAND, COMPOST AND SOIL AS FOLLOWS: 40% SAND, 20-30% TOPSOIL, AND 30-40% COMPOST.
- SOIL MIX MUST BE UNIFORM, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN 2 INCHES; CLAY CONTENT LESS THAN 5%, pH BETWEEN 5.5 AND 6.5.
- SOIL MIX SAND COMPONENT SHALL BE GRAVELLY SAND MEETING ASTM D422 AS FOLLOWS:

SIEVE SIZE	% PASSING
2"	100
3/4"	70-100
1/4"	50-80
#40	15-40
#200	0-3
- SOIL MIX TOPSOIL COMPONENT SHALL BE SANDY LOAM, LOAMY SAND OR LOAM TEXTURE. COMPOST COMPONENT SHALL BE PROCESSED YARD WASTE IN COMPLIANCE WITH MASSDEP GUIDELINES AND NOT CONTAIN BIOSOLIDS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING SOIL TESTING TO VERIFY THE SOIL USED FALLS WITHIN THESE LIMITS.
- SPILLWAY TURF REINFORCEMENT MATTING (TRM) SHALL BE NORTH AMERICAN GREEN MODEL P300, OR ENGINEER APPROVED EQUAL.
- INTERIOR SIDE SLOPES SHALL BE SEEDED WITH NEW ENGLAND WETLAND PLANTS "EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS AND MOST SITES" OR AN ENGINEER APPROVED EQUAL.
- THE TERM "BIORETENTION AREA" IS SYNONOMOUS WITH THE TERM "RAIN GARDEN".



SIGN NTS

NOTE:
1) THIS DETAIL APPLIES TO THE CONSTRUCTION OF ALL PROPOSED SIGNS; (SIGN TYPE AND DIMENSIONS MAY VARY FROM THOSE SHOWN). HANDICAP VAN ACCESSIBLE PLACARD SHALL BE MOUNTED DIRECTLY BELOW PRIMARY SIGN.

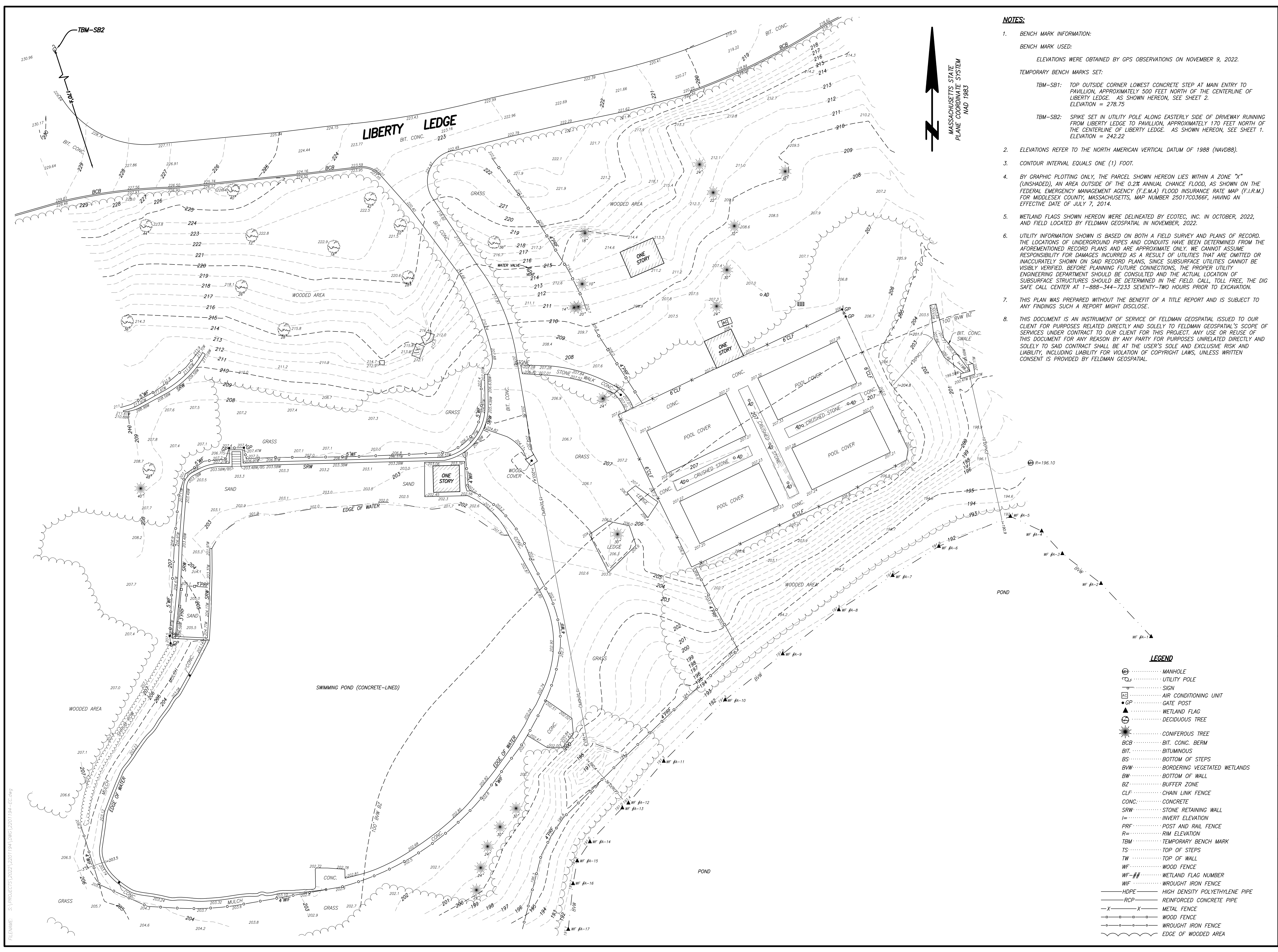


HDPE/PVC DRAIN TRENCH SECTION NTS

NOTES:
1) BACKFILL SHALL BE AN AASHTO CLASS III SOIL; EITHER TRENCH SPOILS OR AN IMPORTED SAND AND GRAVEL WITH FINES AND COMPACTED TO 90% OF THE PROCTOR DENSITY.
2) BACKFILL OF HDPE PIPE SHALL CONFORM TO ASTM D2321 AND/OR MANUFACTURER'S SPECIFICATIONS.

STORMWATER BIORETENTION AREA PLANTING LIST

CODE	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
GRASSES					
PV	5	PANICUM VIRGATUM	SWITCH GRASS	2 GAL.	18" O.C.
PA	5	PENNETUM ALOPECUROIDES	FOUNTAIN GRASS	2 GAL.	18" O.C.
PERENNIALS					
ATU	10	ASCLEPIAS TUBEROSA	BUTTERFLY MILKWEED	2 GAL.	24" O.C.
ER	10	ECHINOPS RITRO	GLOBE THISTLE	1 GAL.	18" O.C.
ATR	10	ANAPHALIS TRIPLINERVIS	PEARLY EVERLASTING	1 GAL.	18" O.C.
SHRUBS					
IV	2	ITEA VIRGINICA	VIRGINIA SWEETSPIRE	36" SPREAD	B&B
VD	2	VIBURNUM DENTATUM	ARROWWOOD	3 GAL.	B&B
AI	2	ALNUS INCANA	SPECKLED ADLER	#2 CONT.	CONT.



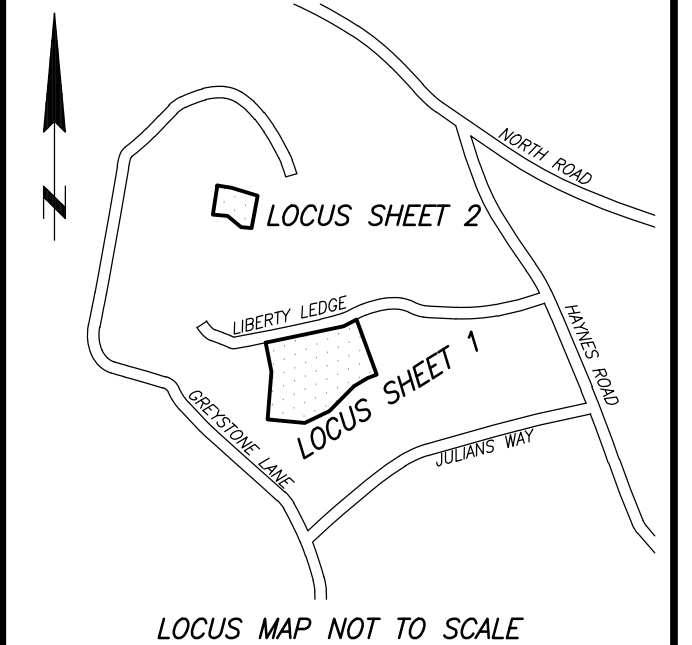
- NOTES:**
- BENCH MARK INFORMATION:
BENCH MARK USED:
ELEVATIONS WERE OBTAINED BY GPS OBSERVATIONS ON NOVEMBER 9, 2022.
TEMPORARY BENCH MARKS SET:
TBM-SB1: TOP OUTSIDE CORNER LOWEST CONCRETE STEP AT MAIN ENTRY TO PAVILLION, APPROXIMATELY 500 FEET NORTH OF THE CENTERLINE OF LIBERTY LEDGE. AS SHOWN HEREON, SEE SHEET 2. ELEVATION = 278.75
TBM-SB2: SPIKE SET IN UTILITY POLE ALONG EASTERLY SIDE OF DRIVEWAY RUNNING FROM LIBERTY LEDGE TO PAVILLION, APPROXIMATELY 170 FEET NORTH OF THE CENTERLINE OF LIBERTY LEDGE. AS SHOWN HEREON, SEE SHEET 1. ELEVATION = 242.22
 - ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
 - CONTOUR INTERVAL EQUALS ONE (1) FOOT.
 - BY GRAPHIC PLOTTING ONLY, THE PARCEL SHOWN HEREON LIES WITHIN A ZONE "X" (UNSHADED), AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD, AS SHOWN ON THE FEDERAL EMERGENCY MANAGEMENT AGENCY (F.E.M.A) FLOOD INSURANCE RATE MAP (F.I.R.M.) FOR MIDDLESEX COUNTY, MASSACHUSETTS, MAP NUMBER 25017C0366F, HAVING AN EFFECTIVE DATE OF JULY 7, 2014.
 - WETLAND FLAGS SHOWN HEREON WERE DELINEATED BY ECOTEC, INC. IN OCTOBER, 2022, AND FIELD LOCATED BY FELDMAN GEOSPATIAL IN NOVEMBER, 2022.
 - UTILITY INFORMATION SHOWN IS BASED ON BOTH A FIELD SURVEY AND PLANS OF RECORD. THE LOCATIONS OF UNDERGROUND PIPES AND CONDUITS HAVE BEEN DETERMINED FROM THE AFOREMENTIONED RECORD PLANS AND ARE APPROXIMATE ONLY. WE CANNOT ASSUME RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES THAT ARE OMITTED OR INACCURATELY SHOWN ON SAID RECORD PLANS, SINCE SUBSURFACE UTILITIES CANNOT BE VISIBLY VERIFIED. BEFORE PLANNING FUTURE CONNECTIONS, THE PROPER UTILITY ENGINEERING DEPARTMENT SHOULD BE CONSULTED AND THE ACTUAL LOCATION OF SUBSURFACE STRUCTURES SHOULD BE DETERMINED IN THE FIELD. CALL, TOLL FREE, THE DIG SAFE CALL CENTER AT 1-888-344-7233 SEVENTY-TWO HOURS PRIOR TO EXCAVATION.
 - THIS PLAN WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT AND IS SUBJECT TO ANY FINDINGS SUCH A REPORT MIGHT DISCLOSE.
 - THIS DOCUMENT IS AN INSTRUMENT OF SERVICE OF FELDMAN GEOSPATIAL ISSUED TO OUR CLIENT FOR PURPOSES RELATED DIRECTLY AND SOLELY TO FELDMAN GEOSPATIAL'S SCOPE OF SERVICES UNDER CONTRACT TO OUR CLIENT FOR THIS PROJECT. ANY USE OR REUSE OF THIS DOCUMENT FOR ANY REASON BY ANY PARTY FOR PURPOSES UNRELATED DIRECTLY AND SOLELY TO SAID CONTRACT SHALL BE AT THE USER'S SOLE AND EXCLUSIVE RISK AND LIABILITY, INCLUDING LIABILITY FOR VIOLATION OF COPYRIGHT LAWS, UNLESS WRITTEN CONSENT IS PROVIDED BY FELDMAN GEOSPATIAL.

MASSACHUSETTS STATE
PLANE COORDINATE SYSTEM
MAD 1983

BOSTON HEADQUARTERS
152 HAMPDEN STREET
BOSTON, MA 02119

WORCESTER OFFICE
27 MECHANIC STREET
WORCESTER, MA 01608

(617)357-9740
www.feldmangeo.com



I CERTIFY THAT THIS PLAN IS BASED ON AN ACTUAL FIELD SURVEY AND THE LATEST PLANS AND DEEDS OF RECORD.

JRZ
JOSEPH R. ZAMBUTO, PLS (MA# 52783)
JZAMBUTO@FELDMANGEO.COM

DECEMBER 20, 2022
DATE



DRAWING NAME:
TOPOGRAPHIC PLAN
LIBERTY LEDGE
SUBBURY, MASS.

DATE: DECEMBER 15, 2022

REVISIONS:

NO.	DESCRIPTION

FILENAME: 2201194-EC.dwg

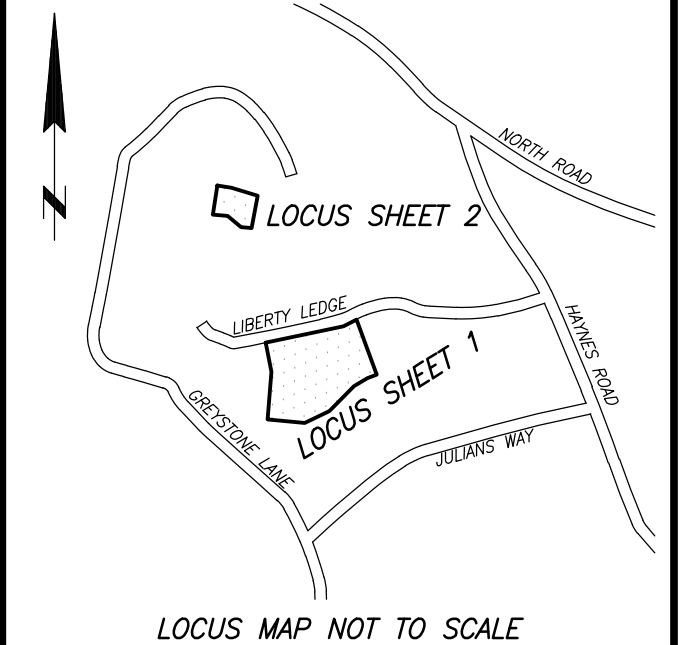
RESEARCH:	FIELD CHIEF: SB
PROJ MGR: TRA	APPROVED: TRA
CALC: JIRZ	CADD: JIRZ
FIELD CHK: CRD	CRD FILE: 2201194



BOSTON HEADQUARTERS
152 HAMPDEN STREET
BOSTON, MA 02119

WORCESTER OFFICE
27 MECHANIC STREET
WORCESTER, MA 01608

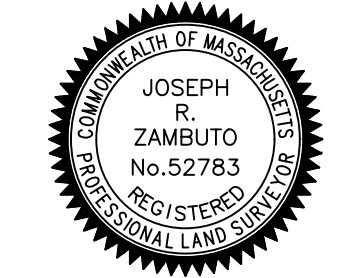
(617)357-9740
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I CERTIFY THAT THIS PLAN IS BASED ON AN ACTUAL FIELD SURVEY AND THE LATEST PLANS AND DEEDS OF RECORD.

[Signature]
JOSEPH R. ZAMBUTO, PLS (MA# 52783)
JZAMBUTO@FELDMANGEO.COM

DECEMBER 20, 2022
DATE



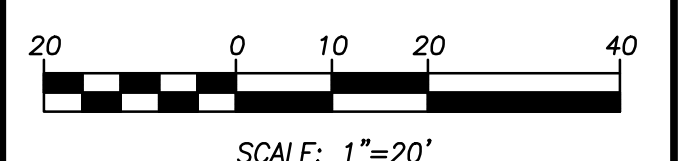
DRAWING NAME:

TOPOGRAPHIC PLAN
LIBERTY LEDGE
SUDBURY, MASS.

DATE: DECEMBER 15, 2022

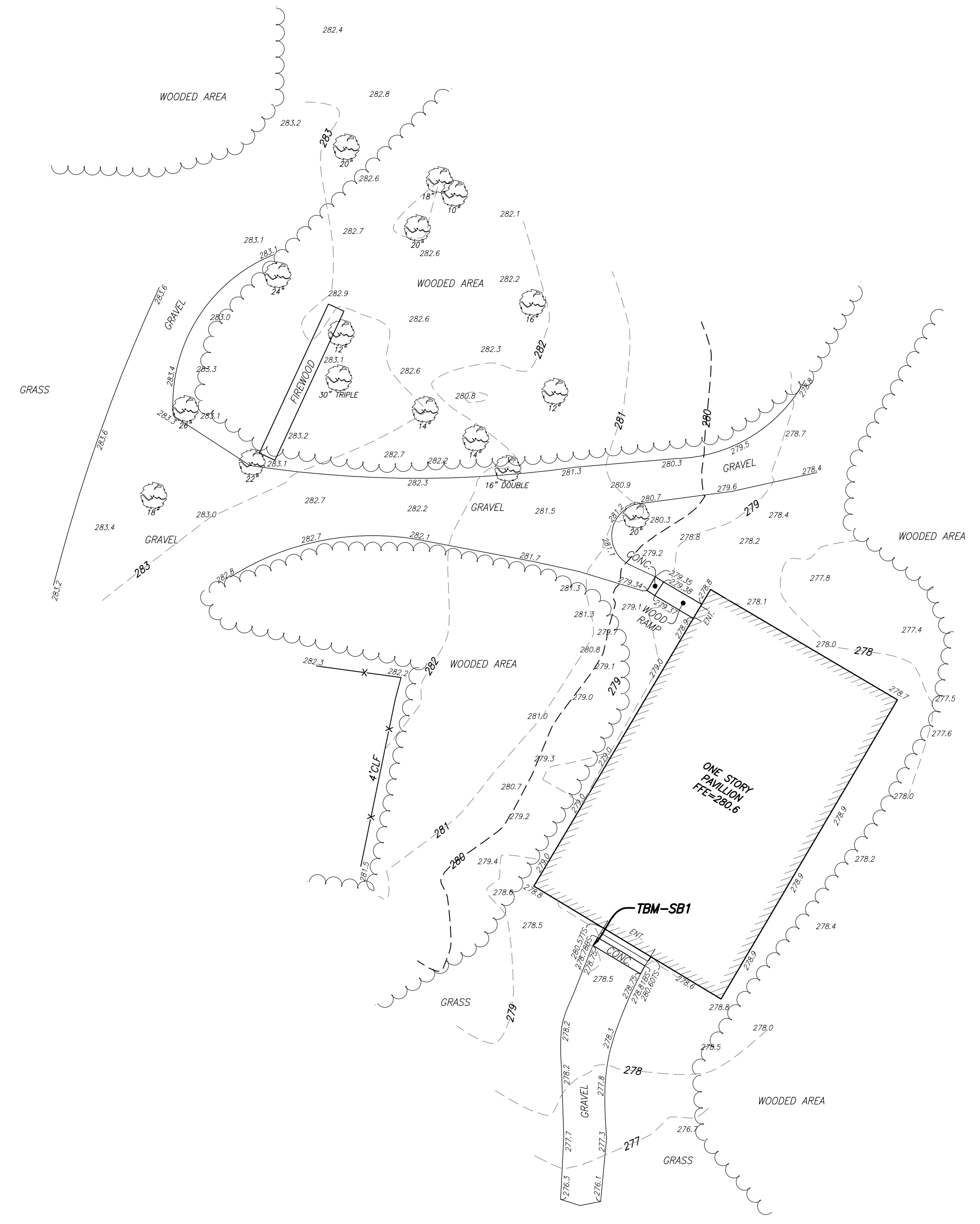
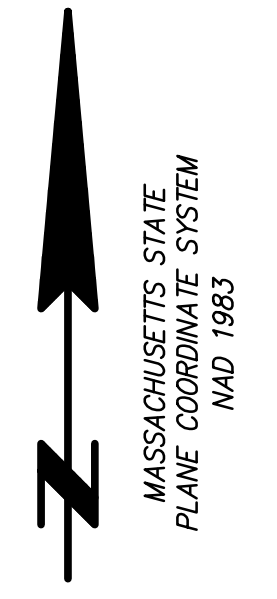
REVISIONS:	

FILENAME:	2201194-EC.dwg
RESEARCH:	FIELD CHIEF: SB
PROJ MGR: TRA	APPROVED: TRA
CALC: CAD:	CADD: JRZ
FIELD CHK:	CRD FILE: 2201194



NOTES:

- BENCH MARK INFORMATION:
BENCH MARK USED:
ELEVATIONS WERE OBTAINED BY GPS OBSERVATIONS ON NOVEMBER 9, 2022.
TEMPORARY BENCH MARKS SET:
TBM-SB1: TOP OUTSIDE CORNER LOWEST CONCRETE STEP AT MAIN ENTRY TO PAVILLION, APPROXIMATELY 500 FEET NORTH OF THE CENTERLINE OF LIBERTY LEDGE. AS SHOWN HEREON, SEE SHEET 2. ELEVATION = 278.75
TBM-SB2: SPIKE SET IN UTILITY POLE ALONG EASTERLY SIDE OF DRIVEWAY RUNNING FROM LIBERTY LEDGE TO PAVILLION, APPROXIMATELY 170 FEET NORTH OF THE CENTERLINE OF LIBERTY LEDGE. AS SHOWN HEREON, SEE SHEET 1. ELEVATION = 242.22
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- BY GRAPHIC PLOTTING ONLY, THE PARCEL SHOWN HEREON LIES WITHIN A ZONE "X" (UNSHADED), AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD, AS SHOWN ON THE FEDERAL EMERGENCY MANAGEMENT AGENCY (F.E.M.A) FLOOD INSURANCE RATE MAP (F.I.R.M.) FOR MIDDLESEX COUNTY, MASSACHUSETTS, MAP NUMBER 25017C0366F, HAVING AN EFFECTIVE DATE OF JULY 7, 2014.
- WETLAND FLAGS SHOWN HEREON WERE DELINEATED BY ECOTEQ, INC. IN OCTOBER, 2022, AND FIELD LOCATED BY FELDMAN GEOSPATIAL IN NOVEMBER, 2022.
- UTILITY INFORMATION SHOWN IS BASED ON BOTH A FIELD SURVEY AND PLANS OF RECORD. THE LOCATIONS OF UNDERGROUND PIPES AND CONDUITS HAVE BEEN DETERMINED FROM THE AFOREMENTIONED RECORD PLANS AND ARE APPROXIMATE ONLY. WE CANNOT ASSUME RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES THAT ARE OMITTED OR INACCURATELY SHOWN ON SAID RECORD PLANS, SINCE SUBSURFACE UTILITIES CANNOT BE VISIBLY VERIFIED. BEFORE PLANNING FUTURE CONNECTIONS, THE PROPER UTILITY ENGINEERING DEPARTMENT SHOULD BE CONSULTED AND THE ACTUAL LOCATION OF SUBSURFACE STRUCTURES SHOULD BE DETERMINED IN THE FIELD. CALL, TOLL FREE, THE DIG SAFE CALL CENTER AT 1-888-344-7233 SEVENTY-TWO HOURS PRIOR TO EXCAVATION.
- THIS PLAN WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT AND IS SUBJECT TO ANY FINDINGS SUCH A REPORT MIGHT DISCLOSE.
- THIS DOCUMENT IS AN INSTRUMENT OF SERVICE OF FELDMAN GEOSPATIAL ISSUED TO OUR CLIENT FOR PURPOSES RELATED DIRECTLY AND SOLELY TO FELDMAN GEOSPATIAL'S SCOPE OF SERVICES UNDER CONTRACT TO OUR CLIENT FOR THIS PROJECT. ANY USE OR REUSE OF THIS DOCUMENT FOR ANY REASON BY ANY PARTY FOR PURPOSES UNRELATED DIRECTLY AND SOLELY TO SAID CONTRACT SHALL BE AT THE USER'S SOLE AND EXCLUSIVE RISK AND LIABILITY, INCLUDING LIABILITY FOR VIOLATION OF COPYRIGHT LAWS, UNLESS WRITTEN CONSENT IS PROVIDED BY FELDMAN GEOSPATIAL.



LEGEND

- ⊕ MANHOLE
- ⊙ UTILITY POLE
- SIGN
- ⊠ AIR CONDITIONING UNIT
- GP GATE POST
- ▲ WETLAND FLAG
- ⊗ DECIDUOUS TREE
- ⊗ CONIFEROUS TREE
- BCB BIT. CONC. BERM
- BIT. BITUMINOUS
- BS BOTTOM OF STEPS
- BW BORDERING VEGETATED WETLANDS
- BW BOTTOM OF WALL
- BZ BUFFER ZONE
- CLF CHAIN LINK FENCE
- CONC. CONCRETE
- SRW STONE RETAINING WALL
- I= INVERT ELEVATION
- PRF POST AND RAIL FENCE
- R= RIM ELEVATION
- TBM TEMPORARY BENCH MARK
- TS TOP OF STEPS
- TW TOP OF WALL
- WF WOOD FENCE
- WF-# WETLAND FLAG NUMBER
- WIF WROUGHT IRON FENCE
- HDPE HIGH DENSITY POLYETHYLENE PIPE
- RCP REINFORCED CONCRETE PIPE
- X- METAL FENCE
- ○ ○ WOOD FENCE
- ○ ○ WROUGHT IRON FENCE
- ~~~~~ EDGE OF WOODED AREA

STORMWATER REPORT

for

Handicap Accessibility Improvements

1 Liberty Ledge

Sudbury, MA 01776

Prepared for:

Camp Sewataro, LLC

1 Liberty Ledge

Sudbury, MA 01776

Date:

April 10, 2023

Prepared By:



ENGINEERING, Inc.

100 Grove Street

Worcester, MA 01605

T 508-856-0321

F 508-856-0357

gravesengineering.com



Electronically stamped by:
Michael Andrade 04/10/23

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- **Appendix C** HydroCAD Reports - Post-development 2, 10, 25, & 100-year storms
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NARRATIVE

Project Description

Site Location: Camp Sewataro, 1 Liberty Lane
Sudbury, MA

Development Type: Handicap Accessibility Improvements

Project Summary:

The proposed project is construction of parking area expansion, picnic area, and handicap access to the existing swimming area at Camp Sewataro located at 1 Liberty Lane in Sudbury MA. The project will provide three handicap parking spaces, and handicap access to the swimming pool area and the swimming pond. A paved picnic area will be built adjacent to the swimming pool area as well.

A bioretention system has been designed and will be constructed to treat and attenuate the runoff as a result of 1,823 square feet of additional impervious area from the proposed construction in accordance with Mass DEP Stormwater Management Standards.

Existing Site Conditions

Location: The site is located at Camp Sewataro, 1 Liberty Ledge in Sudbury, MA.

Ground Cover: The ground cover on the property is a combination of woods and grassed areas, a swimming pool area, and a concrete lined swimming pond.

Slopes: The site topography varies in slope from Liberty Lane in a north to south direction towards the ponds.

Soil Types: Site soil types as listed by the USDA-NRCS are Hinkley loamy sand (map unit symbols 245B). This soil is classified as hydrologic group 'A' indicating a high infiltration rate when thoroughly wet. Refer to Appendix D for more detailed USDA-NRCS soil information.

HYDROLOGY CALCULATIONS

Methodology

Peak rate of runoff flows are calculated using SCS TR-20 and TR-55 methodology as implemented by the HydroCAD Stormwater Modeling System computer program. The 2, 10, 25, and 100-year storm events were analyzed with the HydroCAD program using NRCC Worcester County rainfall frequency data as follows:

NRCC Rainfall Amounts (inches) by Frequency			
2 Year	10 Year	25 Year	100 Year
3.25	4.90	6.20	8.85

Design Points

The Design point for this project is the swimming ponds on the southern portion of the swimming pool area as indicated on the Drainage Area Plans. In the predeveloped condition there is one Drainage Area #1 as shown on the Pre-Development Map. The Post-Development subcatchment areas are divided into two subcatchments: Drainage Area 10 flows overland undetained to the Design Point at the Swimming Ponds. Drainage area 20 flows to the Bioretention Area. The bioretention area flows to the design point.

Drainage Area #20 flows to the Bio-Retention Area. The two subcatchment areas are combined at the same Design Point as in the Predeveloped condition.

Pre-Development

The total pre-development drainage area studied in this report consists of approximately 12,666 square feet draining to design point 1 located at the pond on the southern portion of the site improvements.

Refer to Appendix B for the HydroCAD output sheets for each storm event. A summary of the peak rate of runoff for the design point for each storm is as follows:

Pre-Development Peak Rate of Runoff (cfs)				
	2 Year	10 Year	25 Year	100 Year
Design Point #1 (ponds)	0.00	0.01	0.09	0.43

Post-Development

The total post-development drainage area studied in this report consists of two areas to the same Design Point. A portion of the site and parking area is infiltrated into a bioretention pond consisting of a sediment forebay and a bioretention pond.

Refer to Appendix C for the HydroCAD output sheets for each storm event. A summary of the peak rate of runoff for the design point for each storm is as follows:

Post-Development Peak Rate of Runoff (cfs)				
	2 Year	10 Year	25 Year	100 Year
Design Point #1 (ponds)	0.00	0.01	0.08	0.30

The total net change in peak rate of runoff from pre-development to post-development at the design point for each storm is as follows:

Comparison of Pre- vs. Post-Development Peak Rate of Runoff (cfs)				
Net Change				
	2 Year	10 Year	25 Year	100 Year
Design Point #1 (ponds)	0.00	0.00	-0.01	-0.13

STORMWATER MANAGEMENT

To demonstrate compliance with MassDEP Stormwater Management, we offer the following in response to each of the 10 Standards.

No New Untreated Discharges (Stormwater Management Standard 1)

All new areas are treated through the Bioretention Area to achieve the required TSS. See Appendix G for removal calculations. In summary, the project achieves a 93% TSS Removal rate.

Peak Rate Attenuation (Stormwater Management Standard 2)

Runoff is attenuated through infiltration by directing a portion of the constructed parking and walkway impervious areas to the bioretention area such that there is no net increase in peak rate of runoff at design point.

Recharge to Groundwater (Stormwater Management Standard 3)

USDA-NRCS soil survey indicates site soils are well drained, sandy loam, hydrologic group A soils:

Total pre-development impervious area = 235 ft²
Total post-development impervious area = 2,058 ft²
Net increase in impervious area = 1,823 ft²

Required Recharge Volume (R_v) = F x Net increase in Impervious Area where, F = Target Depth Factor (in.)

$$(0.6"/12")(1,823)=91 \text{ ft}^3$$

Time_{drawdown} = R_v / (K x Bottom Area) where, R_v= recharge BMP storage volume
K= Saturated Hydraulic Conductivity (Rawls) Rate

$$\text{Time}_{\text{drawdown}} = 91 \text{ ft}^3 / (2.41 \text{ in./hr./12"} \times 206 \text{ ft}^2) = \underline{2.20 \text{ hours}} < 72 \text{ hours.}$$

Water Quality Calculations (Stormwater Management Standard 4)

The proposed runoff flow path to the bioretention area entails runoff directed into a sediment forebay and ultimately into the bioretention area. The proposed treatment train of a sediment forebay and the bioretention area is anticipated to have a TSS removal rate of 90% for a bioretention area per MassDEP Stormwater Handbook. Refer to Appendix G for detailed TSS calculations that demonstrate the TSS removal rates for the site.

Water Quality Volume: $V = 0.5"/12 \times A_{\text{IMP}}$

Bioretention Area
 $V = 0.5"/12 \times 1,823 \text{ ft}^2 = \underline{76 \text{ ft}^3}$ required volume per MassDEP
Provided volume = 126 ft³

(See HydroCAD stage-storage-volume sheet following this Narrative)

Forebay Sizing:

$$V = 0.6"/12 \times A_{\text{IMP}}$$

Forebay (Bioretention 1,823 ft²) = 91 ft³
Provided volume = 112 ft³

(See HydroCAD stage-storage-volume sheet following this Narrative)

Additionally, a Long-Term Pollution Prevention Plan has been developed for the site (refer to Appendix F).

Higher Potential Pollutant Loads (Stormwater Management Standard 5)

The site is not a land use with a higher potential pollutant load.

Protection of Critical Areas (Stormwater Management Standard 6)

The site does not discharge to a critical area.

Redevelopment Projects (Stormwater Management Standard 7)

The site is not considered redevelopment as there is an increase in impervious area.

Erosion/Sediment Control (Stormwater Management Standard 8)

See the Site development plans for erosion and sediment control during construction.

Operation/Maintenance Plan (Stormwater Management Standard 9)

Refer to Appendix E for the site Long-Term Drainage System Operation & Maintenance Plan.

Illicit Discharge Compliance Statement (Stormwater Management Standard 10)

There are no existing illicit discharges to GEI's or the owner's knowledge and there are no proposed illicit discharges. There are no cross-connections between the stormwater system and the wastewater system and discharges to each will remain separate; these systems are shown on the project drawings.

APPENDIX A

MA DEP STORMWATER REPORT CHECKLIST



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



Electronically stamped by
Michael Andrade, PE:
04/10/23

Signature and Date

Checklist

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

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



Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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



Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

Standard 3: Recharge

- Soil Analysis provided.
- Required Recharge Volume calculation provided.
- Required Recharge volume reduced through use of the LID site Design Credits.
- Sizing the infiltration, BMPs is based on the following method: Check the method used.
 - Static
 - Simple Dynamic
 - Dynamic 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

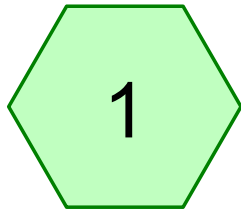
- The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
 - Name of the stormwater management system owners;
 - Party responsible for operation and maintenance;
 - Schedule for implementation of routine and non-routine maintenance 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.

APPENDIX B

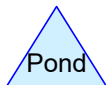
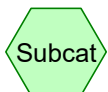
HYDROCAD REPORTS PRE-DEVELOPMENT



Area to DP



Design Point #1- Ponds



22148_Pre-Development

Prepared by Graves Engineering, Inc

HydroCAD® 10.20-2g s/n 00448 © 2022 HydroCAD Software Solutions LLC

NRCC 24-hr D 2-yr Rainfall=3.25"

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Page 2

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Area to DP

Runoff Area=12,666 sf 1.86% Impervious Runoff Depth=0.02"
Flow Length=323' Tc=10.1 min CN=42 Runoff=0.00 cfs 18 cf

Link DP: Design Point #1- Ponds

Inflow=0.00 cfs 18 cf
Primary=0.00 cfs 18 cf

Total Runoff Area = 12,666 sf Runoff Volume = 18 cf Average Runoff Depth = 0.02"
98.14% Pervious = 12,431 sf 1.86% Impervious = 235 sf

22148_Pre-Development

Prepared by Graves Engineering, Inc

HydroCAD® 10.20-2g s/n 00448 © 2022 HydroCAD Software Solutions LLC

NRCC 24-hr D 2-yr Rainfall=3.25"

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Page 3

Summary for Subcatchment 1: Area to DP

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 18 cf, Depth= 0.02"

Routed to Link DP : Design Point #1- Ponds

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-yr Rainfall=3.25"

Area (sf)	CN	Description
7,159	39	>75% Grass cover, Good, HSG A
5,272	43	Woods/grass comb., Fair, HSG A
* 235	98	Impervious, HSG A
12,666	42	Weighted Average
12,431		98.14% Pervious Area
235		1.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.18"
0.6	74	0.1700	2.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	137	0.0440	3.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	62	0.1300	5.80		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
10.1	323	Total			

Summary for Link DP: Design Point #1- Ponds

Inflow Area = 12,666 sf, 1.86% Impervious, Inflow Depth = 0.02" for 2-yr event

Inflow = 0.00 cfs @ 24.00 hrs, Volume= 18 cf

Primary = 0.00 cfs @ 24.00 hrs, Volume= 18 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

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NRCC 24-hr D 10-yr Rainfall=4.90"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Area to DP

Runoff Area=12,666 sf 1.86% Impervious Runoff Depth=0.29"
Flow Length=323' Tc=10.1 min CN=42 Runoff=0.01 cfs 303 cf

Link DP: Design Point #1- Ponds

Inflow=0.01 cfs 303 cf
Primary=0.01 cfs 303 cf

Total Runoff Area = 12,666 sf Runoff Volume = 303 cf Average Runoff Depth = 0.29"
98.14% Pervious = 12,431 sf 1.86% Impervious = 235 sf

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NRCC 24-hr D 10-yr Rainfall=4.90"

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Summary for Subcatchment 1: Area to DP

Runoff = 0.01 cfs @ 12.58 hrs, Volume= 303 cf, Depth= 0.29"

Routed to Link DP : Design Point #1- Ponds

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-yr Rainfall=4.90"

Area (sf)	CN	Description
7,159	39	>75% Grass cover, Good, HSG A
5,272	43	Woods/grass comb., Fair, HSG A
* 235	98	Impervious, HSG A
12,666	42	Weighted Average
12,431		98.14% Pervious Area
235		1.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.18"
0.6	74	0.1700	2.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	137	0.0440	3.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	62	0.1300	5.80		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
10.1	323	Total			

Summary for Link DP: Design Point #1- Ponds

Inflow Area = 12,666 sf, 1.86% Impervious, Inflow Depth = 0.29" for 10-yr event

Inflow = 0.01 cfs @ 12.58 hrs, Volume= 303 cf

Primary = 0.01 cfs @ 12.58 hrs, Volume= 303 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

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NRCC 24-hr D 25-yr Rainfall=6.20"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Area to DP

Runoff Area=12,666 sf 1.86% Impervious Runoff Depth=0.69"
Flow Length=323' Tc=10.1 min CN=42 Runoff=0.09 cfs 723 cf

Link DP: Design Point #1- Ponds

Inflow=0.09 cfs 723 cf
Primary=0.09 cfs 723 cf

Total Runoff Area = 12,666 sf Runoff Volume = 723 cf Average Runoff Depth = 0.69"
98.14% Pervious = 12,431 sf 1.86% Impervious = 235 sf

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NRCC 24-hr D 25-yr Rainfall=6.20"

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Summary for Subcatchment 1: Area to DP

Runoff = 0.09 cfs @ 12.22 hrs, Volume= 723 cf, Depth= 0.69"
 Routed to Link DP : Design Point #1- Ponds

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 NRCC 24-hr D 25-yr Rainfall=6.20"

Area (sf)	CN	Description
7,159	39	>75% Grass cover, Good, HSG A
5,272	43	Woods/grass comb., Fair, HSG A
* 235	98	Impervious, HSG A
12,666	42	Weighted Average
12,431		98.14% Pervious Area
235		1.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.18"
0.6	74	0.1700	2.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	137	0.0440	3.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	62	0.1300	5.80		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
10.1	323	Total			

Summary for Link DP: Design Point #1- Ponds

Inflow Area = 12,666 sf, 1.86% Impervious, Inflow Depth = 0.69" for 25-yr event
 Inflow = 0.09 cfs @ 12.22 hrs, Volume= 723 cf
 Primary = 0.09 cfs @ 12.22 hrs, Volume= 723 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

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NRCC 24-hr D 100-yr Rainfall=8.85"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Area to DP

Runoff Area=12,666 sf 1.86% Impervious Runoff Depth=1.86"
Flow Length=323' Tc=10.1 min CN=42 Runoff=0.43 cfs 1,966 cf

Link DP: Design Point #1- Ponds

Inflow=0.43 cfs 1,966 cf
Primary=0.43 cfs 1,966 cf

Total Runoff Area = 12,666 sf Runoff Volume = 1,966 cf Average Runoff Depth = 1.86"
98.14% Pervious = 12,431 sf 1.86% Impervious = 235 sf

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NRCC 24-hr D 100-yr Rainfall=8.85"

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Summary for Subcatchment 1: Area to DP

Runoff = 0.43 cfs @ 12.19 hrs, Volume= 1,966 cf, Depth= 1.86"

Routed to Link DP : Design Point #1- Ponds

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-yr Rainfall=8.85"

Area (sf)	CN	Description
7,159	39	>75% Grass cover, Good, HSG A
5,272	43	Woods/grass comb., Fair, HSG A
* 235	98	Impervious, HSG A
12,666	42	Weighted Average
12,431		98.14% Pervious Area
235		1.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0500	0.10		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.18"
0.6	74	0.1700	2.06		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.7	137	0.0440	3.38		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
0.2	62	0.1300	5.80		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
10.1	323	Total			

Summary for Link DP: Design Point #1- Ponds

Inflow Area = 12,666 sf, 1.86% Impervious, Inflow Depth = 1.86" for 100-yr event

Inflow = 0.43 cfs @ 12.19 hrs, Volume= 1,966 cf

Primary = 0.43 cfs @ 12.19 hrs, Volume= 1,966 cf, Atten= 0%, Lag= 0.0 min

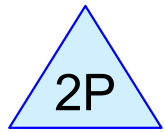
Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

APPENDIX C

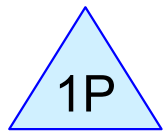
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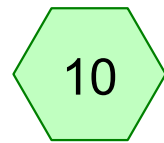
Area to BA



BioRetention Area



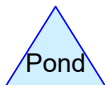
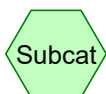
Forebay



Undetained Area to DP



Design Point - Ponds



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NRCC 24-hr D 2-yr Rainfall=3.25"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10: Undetained Area to DP Runoff Area=6,400 sf 4.34% Impervious Runoff Depth=0.02"
Tc=6.0 min CN=42 Runoff=0.00 cfs 9 cf

Subcatchment 20: Area to BA Runoff Area=6,268 sf 25.03% Impervious Runoff Depth=0.30"
Tc=6.0 min CN=56 Runoff=0.02 cfs 154 cf

Pond 1P: Forebay Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0 cf

Pond 2P: BioRetention Area Peak Elev=204.00' Storage=0 cf Inflow=0.02 cfs 154 cf
Discarded=0.02 cfs 154 cf Primary=0.00 cfs 0 cf Outflow=0.02 cfs 154 cf

Link DP: Design Point - Ponds Inflow=0.00 cfs 9 cf
Primary=0.00 cfs 9 cf

Total Runoff Area = 12,668 sf Runoff Volume = 163 cf Average Runoff Depth = 0.15"
85.42% Pervious = 10,821 sf 14.58% Impervious = 1,847 sf

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NRCC 24-hr D 2-yr Rainfall=3.25"

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Summary for Subcatchment 10: Undetained Area to DP

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 9 cf, Depth= 0.02"

Routed to Link DP : Design Point - Ponds

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-yr Rainfall=3.25"

Area (sf)	CN	Description
* 278	98	Impervious, HSG A
5,287	39	>75% Grass cover, Good, HSG A
835	43	Woods/grass comb., Fair, HSG A
6,400	42	Weighted Average
6,122		95.66% Pervious Area
278		4.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment 20: Area to BA

Runoff = 0.02 cfs @ 12.17 hrs, Volume= 154 cf, Depth= 0.30"

Routed to Pond 2P : BioRetention Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2-yr Rainfall=3.25"

Area (sf)	CN	Description
* 1,569	98	Impervious, HSG A
1,744	39	>75% Grass cover, Good, HSG A
2,955	43	Woods/grass comb., Fair, HSG A
6,268	56	Weighted Average
4,699		74.97% Pervious Area
1,569		25.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Pond 1P: Forebay

Volume	Invert	Avail.Storage	Storage Description
#1	204.00'	112 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

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NRCC 24-hr D 2-yr Rainfall=3.25"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
204.00	70	0	0
204.50	113	46	46
205.00	151	66	112

Device	Routing	Invert	Outlet Devices
#1	Primary	205.00'	14.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: BioRetention Area

Inflow Area = 6,268 sf, 25.03% Impervious, Inflow Depth = 0.30" for 2-yr event
 Inflow = 0.02 cfs @ 12.17 hrs, Volume= 154 cf
 Outflow = 0.02 cfs @ 12.17 hrs, Volume= 154 cf, Atten= 0%, Lag= 0.0 min
 Discarded = 0.02 cfs @ 12.17 hrs, Volume= 154 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link DP : Design Point - Ponds

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 204.00' @ 12.17 hrs Surf.Area= 206 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 154 cf (100% of inflow)
 Center-of-Mass det. time= 0.0 min (994.4 - 994.4)

Volume	Invert	Avail.Storage	Storage Description
#1	204.00'	303 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.00	206	0	0	206
204.50	300	126	126	304
205.00	412	177	303	421

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	9.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	204.00'	2.41 cfs Exfiltration at all elevations

Discarded OutFlow Max=2.41 cfs @ 12.17 hrs HW=204.00' (Free Discharge)
 ↑2=**Exfiltration** (Exfiltration Controls 2.41 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.00' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link DP: Design Point - Ponds

Inflow Area = 12,668 sf, 14.58% Impervious, Inflow Depth = 0.01" for 2-yr event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 9 cf
Primary = 0.00 cfs @ 24.00 hrs, Volume= 9 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

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NRCC 24-hr D 10-yr Rainfall=4.90"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10: Undetained Area to DP Runoff Area=6,400 sf 4.34% Impervious Runoff Depth=0.29"
Tc=6.0 min CN=42 Runoff=0.01 cfs 153 cf

Subcatchment 20: Area to BA Runoff Area=6,268 sf 25.03% Impervious Runoff Depth=0.99"
Tc=6.0 min CN=56 Runoff=0.13 cfs 517 cf

Pond 1P: Forebay Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0 cf

Pond 2P: BioRetention Area Peak Elev=204.00' Storage=0 cf Inflow=0.13 cfs 517 cf
Discarded=0.13 cfs 517 cf Primary=0.00 cfs 0 cf Outflow=0.13 cfs 517 cf

Link DP: Design Point - Ponds Inflow=0.01 cfs 153 cf
Primary=0.01 cfs 153 cf

Total Runoff Area = 12,668 sf Runoff Volume = 670 cf Average Runoff Depth = 0.63"
85.42% Pervious = 10,821 sf 14.58% Impervious = 1,847 sf

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NRCC 24-hr D 10-yr Rainfall=4.90"

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Summary for Subcatchment 10: Undetained Area to DP

Runoff = 0.01 cfs @ 12.54 hrs, Volume= 153 cf, Depth= 0.29"

Routed to Link DP : Design Point - Ponds

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-yr Rainfall=4.90"

Area (sf)	CN	Description
* 278	98	Impervious, HSG A
5,287	39	>75% Grass cover, Good, HSG A
835	43	Woods/grass comb., Fair, HSG A
6,400	42	Weighted Average
6,122		95.66% Pervious Area
278		4.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment 20: Area to BA

Runoff = 0.13 cfs @ 12.14 hrs, Volume= 517 cf, Depth= 0.99"

Routed to Pond 2P : BioRetention Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10-yr Rainfall=4.90"

Area (sf)	CN	Description
* 1,569	98	Impervious, HSG A
1,744	39	>75% Grass cover, Good, HSG A
2,955	43	Woods/grass comb., Fair, HSG A
6,268	56	Weighted Average
4,699		74.97% Pervious Area
1,569		25.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Pond 1P: Forebay

Volume	Invert	Avail.Storage	Storage Description
#1	204.00'	112 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

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NRCC 24-hr D 10-yr Rainfall=4.90"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
204.00	70	0	0
204.50	113	46	46
205.00	151	66	112

Device	Routing	Invert	Outlet Devices
#1	Primary	205.00'	14.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: BioRetention Area

Inflow Area = 6,268 sf, 25.03% Impervious, Inflow Depth = 0.99" for 10-yr event
 Inflow = 0.13 cfs @ 12.14 hrs, Volume= 517 cf
 Outflow = 0.13 cfs @ 12.14 hrs, Volume= 517 cf, Atten= 0%, Lag= 0.0 min
 Discarded = 0.13 cfs @ 12.14 hrs, Volume= 517 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link DP : Design Point - Ponds

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 204.00' @ 12.14 hrs Surf.Area= 206 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 517 cf (100% of inflow)
 Center-of-Mass det. time= 0.0 min (930.2 - 930.2)

Volume	Invert	Avail.Storage	Storage Description
#1	204.00'	303 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.00	206	0	0	206
204.50	300	126	126	304
205.00	412	177	303	421

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	9.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	204.00'	2.41 cfs Exfiltration at all elevations

Discarded OutFlow Max=2.41 cfs @ 12.14 hrs HW=204.00' (Free Discharge)
 ↑2=**Exfiltration** (Exfiltration Controls 2.41 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.00' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link DP: Design Point - Ponds

Inflow Area = 12,668 sf, 14.58% Impervious, Inflow Depth = 0.14" for 10-yr event
Inflow = 0.01 cfs @ 12.54 hrs, Volume= 153 cf
Primary = 0.01 cfs @ 12.54 hrs, Volume= 153 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

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NRCC 24-hr D 25-yr Rainfall=6.20"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10: Undetained Area to DP Runoff Area=6,400 sf 4.34% Impervious Runoff Depth=0.69"
Tc=6.0 min CN=42 Runoff=0.06 cfs 366 cf

Subcatchment 20: Area to BA Runoff Area=6,268 sf 25.03% Impervious Runoff Depth=1.72"
Tc=6.0 min CN=56 Runoff=0.25 cfs 896 cf

Pond 1P: Forebay Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0 cf

Pond 2P: BioRetention Area Peak Elev=204.00' Storage=0 cf Inflow=0.25 cfs 896 cf
Discarded=0.25 cfs 896 cf Primary=0.00 cfs 0 cf Outflow=0.25 cfs 896 cf

Link DP: Design Point - Ponds Inflow=0.06 cfs 366 cf
Primary=0.06 cfs 366 cf

Total Runoff Area = 12,668 sf Runoff Volume = 1,262 cf Average Runoff Depth = 1.20"
85.42% Pervious = 10,821 sf 14.58% Impervious = 1,847 sf

22148_Post-Development

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NRCC 24-hr D 25-yr Rainfall=6.20"

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Summary for Subcatchment 10: Undetained Area to DP

Runoff = 0.06 cfs @ 12.16 hrs, Volume= 366 cf, Depth= 0.69"

Routed to Link DP : Design Point - Ponds

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-yr Rainfall=6.20"

Area (sf)	CN	Description
* 278	98	Impervious, HSG A
5,287	39	>75% Grass cover, Good, HSG A
835	43	Woods/grass comb., Fair, HSG A
6,400	42	Weighted Average
6,122		95.66% Pervious Area
278		4.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment 20: Area to BA

Runoff = 0.25 cfs @ 12.14 hrs, Volume= 896 cf, Depth= 1.72"

Routed to Pond 2P : BioRetention Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25-yr Rainfall=6.20"

Area (sf)	CN	Description
* 1,569	98	Impervious, HSG A
1,744	39	>75% Grass cover, Good, HSG A
2,955	43	Woods/grass comb., Fair, HSG A
6,268	56	Weighted Average
4,699		74.97% Pervious Area
1,569		25.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Pond 1P: Forebay

Volume	Invert	Avail.Storage	Storage Description
#1	204.00'	112 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

22148_Post-Development

NRCC 24-hr D 25-yr Rainfall=6.20"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
204.00	70	0	0
204.50	113	46	46
205.00	151	66	112

Device	Routing	Invert	Outlet Devices
#1	Primary	205.00'	14.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: BioRetention Area

Inflow Area = 6,268 sf, 25.03% Impervious, Inflow Depth = 1.72" for 25-yr event
 Inflow = 0.25 cfs @ 12.14 hrs, Volume= 896 cf
 Outflow = 0.25 cfs @ 12.14 hrs, Volume= 896 cf, Atten= 0%, Lag= 0.0 min
 Discarded = 0.25 cfs @ 12.14 hrs, Volume= 896 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link DP : Design Point - Ponds

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 204.00' @ 12.14 hrs Surf.Area= 206 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 895 cf (100% of inflow)
 Center-of-Mass det. time= 0.0 min (906.8 - 906.8)

Volume	Invert	Avail.Storage	Storage Description
#1	204.00'	303 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.00	206	0	0	206
204.50	300	126	126	304
205.00	412	177	303	421

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	9.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	204.00'	2.41 cfs Exfiltration at all elevations

Discarded OutFlow Max=2.41 cfs @ 12.14 hrs HW=204.00' (Free Discharge)
 ↑2=**Exfiltration** (Exfiltration Controls 2.41 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.00' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link DP: Design Point - Ponds

Inflow Area = 12,668 sf, 14.58% Impervious, Inflow Depth = 0.35" for 25-yr event
Inflow = 0.06 cfs @ 12.16 hrs, Volume= 366 cf
Primary = 0.06 cfs @ 12.16 hrs, Volume= 366 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

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NRCC 24-hr D 100-yr Rainfall=8.85"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10: Undetained Area to DP Runoff Area=6,400 sf 4.34% Impervious Runoff Depth=1.86"
Tc=6.0 min CN=42 Runoff=0.26 cfs 993 cf

Subcatchment 20: Area to BA Runoff Area=6,268 sf 25.03% Impervious Runoff Depth=3.50"
Tc=6.0 min CN=56 Runoff=0.54 cfs 1,828 cf

Pond 1P: Forebay Peak Elev=0.00' Storage=0 cf
Primary=0.00 cfs 0 cf

Pond 2P: BioRetention Area Peak Elev=204.00' Storage=0 cf Inflow=0.54 cfs 1,828 cf
Discarded=0.54 cfs 1,828 cf Primary=0.00 cfs 0 cf Outflow=0.54 cfs 1,828 cf

Link DP: Design Point - Ponds Inflow=0.26 cfs 993 cf
Primary=0.26 cfs 993 cf

Total Runoff Area = 12,668 sf Runoff Volume = 2,822 cf Average Runoff Depth = 2.67"
85.42% Pervious = 10,821 sf 14.58% Impervious = 1,847 sf

22148_Post-Development

Prepared by Graves Engineering, Inc

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NRCC 24-hr D 100-yr Rainfall=8.85"

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Summary for Subcatchment 10: Undetained Area to DP

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 993 cf, Depth= 1.86"

Routed to Link DP : Design Point - Ponds

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-yr Rainfall=8.85"

Area (sf)	CN	Description
* 278	98	Impervious, HSG A
5,287	39	>75% Grass cover, Good, HSG A
835	43	Woods/grass comb., Fair, HSG A
6,400	42	Weighted Average
6,122		95.66% Pervious Area
278		4.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Subcatchment 20: Area to BA

Runoff = 0.54 cfs @ 12.13 hrs, Volume= 1,828 cf, Depth= 3.50"

Routed to Pond 2P : BioRetention Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100-yr Rainfall=8.85"

Area (sf)	CN	Description
* 1,569	98	Impervious, HSG A
1,744	39	>75% Grass cover, Good, HSG A
2,955	43	Woods/grass comb., Fair, HSG A
6,268	56	Weighted Average
4,699		74.97% Pervious Area
1,569		25.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Summary for Pond 1P: Forebay

Volume	Invert	Avail.Storage	Storage Description
#1	204.00'	112 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

22148_Post-Development

NRCC 24-hr D 100-yr Rainfall=8.85"

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
204.00	70	0	0
204.50	113	46	46
205.00	151	66	112

Device	Routing	Invert	Outlet Devices
#1	Primary	205.00'	14.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: BioRetention Area

Inflow Area = 6,268 sf, 25.03% Impervious, Inflow Depth = 3.50" for 100-yr event
 Inflow = 0.54 cfs @ 12.13 hrs, Volume= 1,828 cf
 Outflow = 0.54 cfs @ 12.13 hrs, Volume= 1,828 cf, Atten= 0%, Lag= 0.0 min
 Discarded = 0.54 cfs @ 12.13 hrs, Volume= 1,828 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Link DP : Design Point - Ponds

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 204.00' @ 12.13 hrs Surf.Area= 206 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 1,826 cf (100% of inflow)
 Center-of-Mass det. time= 0.0 min (879.2 - 879.2)

Volume	Invert	Avail.Storage	Storage Description
#1	204.00'	303 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
204.00	206	0	0	206
204.50	300	126	126	304
205.00	412	177	303	421

Device	Routing	Invert	Outlet Devices
#1	Primary	204.50'	9.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	204.00'	2.41 cfs Exfiltration at all elevations

Discarded OutFlow Max=2.41 cfs @ 12.13 hrs HW=204.00' (Free Discharge)
 ↑2=**Exfiltration** (Exfiltration Controls 2.41 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=204.00' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link DP: Design Point - Ponds

Inflow Area = 12,668 sf, 14.58% Impervious, Inflow Depth = 0.94" for 100-yr event
Inflow = 0.26 cfs @ 12.14 hrs, Volume= 993 cf
Primary = 0.26 cfs @ 12.14 hrs, Volume= 993 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Stage-Area-Storage for Pond 2P: BioRetention Area

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
204.00	206	0	204.52	304	132
204.01	208	2	204.53	306	135
204.02	209	4	204.54	308	138
204.03	211	6	204.55	310	141
204.04	213	8	204.56	313	144
204.05	215	11	204.57	315	147
204.06	216	13	204.58	317	150
204.07	218	15	204.59	319	154
204.08	220	17	204.60	321	157
204.09	222	19	204.61	323	160
204.10	223	21	204.62	325	163
204.11	225	24	204.63	327	167
204.12	227	26	204.64	330	170
204.13	229	28	204.65	332	173
204.14	231	31	204.66	334	176
204.15	232	33	204.67	336	180
204.16	234	35	204.68	338	183
204.17	236	38	204.69	340	187
204.18	238	40	204.70	343	190
204.19	240	42	204.71	345	193
204.20	241	45	204.72	347	197
204.21	243	47	204.73	349	200
204.22	245	50	204.74	352	204
204.23	247	52	204.75	354	207
204.24	249	55	204.76	356	211
204.25	251	57	204.77	358	215
204.26	253	60	204.78	361	218
204.27	255	62	204.79	363	222
204.28	256	65	204.80	365	225
204.29	258	67	204.81	367	229
204.30	260	70	204.82	370	233
204.31	262	72	204.83	372	236
204.32	264	75	204.84	374	240
204.33	266	78	204.85	377	244
204.34	268	80	204.86	379	248
204.35	270	83	204.87	381	251
204.36	272	86	204.88	384	255
204.37	274	88	204.89	386	259
204.38	276	91	204.90	388	263
204.39	278	94	204.91	391	267
204.40	280	97	204.92	393	271
204.41	282	100	204.93	395	275
204.42	284	102	204.94	398	279
204.43	286	105	204.95	400	283
204.44	288	108	204.96	402	287
204.45	290	111	204.97	405	291
204.46	292	114	204.98	407	295
204.47	294	117	204.99	410	299
204.48	296	120	205.00	412	303
204.49	298	123			
204.50	300	126			
204.51	302	129			

APPENDIX D

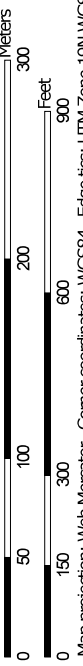
USDA-NRCS SITE SOILS MAP

Soil Map—Middlesex County, Massachusetts
(1 Liberty Ledge, Sudbury)



Soil Map may not be valid at this scale.

Map Scale: 1:3,800 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)
- Soils
 - Soil Map Unit Polygons
 - Soil Map Unit Lines
 - Soil Map Unit Points
- Special Point Features
 - Blowout
 - Borrow Pit
 - Clay Spot
 - Closed Depression
 - Gravel Pit
 - Gravelly Spot
 - Landfill
 - Lava Flow
 - Marsh or swamp
 - Mine or Quarry
 - Miscellaneous Water
 - Perennial Water
 - Rock Outcrop
 - Saline Spot
 - Sandy Spot
 - Severely Eroded Spot
 - Sinkhole
 - Slide or Slip
 - Sodic Spot
- Water Features
 - Streams and Canals
- Transportation
 - Rails
 - Interstate Highways
 - US Routes
 - Major Roads
 - Local Roads
- Background
 - Aerial Photography
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 22, Sep 9, 2022

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

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

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Water	2.5	3.4%
51A	Swansea muck, 0 to 1 percent slopes	0.1	0.1%
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	1.0	1.3%
73B	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	1.3	1.8%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	4.6	6.2%
253C	Hinckley loamy sand, 8 to 15 percent slopes	4.9	6.6%
253D	Hinckley loamy sand, 15 to 25 percent slopes	2.6	3.5%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	26.5	36.0%
300B	Montauk fine sandy loam, 3 to 8 percent slopes	4.3	5.8%
302B	Montauk fine sandy loam, 0 to 8 percent slopes, extremely stony	1.6	2.2%
305B	Paxton fine sandy loam, 3 to 8 percent slopes	1.3	1.7%
317B	Scituate fine sandy loam, 3 to 8 percent slopes, extremely stony	10.7	14.6%
407C	Charlton fine sandy loam, 8 to 15 percent slopes, extremely stony	0.5	0.7%
420B	Canton fine sandy loam, 3 to 8 percent slopes	0.3	0.4%
600	Pits, gravel	1.0	1.4%
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	10.4	14.1%
Totals for Area of Interest		73.5	100.0%

APPENDIX E

SHORT-TERM CONSTRUCTION OPERATION & MAINTENANCE PLAN

SHORT TERM CONSTRUCTION OPERATION & MAINTENANCE PLAN

Construction Period

During construction, the owners are responsible for the following Operation and Maintenance.

Responsible Parties

The owners must designate "qualified personnel" to perform the inspections associated with this plan. This means a person knowledgeable of the layout and overall function of the stormwater system. As necessary, this "qualified personnel" shall employ the services of a registered professional engineer when inspections reveal a failing stormwater system component or when similar attention is needed beyond the knowledge or experience of the inspector.

Operation and Maintenance Duties

The following duties shall be considered the minimum required and may be supplemented by additional measures as necessary to maintenance of the program.

General:

The property and drainage infrastructure shall be inspected and maintained on a routine basis to ensure sediment and debris does not enter the drainage system. This includes leaf litter from roof drain down spouts.

Erosion Control:

Erosion control barriers shall be inspected on a weekly basis. The inspector shall require repair of any part of the erosion control that is found to be damaged or not functioning properly.

Any siltation against the erosion control barriers shall be removed. If erosion control barriers must be replaced, the inspector shall inform the town and owner to have the repair made as soon as possible.

Areas being revegetated shall be inspected for areas of erosion. If any areas have become bare the inspector shall notify the contractor and owner and additional stabilization methods shall be employed to achieve stabilization through vegetation.

If fertilizer is used, it must be low in phosphorous and utilize slow release of phosphorous.

Pet wastes must be collected and disposed of, not allowed to enter stormwater runoff.

Owner Information:

Names: Scott Brody
Address: Combined Facility Director
275 Lancaster Road
Sudbury, MA 01776
Office: 9798-440-5465
Cell: 978-405-4753

Signature: _____

APPENDIX E

LONG-TERM DRAINAGE SYSTEM OPERATION & MAINTENANCE PLAN

LONG-TERM DRAINAGE SYSTEM OPERATION & MAINTENANCE PLAN

System

The drainage system at Camp Sewataro is a combination of open and closed drainage system consisting of a Bioretention Area including a sediment forebay and outlet drainage pipe connecting to the existing 15' HDPE drainpipe.

Responsible Parties

The drainage system will be operated and maintained by the Contractor during construction and the property owner post-construction. Drainage system maintenance tasks shall include routine cleaning of the overall drainage network and specific duties as listed below.

The responsible party must designate a "qualified personnel" to perform the inspections associated with this plan. This means a person knowledgeable of the layout and overall function of the stormwater system. As necessary, this "qualified personnel" shall employ the services of a registered professional engineer when inspections reveal a failing stormwater system component or when similar attention is needed beyond the knowledge or experience of the inspector.

Owner: Camp Sewataro

Responsible Party for O&M: Camp Sewataro, LLC (1 Liberty Ledge, Sudbury, MA 01776)

Names: Scott Brody
Address: Combined Facility Director
275 Lancaster Road
Sudbury, MA 01776
Office: 9798-440-5465
Cell: 978-405-4753

Operation and Maintenance Duties

The following duties shall be considered the minimum required and may be supplemented by additional measures as necessary to maintain the function of the drainage system. This operation and maintenance plan shall serve as a supplement to any and all existing drainage system duties.

Sweeping:

Sweeping of the impervious areas, parking lots and driveways should be done at least 2 times annually, namely in the spring and fall. It is imperative that sweeping take place immediately following final winter snowmelt to remove winter sand. All sediments containing hydrocarbons shall be handled properly and disposed of in accordance with local, state and federal guidelines and regulations.

Culverts and pipes:

All culverts and pipes shall be inspected four times per year and cleaned when drainage impediments are discovered. Flushing of pipes may be required to remove accumulated sediment.

Riprap Drain Outfalls (located at end of pipes):

All riprap drain outfalls shall be inspected four times per year and repaired as necessary. Riprap shall be replaced/repaired as necessary, debris and accumulated sediment removed, and any woody growth removed.

Sediment Forebay:

The sediment forebay shall be inspected every month. If necessary, remove any accumulated sediment and replace or repair dislodged riprap.

Bioretention Area:

Bioretention area maintenance begins with education of the function and purpose of the structure; namely that of stormwater management and treatment. It is imperative that sand used in winter conditions not be allowed to enter the bioretention area as it will clog the soil media. Reduced sanding should be employed in the area draining to the bioretention area and any accumulated sand should be removed immediately. Snow must not be stored in the bioretention area. Deicing chemicals should not be used in the area draining to the bioretention area.

Inspections should be performed monthly and/or after every rain event of more than 2 inches of rainfall in 24 hours; there should be no ponding water within the bioretention area after 72 hours following a rainstorm. Inspect the bioretention area for signs of erosion and repair immediately if found. Re-mulch void areas as needed (use only shredded hardwood mulch, 3" depth). The mulch needs to be replaced every two years, in the early spring. Monthly inspections must also include the following:

- Remove litter and debris.
- Treat diseased plantings as needed; prune and replace dead vegetation with like material.
- Remove invasive vegetation and weeds.
- Maintain all culverts, outlet structures, and piping free of debris and blockages.

Snow Management Plan

The goal of this plan is to employ proper management of snow and snow melt, in terms of snow removal and storage, use of de-icing compounds, and other practices that can prevent or minimize runoff pollutant loading impacts. The following measures shall be taken:

- Use of de-icing compounds:
 - Use alternative de-icing compounds such as calcium chloride (CaCl₂) and calcium magnesium acetate (CMA),
 - Reduce the use of de-icing compounds through better training and careful application.

Storage of de-icing compound Names: Scott Brody

Address: Combined Facility Director
275 Lancaster Road
Sudbury, MA 01776
Office: 9798-440-5465
Cell: 978-405-4753

- Store compounds in sheltered (protected from precipitation and wind) impervious pads or in original shipment containers if possible.
- Snow removal and storage:
 - Place snow in designated area where it can slowly infiltrate however it should not be placed over any component of the site's stormwater management system nor in the wetland buffer area.

Annual Budget

An annual budget for the operation and maintenance tasks describe above is estimated at \$1,500.

Records

A copy of the O&M Plan will be kept with Scott Brody at, 275 Lancaster Road, c/o Camp Sewataro.

APPENDIX G

LONG-TERM POLLUTION OPERATION AND MAINTNENANCE PLAN

LONG-TERM POLLUTION PREVENTION PLAN

Pollution Prevention and Source Control Plan

The site owner, Camp Sewataro, LLC, shall designate a pollution prevention team whose responsibilities are the following:

- Good housekeeping: General trash and litter cleanup of the site and provide routine visual inspections of potential pollution sources. Initiate and maintain record keeping of activity with regard to the contents of this plan.
- Storing materials and waste products inside or under cover: All materials and waste products shall be stored within a building or within a covered dumpster.
- Routine inspections and maintenance of stormwater BMP's: Follow the requirements of the site *Long-Term Drainage System Operation & Maintenance Plan*. Be aware of site drainage components and Best Management Practices (BMP's) and their locations including drain pipe downspouts and subsurface detention system.
- Spill prevention and response: In the event of a spill outside of the building, and in the parking areas, immediately initiate containment and cleanup procedures appropriate for the material including but not limited to sorbent media (speed dry), towels and barriers, as well as notifying the proper authorities. All attempts must be made to prevent spilled material from entering the drainage system or infiltrating into the ground.
- Maintenance of lawns and landscaped areas: Regularly mow lawn areas and weed landscaped areas.
- Storage and use of fertilizers, herbicides, and pesticides: All such materials shall be stored inside the building. It is recommended not to store such materials in large quantities.

Snow Management Plan

The goal of this plan is to employ proper management of snow and snow melt, in terms of snow removal and storage, use of de-icing compounds, and other practices that can prevent or minimize runoff pollutant loading impacts. The following measures shall be taken:

- Snow removal and storage:
 - Place snow in pervious areas where it can slowly infiltrate, however it should not be placed over any component of the site's stormwater management system, including the stone filtration trench along the edge of the parking area to the Bioretention Area. Any sand and debris mixed with the snow would block the infiltration area and allow sediment to accumulate in the Bioretention area.

Illicit Discharges

An illicit discharge is defined as discharges to the drainage system that are not entirely comprised of stormwater, excluding the following: firefighting, water line flushing, landscape irrigation, uncontaminated groundwater, potable water sources, foundation and footing drains, air conditioning condensation, individual resident car washing, water from swimming pools, water used for street washing and water used to clean residential buildings without detergents.

There are believed to be no existing illicit discharges on the site. There are no cross-connections between the stormwater system and the wastewater system and discharges to each will remain separate. The homeowner shall prevent illicit discharges such as oil and grease coming into contact with stormwater (see spill prevention and response).