

Applicant:  
Zepaj Development LLC  
78 Mill Street  
Middleton, MA 01949

Project File: LYF-1382A

# Notice of Intent Application

Proposed Single-Family House  
271 Main Street, Lot 2  
Lynnfield, Massachusetts

March 2023



603 Salem Street  
Wakefield, MA 01880  
Tel: (781) 246-2800  
Nantucket, MA 02554

**TABLE OF CONTENTS  
NOTICE OF INTENT  
271 MAIN STREET, LOT 2  
LYNNFIELD, MASSACHUSETTS**

March 29, 2023

<u>Identifying Number / Letter</u>	<u>Title / Date</u>
<b>SECTION A</b>	WPA Form 3- Notice of Intent and NOI Wetland Fee Transmittal Form –271 Main Street, Lot 2, Lynnfield, MA (including USGS Vicinity Map, Certified List of Abutters (March 2023), Abutter Notification letter, and Affidavit of Service).
<b>SECTION B</b>	Project Narrative, Proposed Single Family House, #271 Main Street , Lot 2, Lynnfield, MA; March 17, 2023, including Bordering Vegetated Wetland Field Delineation Data Sheets dated December 2019, a page with 2021 MassGIS MassMapper Aerial photograph showing locus with DEP Wetlands and a page with MassGIS MassMapper Base Map showing locus with Zone A boundary, both obtained from: <a href="https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html">https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html</a> ) - the Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services.
<b>SECTION C</b>	Drainage Analysis, 271 Main Street, Lynnfield, MA, August 16, 2020, including Stormwater Checklist, Construction Pollution Prevention Plan and Erosion and Sedimentation Control, Operation and Maintenance Plan and Long-term Pollution Prevention Plan, and Watershed Plans (referenced below); prepared by Hayes Engineering, Inc.
<b>PLANS</b>	Definitive Plan, Road A, Lynnfield, Mass., Existing Conditions and Demolition Plan; Hayes Engineering, Inc.; Scale: 1"=20'; August 13, 2020, Revised through September 28, 2022 (Plan Sheet 2 of 6).  Definitive Plan, Road A, Lynnfield, Mass., Plan and Profile; Hayes Engineering, Inc.; Scale: 1"=20'(HOR) & 2' (VERT.); August 13, 2020, Revised through September 28, 2022 (Plan Sheet 3 of 6).

<u>Identifying Number / Letter</u>	<u>Title / Date</u>
<b>PLANS (Cont.)</b>	<p>Definitive Plan, Road A, Lynnfield, Mass., Topography and Erosion Control; Hayes Engineering, Inc.; Scale: 1"=20'; August 13, 2020, Revised through September 28, 2022 (Plan Sheet 4 of 6).</p> <p>Definitive Plan, Road A, Lynnfield, Mass., Detail Sheet; Hayes Engineering, Inc.; Scale: 1"=20' and as noted; August 13, 2020, Revised through September 28, 2022 (Detail Sheets 1 of 2 and 2 of 2, Plan Sheet 5 of 6 and 6 of 6).</p> <p>Certified Proposed Plot Plan &amp; Sanitary Disposal System Plan, #271 Rear Main Street, Lynnfield, Mass.; Scale: 1"=20' and as noted; Date: March 10, 2023, revised March 29, 2023 (2 sheets).</p> <p>Watershed Map in Lynnfield, Mass., Existing Conditions, Hayes Engineering, Inc.; Scale: 1"=20'; Date: August 13, 2020 (1 Sheet 11" x 17", contained in the above referenced "Drainage Analysis")</p> <p>Watershed Map in Lynnfield, Mass., Proposed Conditions, Hayes Engineering, Inc.; Scale: 1"=20'; Date: August 13, 2020 (1 Sheet 11" x 17", contained in the above referenced "Drainage Analysis").</p>

**SECTION A**

**NOTICE OF INTENT FORM  
AND  
ABUTTER NOTICE DOCUMENTS**





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

**WPA Form 3 – Notice of Intent**

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

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Lynnfield  
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):

271 Main Street, Lot 2

a. Street Address

Lynnfield

b. City/Town

01940

c. Zip Code

Latitude and Longitude:

42d 31m 56s N

d. Latitude

-71d 03m 38s W

e. Longitude

33

f. Assessors Map/Plat Number

288

g. Parcel /Lot Number

2. Applicant:

a. First Name

b. Last Name

Zepaj Development LLC c/o Mario Zepaj

c. Organization

78 Mill Street

d. Street Address

Middleton

e. City/Town

MA

f. State

01949

g. Zip Code

(978) 869-6363

h. Phone Number

N/A

i. Fax Number

mariozepaj@gmail.com

j. Email Address

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

Same as applicant.

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):

a. First Name

b. Last Name

Hayes Engineering, Inc.

c. Company

603 Salem Street

d. Street Address

Wakefield

e. City/Town

MA

f. State

01880

g. Zip Code

(781)246-2800

h. Phone Number

(781)246-7586

i. Fax Number

lwallis@hayeseng.com

j. Email address

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

\$500.00

a. Total Fee Paid

\$237.50

b. State Fee Paid

\$262.50

c. City/Town Fee Paid



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Provided by MassDEP:

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MassDEP File Number

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Lynnfield  
City/Town

**A. General Information (continued)**

6. General Project Description:

The applicant proposes to construct a single family house in Lot 2 with associated roadway (Road A), driveway, yards, stormwater management BMPs, utilities, landscaping, and all associated site work as shown on the accompanying plans and as described in the attached project narrative.

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

- |   |  |
|---|--|
| 1. <input checked="" type="checkbox"/> Single Family Home             | 2. <input checked="" 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 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 CMR10.24(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:

Essex south	
a. County	b. Certificate # (if registered land)
41478	32
c. Book	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.





Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands

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

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Lynnfield  
City/Town

**A. General Information (continued)**

6. General Project Description:

The applicant proposes to construct a single family house in Lot 2 with associated roadway (Road A), driveway, yards, stormwater management BMPs, utilities, landscaping, and all associated site work as shown on the accompanying plans and as described in the attached project narrative.

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

- |   |  |
|---|--|
| 1. <input checked="" type="checkbox"/> Single Family Home             | 2. <input checked="" 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 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 CMR10.24(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:

Essex south

a. County

41478

c. Book

b. Certificate # (if registered land)

32

d. Page Number

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

1.  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.
2.  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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Lynnfield	_____
City/Town	_____

**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.

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

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
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. <input type="checkbox"/> Riverfront Area	1. Name of Waterway (if available) - <b>specify coastal or inland</b> _____	

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	
l. <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**

- 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](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:**

MassGIS NHESP  
Online Mapping

Natural Heritage and Endangered Species Program  
Division of Fisheries and Wildlife  
1 Rabbit Hill Road  
Westborough, MA 01581

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\*

- Percentage/acreage of property to be altered:

(a) within wetland Resource Area \_\_\_\_\_ percentage/acreage

(b) outside Resource Area \_\_\_\_\_ percentage/acreage

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

- 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/mass-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.



Massachusetts Department of Environmental Protection  
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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:

North Shore - Hull to New Hampshire border:

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](mailto:dmf.envreview-south@mass.gov)

Division of Marine Fisheries -  
North Shore Office  
Attn: Environmental Reviewer  
30 Emerson Avenue  
Gloucester, MA 01930  
Email: [dmf.envreview-north@mass.gov](mailto: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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**Online Users:**  
 Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

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

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.

Refer to attached document "Table of Contents" for titles and dates of submitted materials.

a. Plan Title

Hayes Engineering, Inc.

b. Prepared By

Peter J. Ogren, P.E., P.L.S.

c. Signed and Stamped by

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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City/Town

**F. Signatures and Submittal Requirements**

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

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

1. Signature of Applicant

2. Date

3. Signature of Property Owner (if different)

4. Date

*Elizabeth Walker Hayes Engineering, Inc.*

*3/20/23*

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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**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:

271 Main Street, Lot 2  
 a. Street Address  
 9077  
 c. Check number  
 Lynnfield  
 b. City/Town  
 \$237.50  
 d. Fee amount

2. Applicant Mailing Address:

a. First Name  
 Zepaj Development LLC c/o Mario Zepa  
 c. Organization  
 78 Mill Street  
 d. Mailing Address  
 Middleton MA 01949  
 e. City/Town f. State g. Zip Code  
 (978) 869-6363 N/A mariozepaj@gmail.com  
 h. Phone Number i. Fax Number j. Email Address

3. Property Owner (if different):

Same as applicant.  
 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).



Massachusetts Department of Environmental Protection  
Bureau of Resource Protection - Wetlands  
**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
Single family house and roadway in buffer zone (Category 2.a.)	1	\$500.00	\$500.00
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

**Step 5/Total Project Fee:** \$500.00

**Step 6/Fee Payments:**

Total Project Fee:	<u>\$500.00</u>
	a. Total Fee from Step 5
State share of filing Fee:	<u>\$237.50</u>
	b. 1/2 Total Fee less \$12.50
City/Town share of filling Fee:	<u>\$262.50</u>
	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.)



X-903  
FISA498003

9077

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WARD

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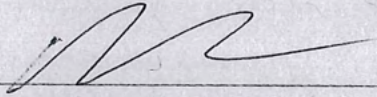
HER



LANCE

ZEPAJ DEVELOPMENT LLC 9077  
78 MILL ST  
MIDDLETON MA 01949-1467 53-447 113 DATE 3/20/23

Pay to the Order of Commonwealth of Mass \$ 237.00  
Two hundred thirty seven dollars 100 DOLLARS

**ROCKLAND TRUST**  
www.rocklandtrust.com

MEMO Must.  MP

9078

LANCE  
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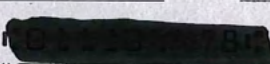

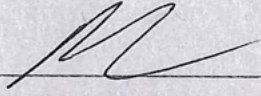
HER

LANCE

ZEPAJ DEVELOPMENT LLC 9078  
78 MILL ST  
MIDDLETON MA 01949-1467 53-447 113 DATE 3/20/23

Pay to the Order of Town of Lyngfield \$ 262.50  
Two hundred sixty two dollars 100 DOLLARS

**ROCKLAND TRUST**  
www.rocklandtrust.com

MEMO     MP

9079

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WARD

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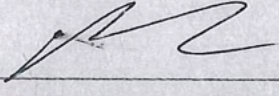
HER

LANCE

ZEPAJ DEVELOPMENT LLC 9079  
78 MILL ST  
MIDDLETON MA 01949-1467 53-447 113 DATE 3/20/23

Pay to the Order of Lyngfield Village \$ 50.00  
Fifty dollars DOLLARS

**ROCKLAND TRUST**  
www.rocklandtrust.com

MEMO    MP



# TOWN OF LYNNFIELD

## ASSESSORS OFFICE

55 Summer Street, Lynnfield, MA 01940

781-334-9450

[www.town.lynnfield.ma.us](http://www.town.lynnfield.ma.us)

### REQUEST FOR CERTIFIED ABUTTERS LIST

**\*\*CERTIFIED LIST WILL BE PROVIDED WITHIN TEN WORKING DAYS \*\***

PROPERTY LOCATION: #271 Main Street (Zepaj Development LLC)

ASSESSORS MAP#: 33 LOT #: 288

*FEE: \$15.00 for first five pages, \$1.00 after each consecutive page.*

**CONSERVATION COMMISSION**

Within 100 ft.

**BOARD OF APPEALS**

Within 300 ft.

**PLANNING BOARD**

Within 300 ft.

**BOARD OF HEALTH**

Immediate abutter and  
directly across the street

REQUESTED BY: Elizabeth Wallis Hayes Engineering, Inc. Date: 3/16/23

PHONE NUMBER (781)246-2800 EMAIL: lwallis@hayeseng.com

-----Assessors Use Only-----

CERTIFIED BY: Theresa C. Palazzo DATE: 3/16/23

# OF PAGES \_\_\_\_\_ DATE PAID: \_\_\_\_\_ CASH \$/Amt: \_\_\_\_\_ CHECK #/Amt. \_\_\_\_\_



(B1) (A)

1.02 Ac

147.62'

284

STREET

283

128.34'

168.25'

2

227

30176 SF

150.00'

31

150.00'

VILLAGE

271

199.38'

196.20'

206.41'

2

265

30000 SF

73

238.25'

3

371

30000 SF

587.06'

128.04'

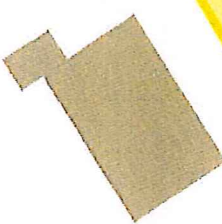
268.94'

288

2.45 Ac

3371

86.43'



556.13'

913

2.09 Ac

89.94'

86.39'

7

Ac

555'

193.53'

114.55'

90.98'

293.

165.19'

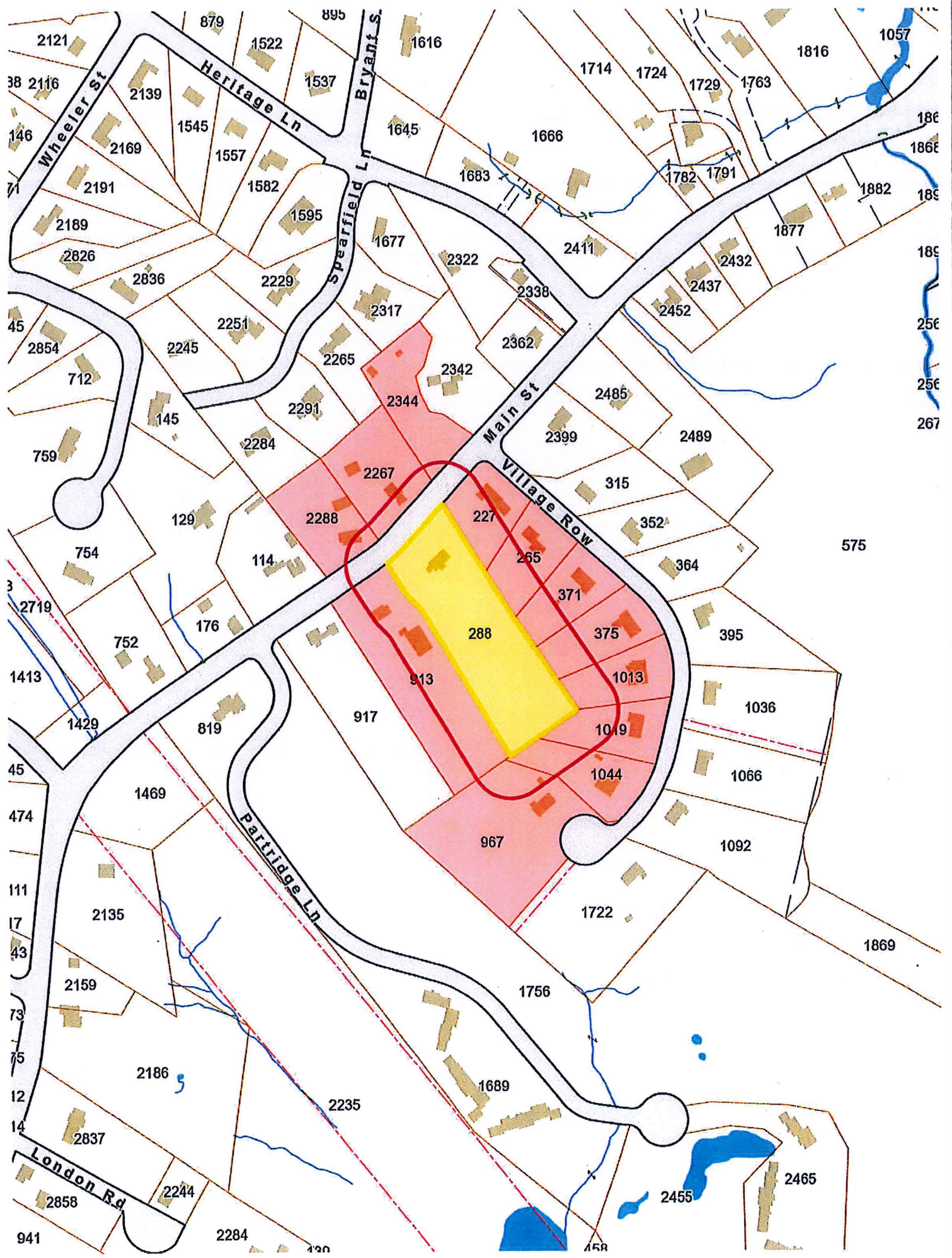
132.84'

7

10

2270









# 100 foot Abutters List Report

Lynnfield, MA  
March 16, 2023

## Subject Property:

Parcel Number: 0033-0000-0288  
CAMA Number: 0033-0000-0288  
Property Address: 271 MAIN ST

Mailing Address: HICKERMAN AUDREY  
271 MAIN ST  
LYNNFIELD, MA 01940

## Abutters:

Parcel Number: 0028-0000-2267  
CAMA Number: 0028-0000-2267  
Property Address: 284 MAIN ST

Mailing Address: LAWLER MATTHEW, T/E LAWLER  
ALISON J, T/E  
284 MAIN ST  
LYNNFIELD, MA 01940

Parcel Number: 0028-0000-2288  
CAMA Number: 0028-0000-2288  
Property Address: 272 MAIN ST

Mailing Address: FLEMING FRANCES B THOMPSON  
WILLIAM A  
272 MAIN STREET  
LYNNFIELD, MA 01940

Parcel Number: 0028-0000-2344  
CAMA Number: 0028-0000-2344  
Property Address: 288 MAIN ST

Mailing Address: GILLON ROBERT M, T/E GILLON LINDA  
J, T/E  
300 MAIN ST  
LYNNFIELD, MA 01940

Parcel Number: 0033-0000-0227  
CAMA Number: 0033-0000-0227  
Property Address: 1 VILLAGE ROW

Mailing Address: KIELT KEVIN P, T/E KIELT ANGELA L,  
T/E  
1 VILLAGE ROW  
LYNNFIELD, MA 01940

Parcel Number: 0033-0000-0265  
CAMA Number: 0033-0000-0265  
Property Address: 3 VILLAGE ROW

Mailing Address: FRANCHI PETER, T/E FRANCHI  
LORETTA, T/E  
3 VILLAGE ROW  
LYNNFIELD, MA 01940

Parcel Number: 0033-0000-0371  
CAMA Number: 0033-0000-0371  
Property Address: 5 VILLAGE ROW

Mailing Address: TACVORIAN COURTNEY P T/E  
TACVORIAN EDWARD K T/E  
5 VILLAGE ROW  
LYNNFIELD, MA 01940

Parcel Number: 0033-0000-0375  
CAMA Number: 0033-0000-0375  
Property Address: 7 VILLAGE ROW

Mailing Address: ALMA BAROZZI LIVING TRUST BAROZZI  
ALMA, TR  
7 VILLAGE ROW  
LYNNFIELD, MA 01940

Parcel Number: 0033-0000-0913  
CAMA Number: 0033-0000-0913  
Property Address: 259 MAIN ST

Mailing Address: HOWARD ELAINE F  
259 MAIN ST  
LYNNFIELD, MA 01940

Parcel Number: 0033-0000-0967  
CAMA Number: 0033-0000-0967  
Property Address: 17 VILLAGE ROW

Mailing Address: MOZZETTA ALBERT JOHN, T/E  
MOZZETTA MELISSA D, T/E  
17 VILLAGE ROW  
LYNNFIELD, MA 01940

Parcel Number: 0033-0000-1013  
CAMA Number: 0033-0000-1013  
Property Address: 9 VILLAGE ROW

Mailing Address: NJL ROBISHAW TRUST LEWIS NORMA  
JEAN, TR  
9 VILLAGE ROW  
LYNNFIELD, MA 01940



www.cai-tech.com

Data shown on this report is provided for planning and informational purposes only. The municipality and CAI Technologies are not responsible for any use for other purposes or misuse or misrepresentation of this report.



# 100 foot Abutters List Report

Lynnfield, MA  
March 16, 2023

Parcel Number: 0033-0000-1019  
CAMA Number: 0033-0000-1019  
Property Address: 11 VILLAGE ROW

Mailing Address: KATZ FAMILY TRUST KATZ ARTHUR F,  
TR  
11 VILLAGE ROW  
LYNNFIELD, MA 01940

Parcel Number: 0033-0000-1044  
CAMA Number: 0033-0000-1044  
Property Address: 15 VILLAGE ROW

Mailing Address: AMENTA DOMINIC P J/T/R/S AMENTA  
VALERIE M J/T/R/S  
15 VILLAGE ROW  
LYNNFIELD, MA 01940



[www.cai-tech.com](http://www.cai-tech.com)

3/16/2023

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Page 2 of 2



## NOTICE TO ABUTTERS

For Applications Submitted to the Conservation Commission  
Under Massachusetts Wetlands Protection Act and/or Lynnfield  
Environmental Bylaw Regulations

As required by M.G.L. c 131, s. 40 ("The Massachusetts Wetlands Protection Act"), an **APPLICANT** shall provide notification to all abutters and any property owner within 100 feet of the property line of the land where the activity is proposed, including if separated from that land by a public or private street.

The following applicant has filed a **Notice of Intent Application** with the Lynnfield Conservation Commission. A public hearing will be held as stated below.

Zepaj Development LLC  
**Name of Applicant**

#78 Mill Street, Middleton, MA  
**Address of Applicant**

Assessor's Map # 33 Parcel # 288

### **Project Address**

House Lot 2 at #271 Main Street, Lynnfield, MA (Assessor's Map 33, Parcel 288)

### **Project Description**

The applicant proposes to construct a single-family house and paved drive within 100 feet of a wetland.

April 18, 2023 at or about 6:30 pm

DATE AND TIME OF PUBLIC HEARING, AT TOWN HALL, 55 SUMMER STREET.

(Anticipated date/time subject to change. Please call the Conservation Office at (781)334-9495 or check Conservation Commission website <https://www.town.lynnfield.ma.us/conservation-commission> for agenda and updated meeting information.)

The public hearing will be advertised in *The Lynnfield Villager* a week in advance.

AFFIDAVIT OF SERVICE

Under the Massachusetts Wetlands Protection Act

(to be submitted to the Massachusetts Department of Environmental Protection and the Conservation Commission when filing a Notice of Intent)

I, JILL LILLEY, hereby certify under the pains and penalties of perjury that on MARCH 30, 2023 I gave notification to abutters in compliance with the second paragraph of Massachusetts General Laws, Chapter 131, Section 40, and the **DEP Guide to Abutter Notification** dated April 8, 1994, in connection with the following matter: House and drive construction within 100 feet of a wetland.

A Notice of Intent has been filed under the Massachusetts Wetlands Protection Act by Zepaj Development LLC with the Lynnfield Conservation Commission on \_\_\_\_\_ for property located Lot 2, #271 Main Street, Lynnfield (Assessor's Map 33 Lot 288).

The form of the notification, and a list of the abutters to whom it was given and their addresses are attached to this Affidavit of Service.

Jill Lilley  
Name - Signature

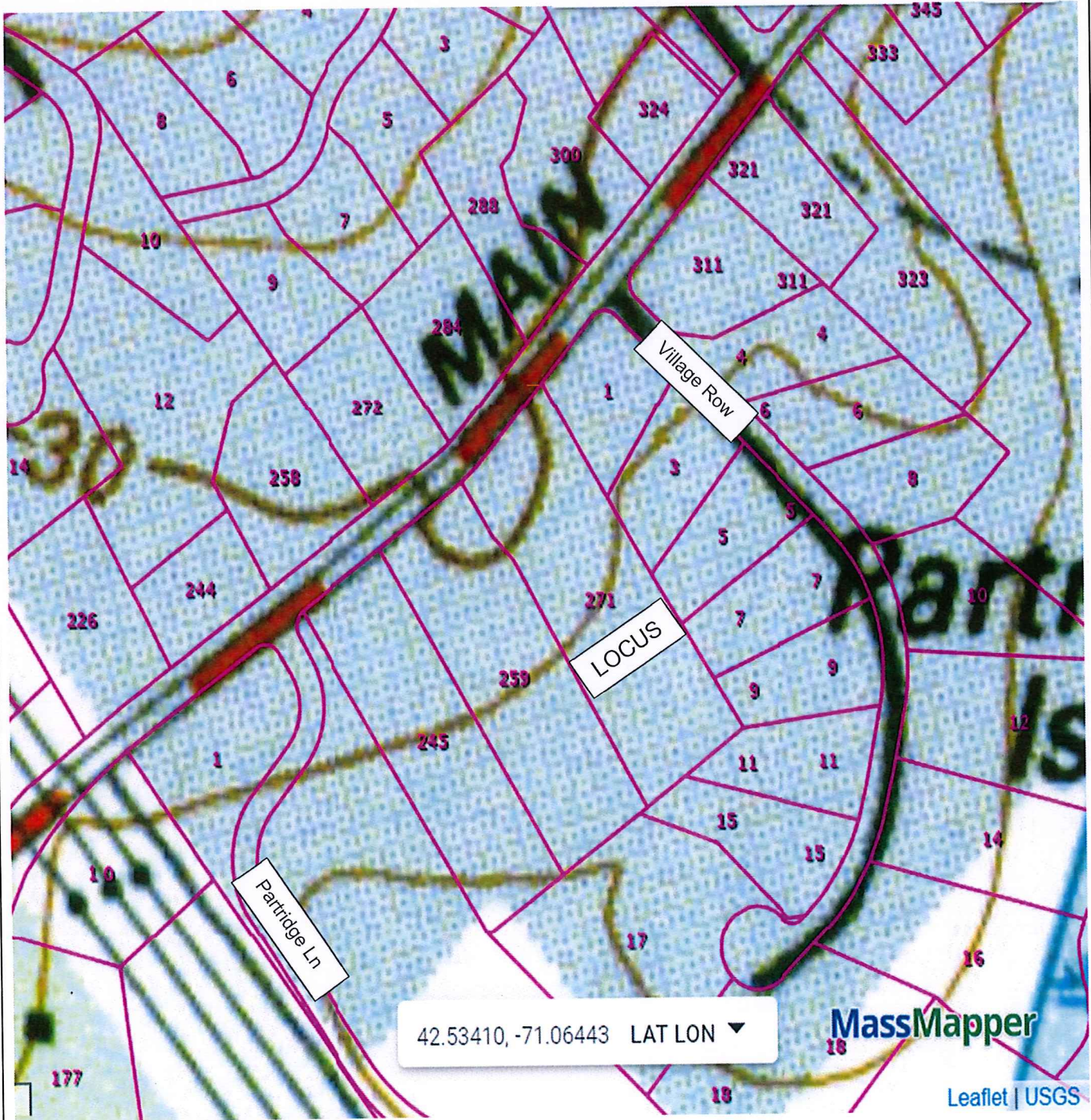
MARCH 30, 2023  
Date



HAYES ENGINEERING, INC.  
CIVIL ENGINEERING &  
LAND SURVEYORS



603 SALEM STREET  
WAKEFIELD, MA 01880  
(781) 246-2800



UNITED STATES GEOLOGICAL SURVEY MAP  
25K MASSGIS QUADRANGLE  
(Map Source: MassGIS "MassMapper" Online Mapping)

LOCUS MAP  
#271 MAIN STREET  
LYNNFIELD, MASSACHUSETTS



**SECTION B**

**PROJECT NARRATIVE**



**PROJECT NARRATIVE  
PROPOSED SINGLE FAMILY HOUSE  
#271 MAIN STREET, LOT 2  
WAKEFIELD, MASSACHUSETTS**

March 17, 2023

Existing Conditions

**General**

The subject property is a rectangular property of 106,861± s.f. which was subdivided into two single family lots as approved by the Lynnfield Planning Board in 2022 and further described below. The property has since changed ownership to Zepaj Development LLC.

Lot 1 is situated in the western (front) portion of the property which is accessed directly off Main Street and contains an existing single-family house with associated horseshoe driveway, septic system, utilities, gravel drive, carport, and landscaping. Lot 2 is situated in the easterly (rear) portion of the property. This Lot is currently occupied by a mowed grassed yard with old fill which extends from the gravel drive at the rear of the existing house to the vicinity of the rear property perimeter where it is bordered by a matrix of upland and wetland shrub thickets and woods. The yard in this lot has historically been cleared and otherwise disturbed, including a former pool structure which was located at the eastern end of the yard. Lot 2 also contains wetland resource areas as well as their associated 100-foot buffer zones. Existing site features and resource area locations are shown on the accompanying September 2022 Hayes Engineering, Inc. (HEI) plans titled "Definitive Plan, Road A, 271 Main Street, Lynnfield, Mass" and Lot 2 septic system plan titled "Certified Proposed Plot Plan & Sanitary Disposal System Plan, #271 Main Street Rear, Lynnfield, Mass. dated March 10, 2023.

**Resource Areas**

Hayes Engineering, Inc.'s Wetland Scientist visited the property on December 16, 2019 to identify any resource areas protected under the Massachusetts Wetlands Protection Act, the Town of Lynnfield Environmental Bylaw, and their promulgated Regulations. Resource areas identified on the site consisted of Bordering Vegetated Wetland (BVW) and Inland Bank (Bank) associated with intermittent streams present along the woods and edge of mowed yard grass at the vicinity of the eastern and southern property lines. The boundary of the BVW was delineated with wetland flags #1-#13 during the visit as detailed on the accompanying project plans and DEP Wetland Delineation Worksheets. Bank resource areas were not field delineated. A review of MassGIS' MassMapper online mapping showed that a portion of the property is within a Zone A Protected Surface Water associated with Hawkes Pond and Saugus River, that the property is outside of any Special Hazard flood zones, and that it is outside of any Natural Heritage and Endangered Species Program Estimated Habitat and Priority Habitat areas. A portion of the property is also within the Town of Lynnfield Groundwater Protection Zone.

**Soils**

The United States Department of Agriculture Natural Resource Conservation Service (NRCS) Web Soil Survey online soil mapping indicates this property is comprised of Merrimac-Urban Land Complex (Lot 1) and Merrimac Fine Sandy Loam (Lot 2), both with a Hydrological Soil Group of A.



### Project Description

The overall project consists of redeveloping the property to accommodate construction of a two-lot residential subdivision containing a paved roadway known as "Road A" with stormwater management system and utilities servicing two new single-family homes with associated yards, septic systems, and other appurtenances (the existing house in Lot 1 is to be replaced with a new dwelling).

The focus of this application is the proposed single family house development in Lot 2 and associated road and driveway construction. Most of the house, the house access driveway, a portion of the road cu-de-sac, and stormwater management BMPs will be constructed within the 50'-100' buffer zone associated with the BVW boundary. The septic system leach field is located outside the 100-ft buffer zone. Details regarding construction of these structures are provided below. All construction debris will be placed within suitable containers or dump trucks for removal off site for proper disposal. Adjacent buffer zone and wetland areas will be protected through implementation of erosion control procedures as outlined in the attached document "Construction Period Pollution Plan and Erosion and Sedimentation Control" and shown on the accompanying project plans. Buffer zone habitat will not be significantly affected since the project was designed to maintain a 50-foot naturally vegetated buffer between the proposed work and the wetland boundary.

#### Single Family House Lot Development

Lot development will consist of the construction of a 2219± s.f. house with deck, septic system 15-ft. wide paved driveway providing access from the end of the road, grassed yards, and all related site and landscaping work. The lot design additionally provides introduction of stormwater management structures including a Bio-retention area with pre-treatment grass filter strip to intercept driveway runoff and two units of Stormtech infiltration chambers to detain and treat roof runoff. Buffer zone activities associated with this work consist of erosion control barrier installation; vegetation removal; excavation; foundation installation; grading; building construction; utility and infiltration unit installation; driveway construction; Bio-retention area construction, paving; and loaming and seeding and other landscaping. Septic system activities will be outside of the buffer zone as shown on the accompanying "Sanitary Disposal System Plan". Construction impact will be minimized by locating all activities outside of the 50-foot buffer zone and placing a portion of the work within areas of the existing grassed yard (man-made disturbance). Note that proposed grass lawns along the west and south sides of the house will replace existing grassed locations, resulting in infiltration and buffer zone habitat functions similar to those of the lost vegetation.

#### Road A Construction

The house in Lot 2 will be accessed from Main Street along a 300-ft paved road known as "Road A" shown on the Definitive Plan sheets. While shown on the Definitive Plan as a proposed standard layout of 40 feet wide with a round cul-de-sac, Road A will be constructed as a 20-foot width paved drive with ending turn out, thus minimizing extent of impervious surfaces and disturbances. The end of the 20-ft wide drive connects to a 15-ft wide driveway to the dwelling in Lot 2. This design includes curbing, drainage system, utility lines, stormwater management system, and landscaping. Approximately 55 feet of the roadway in the vicinity of road stations 2+75 through 3+00 and stormwater management BMPs will be constructed within the buffer zone. Buffer zone activities associated with road construction includes erosion control installation; excavation and grading, utility conduit installation; drainage structure installation; stormwater management system component installation; paving; curbing



installation; and loaming and seeding and other final landscaping (e.g., street trees). Details regarding the proposed stormwater management system are discussed below, and further provided in the accompanying plans and "Drainage Analysis". All roadway work will be kept at least 50 feet away from the wetland boundary.

#### Stormwater Management

A comprehensive stormwater management system consisting of roadway deep sump catch basins with gas traps, Stormceptor oil and grit separator; StormTech subsurface stormwater detention area for the roadway, StormTech roof infiltration chamber system for the house, and a combined Bio-retention area and grass filter strip for the Lot 2 access driveway will be installed as part of the project to detain and treat stormwater runoff. Stormwater management system details are shown on the accompanying Topographic, Plan & Profile, and Detail sheets, and further described in the accompanying document titled "Drainage Analysis". Documents and calculations contained in the "Drainage Analysis" were reviewed and approved by the Planning Board and their Peer Reviewer (Linden Engineering) during the Definitive Plan approval process.

#### Construction Period Sedimentation Controls

Control of erosion and sedimentation will be implemented prior to and during construction activities. The project design includes installation of erosion control barriers along the 50-foot buffer zone (No Build Zone), a stone tracking pad to be installed at the road entrance at Main Street, silt sacks to be installed in existing and proposed catch basins, and implementation of soil stabilization techniques immediately upon completion of grading. Details are provided in the "Construction Period Pollution Plan" contained in the Drainage Analysis" report.

#### Wildlife Habitat

A review of the MassGIS Natural Heritage and Endangered Species Program online mapping ("MassMapper") revealed that this property is not within any rare, threatened, or endangered species habitat. The design places the proposed work away from the wetland boundary so as to ensure that wetland areas remain undisturbed.

**DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form**

**Applicant:**

**Prepared by:** Wallis/Hayes Eng.

**Project location:** #271 Main Street

Lynnfield, MA

Check all that apply:

Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only

Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II

Method other than dominance test used (attach additional information)

Upgradient of flag 6

Section I. Vegetation Observation Plot Number: \_\_\_\_\_ Transect Number: \_\_\_\_\_ Date of Delineation: 12/16/19

A. Sample Layer and Plant Species (by common/scientific name) B. Percent Cover (or dominance ratio) C. Percent Dominance D. Dominant Plant (yes or no) E. Wetland Indicator

No Canopy

Shrubs

Silky dogwood (*Cornus amomum*)

3.0

100.0%

No

\*FACW

TOTAL COVER = 3.0

Ground Cover

Canada goldenrod (*Solidago canadensis*)

63.0

100.0%

yes

FACU

TOTAL COVER = 63.0

Note: plot is adjacent to mown yard.

Vegetation conclusion:

Number of dominant wetland indicator plants: **0**

Number of dominant non-wetland indicator plants: **1**

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? **Yes** **No X**



**DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form**

**Applicant:** Wallis/Hayes Eng. **Project location:** #271 Main Street  
Lynnfield, MA

- Check all that apply:
- Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
  - Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
  - Method other than dominance test used (attach additional information) Downgradient of flag 6

Section I. Vegetation Observation Plot Number: \_\_\_\_\_ Transect Number: \_\_\_\_\_ Date of Delineation: 12/16/19

A. Sample Layer and Plant Species (by common/scientific name)	B. Percent Cover (or dominance ratio)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator
<u>Canopy</u>				
Red maple ( <i>Acer rubrum</i> )	38.0	78.4%	Yes	*FAC
American elm ( <i>Ulmus americana</i> )	10.5	21.6%	Yes	*FACW
TOTAL COVER = 48.5				
<u>Shrub</u>				
Silky dogwood ( <i>Cornus amomum</i> )	10.5	50.0%	Yes	*FACW
Alder-buckthorn ( <i>Rhamnus frangula</i> )	10.5	50.0%	Yes	*FAC
TOTAL COVER = 21.0				
<u>Ground Cover</u>				
Canada goldenrod ( <i>Solidago canadensis</i> )	38.0	92.7%	Yes	FACU
Jewelweed ( <i>Impatiens capensis</i> )	3.0	7.3%	No	*FACW
TOTAL COVER = 41.0				

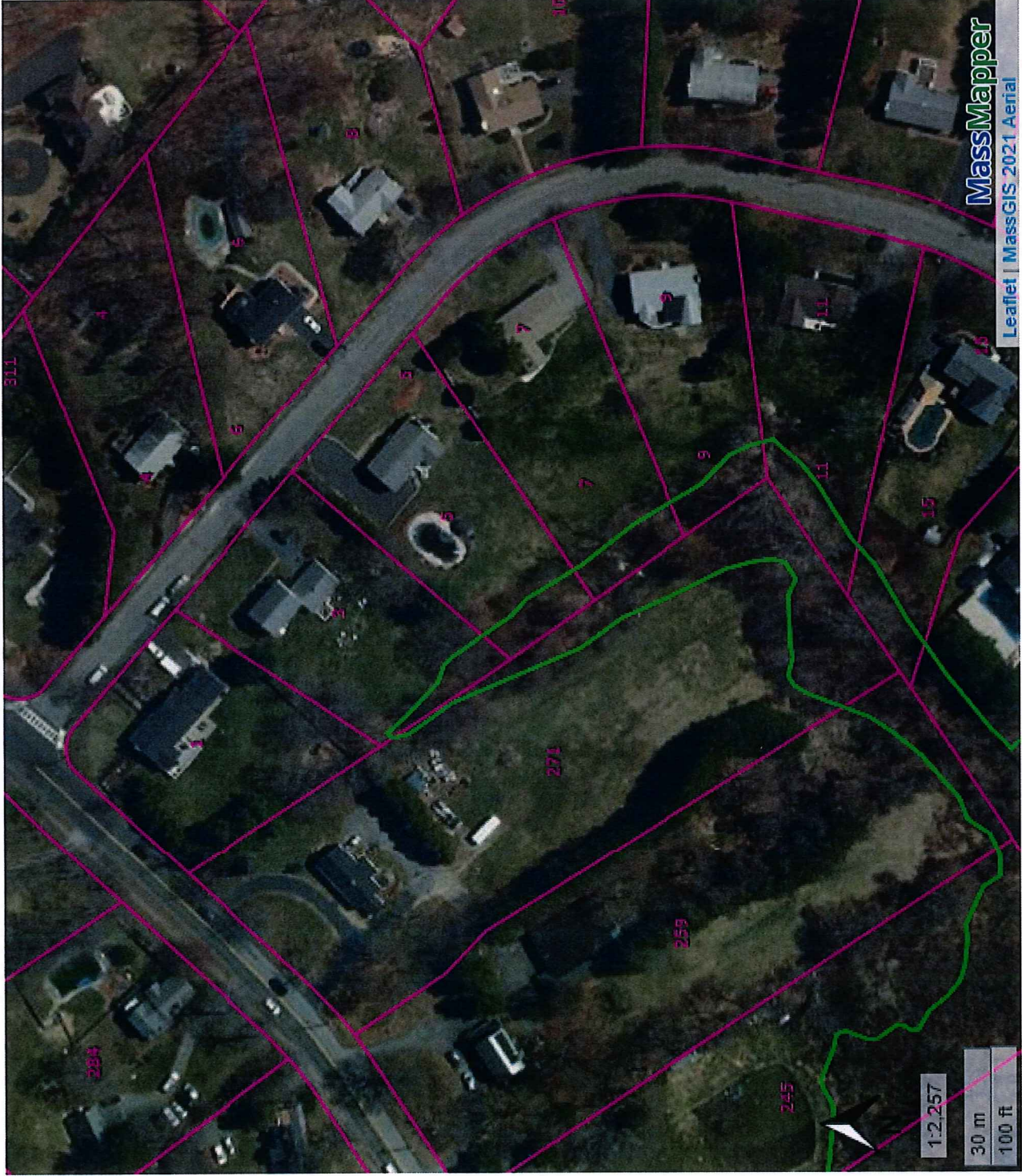
Note: Goldenrod identification and Jewelweed cover estimate based on plant remnants.

Vegetation conclusion:

Number of dominant wetland indicator plants: 4      Number of dominant non-wetland indicator plants: 1  
Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? X Yes No



# 271 Main St. MassGIS Wetlands



## DEP Wetlands Original Linear Features

- SHORELINE
- HYDROLOGIC CONNECTION
- MEAN WATER LINE
- APPARENT WETLAND LIMIT
- CLOSURE LINE
- EDGE OF INTERPRETED AREA

## DEP Wetlands Hydrologic Connections

- SHORELINE
- HYDROLOGIC CONNECTION
- MEAN WATER LINE
- APPARENT WETLAND LIMIT
- CLOSURE LINE
- EDGE OF INTERPRETED AREA

## DEP Wetlands Linear Features

- SHORELINE
- HYDROLOGIC CONNECTION
- MEAN WATER LINE
- APPARENT WETLAND LIMIT
- CLOSURE LINE
- EDGE OF INTERPRETED AREA

## Property Tax Parcels



# 271 Main St. MassGIS -Zone A

- Zone A
- Property Tax Parcels



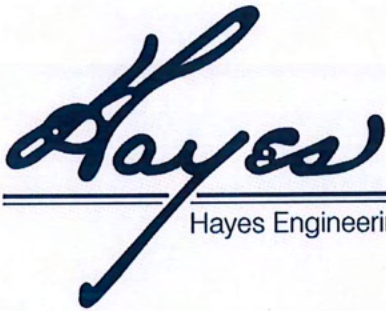
## **SECTION C**

# **STORMWATER DRAINAGE ANALYSIS**

- **Mitigative Drainage Analysis**
- **Stormwater Checklist**
- **Construction Pollution Prevention Plan & Erosion and Sedimentation Control**
- **Existing and Proposed Watershed Maps (11" x 17")**

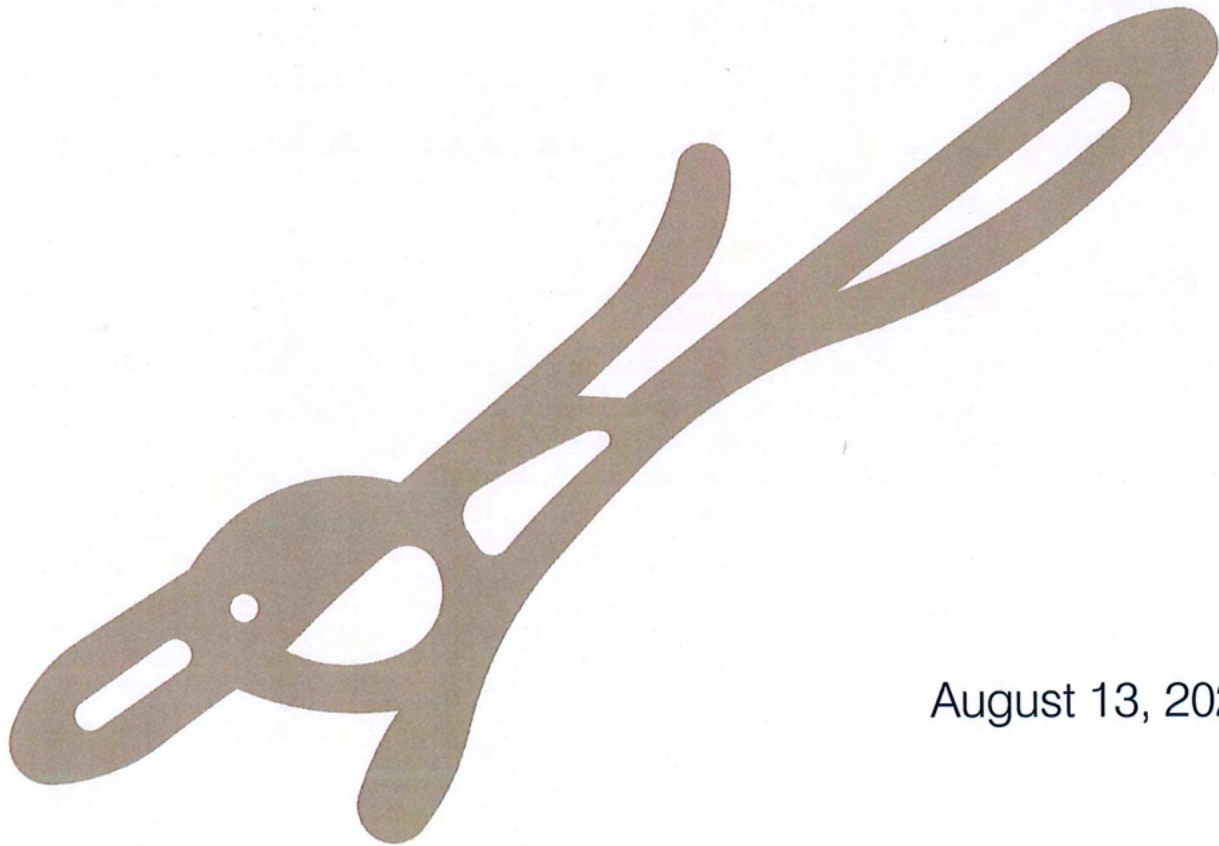


Applicant:  
Audrey Hickman  
271 Main Street  
Lynnfield, MA 01940



Hayes Engineering, Inc

Drainage Analysis:  
#271 Main Street  
Lynnfield, Massachusetts 01940



August 13, 2020

**MITIGATIVE DRAINAGE ANALYSIS  
#271 MAIN STREET  
LYNNFIELD, MASSACHUSETTS**

August 13, 2020

The following Drainage Analysis has been prepared in conjunction with designing the drainage system for the single-family subdivision proposed at 271 Main Street to be known as Road A in Lynnfield, Massachusetts.

## **PROJECT DESCRIPTION**

The scope of the project is to construct a new roadway, as shown on the plan, to create a new single family lot in addition to the existing home at #271 Main Street. The goal of this analysis is to determine potential hydrologic impacts by comparing runoff from the subject property under both the existing and proposed conditions in accordance with the requirements set forth in the Rules and Regulations of the Lynnfield Planning Board and the Massachusetts Department of Environmental Protection's (DEP's) Stormwater Management Standards. Drainage BMPs will consist of deep sump catch basins with gas traps, a proprietary particle separator, a bioretention area, and subsurface chamber systems as shown on the plans.

## **PROJECT COMPLIANCE WITH STORMWATER STANDARDS**

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

***No new storm water conveyances (e.g. outfalls) may discharge untreated storm water directly to or cause erosion in wetlands or waters of the Commonwealth.***

The storm water generated from the proposed development will be treated with deep sump catch basins and a proprietary particle separator or with a Bioretention area pretreated with a gravel and sod filter strip.

### **Standard 2: Peak Rate Attenuation**

***Storm water management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.***

Refer to the attached summary tables and calculations for peak rate runoff analysis. To comply with the Lynnfield Rules and Regulations, the 2, 10, 25, and 100-year, Type III, 24-hour storms have been studied.

The existing subject site consists of one watershed which storm water runoff flows overland from Main Street to an existing wetland to the rear of the site. The watershed has been divided in two, the more northerly portion of the site is considered one watershed which includes the existing house and improvements. The second is a predominantly lawned area to the south and adjacent to the existing wetland.

The proposed driveway will be graded to direct the runoff to deep sump catch basins outside of the 100-foot buffer to the wetland which will discharge through a proprietary particle separator into subsurface chambers where it will be infiltrated with an overflow to daylight. Driveway beyond the



basins will flow overland to a bioretention area. Runoff from the proposed roof of the proposed home is to be connected to infiltration systems. The watersheds are all depicted on the existing and proposed watershed maps which are included in this report.

The runoff computations for this project were all conducted utilizing the HydroCAD Stormwater Modeling System by HydroCAD Software Solutions, LLC. The methodology used is based on TR-55 and TR-20 as developed by the Soil Conservation Service of the USDA. Runoff curve numbers and concentration times were calculated for each sub-watershed in the existing and proposed condition. A computer model for both conditions was then created using the software program. Schematics of the models are included at the beginning of the respective (existing vs. proposed) sections of this report. Included in the proposed design are catch basins, a proprietary particle separator, a subsurface detention chamber system, and a bioretention area, through which the runoff from developed areas will be directed.

There are two sets of calculations: the existing and proposed 2-year, 10-year, 25-year and 100-year storms. Each calculation set includes: 1) summary sheets for each watershed and link; and 2) detailed summary sheets for the stormwater management basins for all design storms.

The results of the calculations indicate that there a reduction of both peak rate of runoff and volume from the site as compared to the existing condition.

### **Standard 3: Recharge**

***Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration ... At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the storm water management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Storm Water Handbook.***

This standard is presumed met when a specific volume of runoff from the proposed impervious areas is infiltrated into the ground. Hydrologic group "A" soils require 0.60 inches of runoff, (over the proposed impervious area) to be infiltrated every storm.

The soil types and hydrologic soil groups were determined using the Web Soil Survey from the National Cooperative Soil Survey for Essex County. The soil survey indicates that the soil in the relevant watershed area is Merrimac fine sandy loam and Merrimac-Urban land complex which are both in the Hydrologic group "A". The soils information is all contained in the soils section of this report. Once the soil groups were determined, the recharge volume was calculated using the appropriate methodologies and adjustments outlined in Chapter 1, Volume 3 of the Massachusetts Stormwater Handbook. There are also logs for test holes that were excavated on the site for determination of soil types and groundwater elevations.

Percolation tests have been performed on the site for septic system designs. Although percolation testing is not recognized by the Stormwater Handbook, they did confirm the soils to be consistent with the Soil Survey Maps and therefore justification to using the Rawl's Rate of 8.27"/hour for sandy hydrologic group "A" soils.

#### **Standard 4: Water Quality**

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

In order to address the issue of water quality, the drainage system has been designed to conform to the Department of Environmental Protection's Stormwater Management Policy. The system includes deep sump catch basins with gas traps and a proprietary particle. Additionally, there is a bioretention area to address TSS removal. Water quality volume flow rate calculations are included in the BMP section of this report. The required Water Quality Volume flow rate is based upon one inch of runoff from all impervious surfaces.

The DEP has assigned presumed total suspended solids (TSS) removal rates for each of these types of Best Management Practices (BMPs). The deep sump catch basin is rated to remove 25%, and the proprietary device is rated to remove 77% and the bioretention area at 90%.

#### **Standard 5: Land Use with Higher Potential Pollutant Loads**

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

NOT APPLICABLE

#### **Standard 6: Critical Areas**

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

The area is tributary to Reedy Meadow which is tributary to a water supply. A water quality volume flow rate equal to 1" of runoff has been used for sizing the BMP's.

#### **Standard 7: Redevelopment**

***A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6.***

The project does not meet the definition of Redevelopment.



Drainage Analysis  
#271 Main Steet, Lynnfield, MA  
August 13, 2020

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

***A plan to control construction-related impacts, including erosion, sedimentation, and other pollutant sources during construction and land disturbance activities shall be developed and implemented.***

A complete Construction Period Pollution Prevention and Erosion and Sedimentation Control is included with this study.

**Standard 9: Operation and Maintenance Plan**

***A Long-Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.***

An Operation and Maintenance is included with this study.

**Standard 10: Prohibition of Illicit Discharges**

***All illicit discharges to the stormwater management system are prohibited.***

No discharge to resource areas is proposed.



# Checklist for Stormwater Report

## A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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





# Checklist for Stormwater Report

## B. Stormwater Checklist and Certification

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

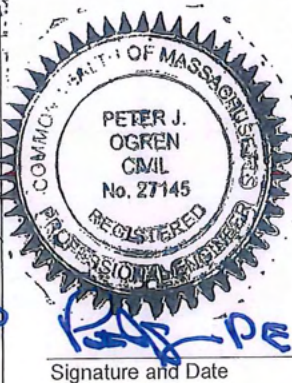
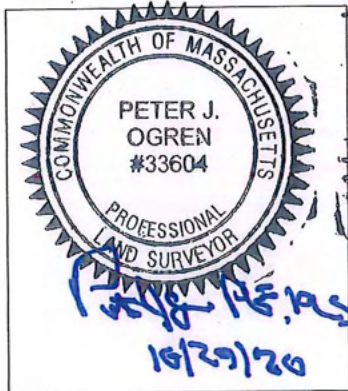
*Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that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

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

### Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Signature and Date

### Checklist

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

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



# Checklist for Stormwater Report

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## Checklist (continued)

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

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

### Standard 1: No New Untreated Discharges

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





# Checklist for Stormwater Report

## Checklist (continued)

### Standard 2: Peak Rate Attenuation

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

### Standard 3: Recharge

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

<sup>1</sup> 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:

- o Good housekeeping practices;
  - o Provisions for storing materials and waste products inside or under cover;
  - o Vehicle washing controls;
  - o Requirements for routine inspections and maintenance of stormwater BMPs;
  - o Spill prevention and response plans;
  - o Provisions for maintenance of lawns, gardens, and other landscaped areas;
  - o Requirements for storage and use of fertilizers, herbicides, and pesticides;
  - o Pet waste management provisions;
  - o Provisions for operation and management of septic systems;
  - o Provisions for solid waste management;
  - o Snow disposal and plowing plans relative to Wetland Resource Areas;
  - o Winter Road Salt and/or Sand Use and Storage restrictions;
  - o Street sweeping schedules;
  - o Provisions for prevention of illicit discharges to the stormwater management system;
  - o 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;
  - o Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
  - o 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

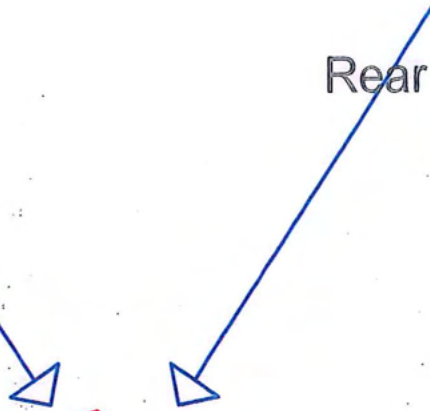
- The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- An Illicit Discharge Compliance Statement is attached;
- NO Illicit Discharge Compliance Statement is attached but will be submitted *prior to* the discharge of any stormwater to post-construction BMPs.



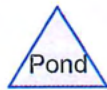
Existing house area



Rear Lawn Area



Flow to Wetland



**Routing Diagram for 271mainEX**

Prepared by {enter your company name here}, Printed 8/13/2020  
HydroCAD® 10.10-4a s/n 03206 © 2020 HydroCAD Software Solutions LLC



**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
62,022	39	>75% Grass cover, Good, HSG A (EX1, EX2)
1,957	96	Gravel surface, HSG A (EX1)
6,811	98	Paved parking, HSG A (EX1)
1,810	98	Roofs, HSG A (EX1)
13,850	32	Woods/grass comb., Good, HSG A (EX1, EX2)
<b>86,450</b>	<b>45</b>	<b>TOTAL AREA</b>

**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
86,450	HSG A	EX1, EX2
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
<b>86,450</b>		<b>TOTAL AREA</b>



**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
62,022	0	0	0	0	62,022	>75% Grass cover, Good
1,957	0	0	0	0	1,957	Gravel surface
6,811	0	0	0	0	6,811	Paved parking
1,810	0	0	0	0	1,810	Roofs
13,850	0	0	0	0	13,850	Woods/grass comb., Good
<b>86,450</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>86,450</b>	<b>TOTAL AREA</b>

271mainEX

Type III 24-hr 2 Year Rainfall=3.10"

Prepared by {enter your company name here}

Printed 8/13/2020

HydroCAD® 10.10-4a s/n 03206 © 2020 HydroCAD Software Solutions LLC

Page 5

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 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 EX1: Existing house area**    Runoff Area=43,650 sf    19.75% Impervious    Runoff Depth=0.17"  
Flow Length=250'    Tc=6.8 min    CN=53    Runoff=0.05 cfs    628 cf

**Subcatchment EX2: Rear Lawn Area**    Runoff Area=42,800 sf    0.00% Impervious    Runoff Depth=0.00"  
Flow Length=270'    Slope=0.0350 '/'    Tc=7.4 min    CN=37    Runoff=0.00 cfs    0 cf

**Link 1L: Flow to Wetland**

Inflow=0.05 cfs    628 cf  
Primary=0.05 cfs    628 cf

**Total Runoff Area = 86,450 sf    Runoff Volume = 628 cf    Average Runoff Depth = 0.09"**  
**90.03% Pervious = 77,829 sf    9.97% Impervious = 8,621 sf**



**Summary for Subcatchment EX1: Existing house area**

Runoff = 0.05 cfs @ 12.42 hrs, Volume= 628 cf, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2 Year Rainfall=3.10"

Area (sf)	CN	Description
1,810	98	Roofs, HSG A
6,811	98	Paved parking, HSG A
30,522	39	>75% Grass cover, Good, HSG A
1,957	96	Gravel surface, HSG A
2,550	32	Woods/grass comb., Good, HSG A
43,650	53	Weighted Average
35,029		80.25% Pervious Area
8,621		19.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	50	0.0300	0.17		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.10"
0.4	30	0.0300	1.21		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
1.5	170	0.0700	1.85		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
6.8	250	Total			

**Summary for Subcatchment EX2: Rear Lawn Area**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2 Year Rainfall=3.10"

Area (sf)	CN	Description
31,500	39	>75% Grass cover, Good, HSG A
11,300	32	Woods/grass comb., Good, HSG A
42,800	37	Weighted Average
42,800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.6	50	0.0350	0.18		<b>Sheet Flow,</b> Grass: Short n= 0.150 P2= 3.10"
2.8	220	0.0350	1.31		<b>Shallow Concentrated Flow,</b> Short Grass Pasture Kv= 7.0 fps
7.4	270	Total			

271mainEX

Type III 24-hr 2 Year Rainfall=3.10"

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### Summary for Link 1L: Flow to Wetland

Inflow Area = 86,450 sf, 9.97% Impervious, Inflow Depth = 0.09" for 2 Year event  
Inflow = 0.05 cfs @ 12.42 hrs, Volume= 628 cf  
Primary = 0.05 cfs @ 12.42 hrs, Volume= 628 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs



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Type III 24-hr 10 Year Rainfall=4.50"

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Page 1

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 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 EX1: Existing house area** Runoff Area=43,650 sf 19.75% Impervious Runoff Depth=0.64"  
Flow Length=250' Tc=6.8 min CN=53 Runoff=0.47 cfs 2,332 cf

**Subcatchment EX2: Rear Lawn Area** Runoff Area=42,800 sf 0.00% Impervious Runoff Depth=0.07"  
Flow Length=270' Slope=0.0350 '/ Slope=0.0350 '/ Tc=7.4 min CN=37 Runoff=0.01 cfs 236 cf

**Link 1L: Flow to Wetland**

Inflow=0.47 cfs 2,568 cf  
Primary=0.47 cfs 2,568 cf

**Total Runoff Area = 86,450 sf Runoff Volume = 2,568 cf Average Runoff Depth = 0.36"**  
**90.03% Pervious = 77,829 sf 9.97% Impervious = 8,621 sf**

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Type III 24-hr 25 Year Rainfall=5.30"

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Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 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 EX1: Existing house area** Runoff Area=43,650 sf 19.75% Impervious Runoff Depth=1.00"  
Flow Length=250' Tc=6.8 min CN=53 Runoff=0.90 cfs 3,650 cf

**Subcatchment EX2: Rear Lawn Area** Runoff Area=42,800 sf 0.00% Impervious Runoff Depth=0.19"  
Flow Length=270' Slope=0.0350 '/' Tc=7.4 min CN=37 Runoff=0.03 cfs 677 cf

**Link 1L: Flow to Wetland**

Inflow=0.90 cfs 4,326 cf  
Primary=0.90 cfs 4,326 cf

**Total Runoff Area = 86,450 sf Runoff Volume = 4,326 cf Average Runoff Depth = 0.60"**  
**90.03% Pervious = 77,829 sf 9.97% Impervious = 8,621 sf**



271mainEX

Type III 24-hr 100 Year Rainfall=6.50"

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Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

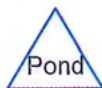
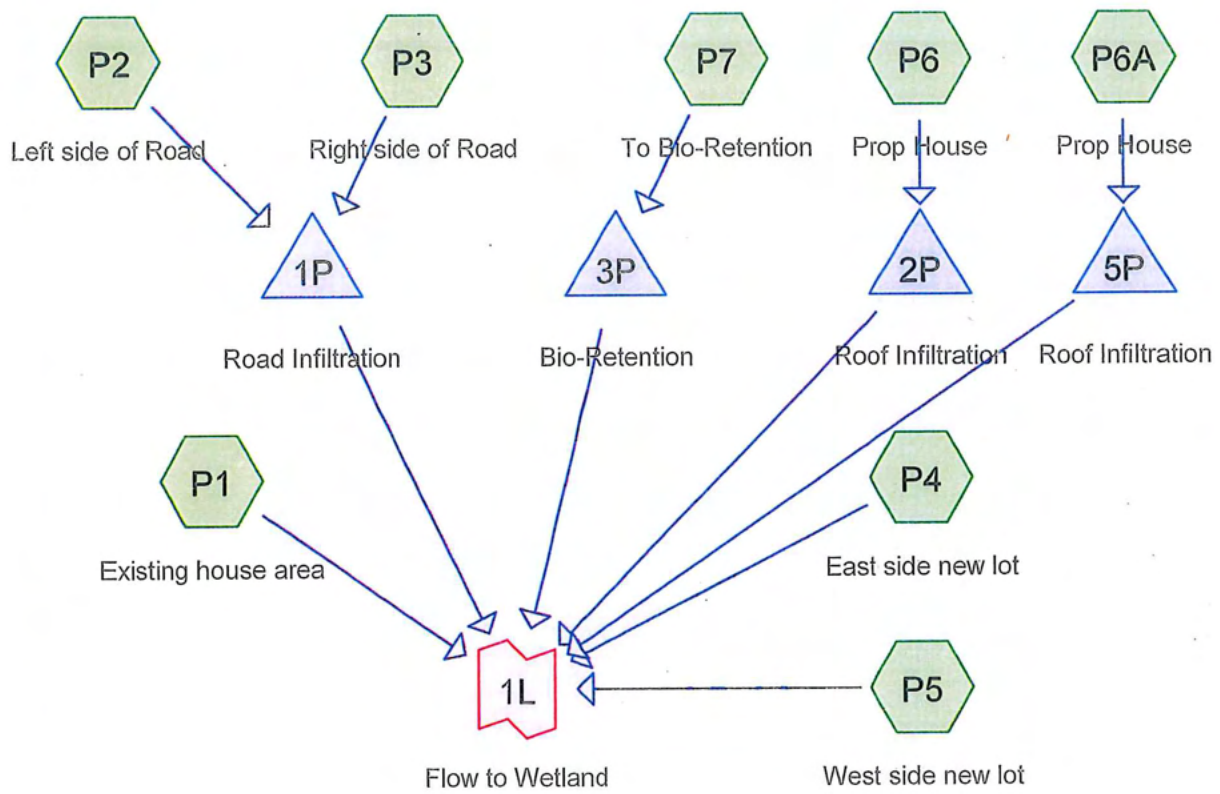
**Subcatchment EX1: Existing house area** . Runoff Area=43,650 sf 19.75% Impervious Runoff Depth=1.64"  
Flow Length=250' Tc=6.8 min CN=53 Runoff=1.66 cfs 5,977 cf

**Subcatchment EX2: Rear Lawn Area** Runoff Area=42,800 sf 0.00% Impervious Runoff Depth=0.48"  
Flow Length=270' Slope=0.0350 '/' Tc=7.4 min CN=37 Runoff=0.18 cfs 1,697 cf

**Link 1L: Flow to Wetland**

Inflow=1.70 cfs 7,675 cf  
Primary=1.70 cfs 7,675 cf

**Total Runoff Area = 86,450 sf Runoff Volume = 7,675 cf Average Runoff Depth = 1.07"**  
**90.03% Pervious = 77,829 sf 9.97% Impervious = 8,621 sf**



**Routing Diagram for 271mainPR**

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**Area Listing (all nodes)**

Area (sq-ft)	CN	Description (subcatchment-numbers)
61,181	39	>75% Grass cover, Good, HSG A (P1, P2, P3, P4, P5, P7)
14,305	98	Paved parking, HSG A (P1, P2, P3, P7)
4,210	98	Roofs, HSG A (P1, P6, P6A)
6,754	32	Woods/grass comb., Good, HSG A (P3, P4, P5, P7)
<b>86,450</b>	<b>51</b>	<b>TOTAL AREA</b>

**Soil Listing (all nodes)**

Area (sq-ft)	Soil Group	Subcatchment Numbers
86,450	HSG A	P1, P2, P3, P4, P5, P6, P6A, P7
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
<b>86,450</b>		<b>TOTAL AREA</b>



**Ground Covers (all nodes)**

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
61,181	0	0	0	0	61,181	>75% Grass cover, Good
14,305	0	0	0	0	14,305	Paved parking
4,210	0	0	0	0	4,210	Roofs
6,754	0	0	0	0	6,754	Woods/grass comb., Good
<b>86,450</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>86,450</b>	<b>TOTAL AREA</b>

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**Pipe Listing (all nodes)**

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	89.35	88.50	9.0	0.0944	0.010	6.0	0.0	0.0



Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points  
 Runoff by SCS TR-20 method, U-I=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment P1: Existing house area</b>	Runoff Area=22,330 sf 24.39% Impervious Runoff Depth=0.17" Tc=6.0 min CN=53 Runoff=0.03 cfs 321 cf
<b>Subcatchment P2: Left side of Road</b>	Runoff Area=10,349 sf 31.97% Impervious Runoff Depth=0.31" Tc=6.0 min CN=58 Runoff=0.03 cfs 265 cf
<b>Subcatchment P3: Right side of Road</b>	Runoff Area=4,289 sf 47.12% Impervious Runoff Depth=0.55" Tc=6.0 min CN=65 Runoff=0.05 cfs 197 cf
<b>Subcatchment P4: East side new lot</b>	Runoff Area=19,106 sf 0.00% Impervious Runoff Depth=0.00" Tc=6.0 min CN=39 Runoff=0.00 cfs 0 cf
<b>Subcatchment P5: West side new lot</b>	Runoff Area=11,582 sf 0.00% Impervious Runoff Depth=0.00" Tc=6.0 min CN=37 Runoff=0.00 cfs 0 cf
<b>Subcatchment P6: Prop House</b>	Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=2.87" Tc=6.0 min CN=98 Runoff=0.08 cfs 287 cf
<b>Subcatchment P6A: Prop House</b>	Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=2.87" Tc=6.0 min CN=98 Runoff=0.08 cfs 287 cf
<b>Subcatchment P7: To Bio-Retention</b>	Runoff Area=16,394 sf 32.56% Impervious Runoff Depth=0.31" Tc=6.0 min CN=58 Runoff=0.06 cfs 419 cf
<b>Pond 1P: Road Infiltration</b>	Peak Elev=88.42' Storage=0.000 af Inflow=0.08 cfs 462 cf Discarded=0.08 cfs 462 cf Primary=0.00 cfs 0 cf Outflow=0.08 cfs 462 cf
<b>Pond 2P: Roof Infiltration</b>	Peak Elev=83.51' Storage=0.001 af Inflow=0.08 cfs 287 cf Discarded=0.03 cfs 287 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 287 cf
<b>Pond 3P: Bio-Retention</b>	Peak Elev=86.50' Storage=3 cf Inflow=0.06 cfs 419 cf Discarded=0.06 cfs 419 cf Primary=0.00 cfs 0 cf Outflow=0.06 cfs 419 cf
<b>Pond 5P: Roof Infiltration</b>	Peak Elev=83.51' Storage=0.001 af Inflow=0.08 cfs 287 cf Discarded=0.03 cfs 287 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 287 cf
<b>Link 1L: Flow to Wetland</b>	Inflow=0.03 cfs 321 cf Primary=0.03 cfs 321 cf

**Total Runoff Area = 86,450 sf Runoff Volume = 1,776 cf Average Runoff Depth = 0.25"**  
**78.58% Pervious = 67,935 sf 21.42% Impervious = 18,515 sf**

**Summary for Subcatchment P1: Existing house area**

Runoff = 0.03 cfs @ 12.40 hrs, Volume= 321 cf, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2 Year Rainfall=3.10"

Area (sf)	CN	Description
3,637	98	Paved parking, HSG A
16,883	39	>75% Grass cover, Good, HSG A
1,810	98	Roofs, HSG A
22,330	53	Weighted Average
16,883		75.61% Pervious Area
5,447		24.39% Impervious Area

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

**Summary for Subcatchment P2: Left side of Road**

Runoff = 0.03 cfs @ 12.16 hrs, Volume= 265 cf, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2 Year Rainfall=3.10"

Area (sf)	CN	Description
3,309	98	Paved parking, HSG A
7,040	39	>75% Grass cover, Good, HSG A
10,349	58	Weighted Average
7,040		68.03% Pervious Area
3,309		31.97% Impervious Area

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

**Summary for Subcatchment P3: Right side of Road**

Runoff = 0.05 cfs @ 12.11 hrs, Volume= 197 cf, Depth= 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2 Year Rainfall=3.10"



Area (sf)	CN	Description
2,021	98	Paved parking, HSG A
1,431	39	>75% Grass cover, Good, HSG A
837	32	Woods/grass comb., Good, HSG A
4,289	65	Weighted Average
2,268		52.88% Pervious Area
2,021		47.12% Impervious Area

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

**Summary for Subcatchment P4: East side new lot**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2 Year Rainfall=3.10"

Area (sf)	CN	Description
17,749	39	>75% Grass cover, Good, HSG A
1,357	32	Woods/grass comb., Good, HSG A
19,106	39	Weighted Average
19,106		100.00% Pervious Area

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

**Summary for Subcatchment P5: West side new lot**

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2 Year Rainfall=3.10"

Area (sf)	CN	Description
8,082	39	>75% Grass cover, Good, HSG A
3,500	32	Woods/grass comb., Good, HSG A
11,582	37	Weighted Average
11,582		100.00% Pervious Area

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

**Summary for Subcatchment P6: Prop House**

Runoff = 0.08 cfs @ 12.08 hrs, Volume= 287 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2 Year Rainfall=3.10"

Area (sf)	CN	Description
1,200	98	Roofs, HSG A
1,200		100.00% Impervious Area

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

**Summary for Subcatchment P6A: Prop House**

Runoff = 0.08 cfs @ 12.08 hrs, Volume= 287 cf, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2 Year Rainfall=3.10"

Area (sf)	CN	Description
1,200	98	Roofs, HSG A
1,200		100.00% Impervious Area

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

**Summary for Subcatchment P7: To Bio-Retention**

Runoff = 0.06 cfs @ 12.16 hrs, Volume= 419 cf, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
Type III 24-hr 2 Year Rainfall=3.10"

Area (sf)	CN	Description
5,338	98	Paved parking, HSG A
9,996	39	>75% Grass cover, Good, HSG A
1,060	32	Woods/grass comb., Good, HSG A
16,394	58	Weighted Average
11,056		67.44% Pervious Area
5,338		32.56% Impervious Area

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



**Summary for Pond 1P: Road Infiltration**

Inflow Area = 14,638 sf, 36.41% Impervious, Inflow Depth = 0.38" for 2 Year event  
 Inflow = 0.08 cfs @ 12.13 hrs, Volume= 462 cf  
 Outflow = 0.08 cfs @ 12.15 hrs, Volume= 462 cf, Atten= 1%, Lag= 0.9 min  
 Discarded = 0.08 cfs @ 12.15 hrs, Volume= 462 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
 Peak Elev= 88.42' @ 12.15 hrs Surf.Area= 0.013 ac Storage= 0.000 af

Plug-Flow detention time= 0.8 min calculated for 462 cf (100% of inflow)  
 Center-of-Mass det. time= 0.8 min ( 922.0 - 921.2 )

Volume	Invert	Avail.Storage	Storage Description
#1A	88.40'	0.010 af	<b>18.17'W x 31.68'L x 2.33'H Field A</b> 0.031 af Overall - 0.007 af Embedded = 0.024 af x 40.0% Voids
#2A	88.90'	0.007 af	<b>ADS_StormTech SC-310 +Cap x 20 Inside #1</b> Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 20 Chambers in 5 Rows
		0.016 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	89.35'	<b>6.0" Round CULVERT</b> L= 9.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 89.35' / 88.50' S= 0.0944 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#2	Discarded	88.40'	<b>8.270 in/hr Exfiltration over Surface area</b>

Discarded OutFlow Max=0.11 cfs @ 12.15 hrs HW=88.42' (Free Discharge)  
 ↳2=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=88.40' (Free Discharge)  
 ↳1=CULVERT ( Controls 0.00 cfs)

**Summary for Pond 2P: Roof Infiltration**

Inflow Area = 1,200 sf, 100.00% Impervious, Inflow Depth = 2.87" for 2 Year event  
 Inflow = 0.08 cfs @ 12.08 hrs, Volume= 287 cf  
 Outflow = 0.03 cfs @ 12.03 hrs, Volume= 287 cf, Atten= 67%, Lag= 0.0 min  
 Discarded = 0.03 cfs @ 12.03 hrs, Volume= 287 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
 Peak Elev= 83.51' @ 12.36 hrs Surf.Area= 0.003 ac Storage= 0.001 af

Plug-Flow detention time= 21.3 min calculated for 287 cf (100% of inflow)  
 Center-of-Mass det. time= 21.3 min ( 778.4 - 757.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	82.70'	0.003 af	<b>8.17'W x 17.44'L x 2.33'H Field A</b> 0.008 af Overall - 0.001 af Embedded = 0.006 af x 40.0% Voids
#2A	83.20'	0.001 af	<b>ADS_StormTech SC-310 +Cap x 4 Inside #1</b> Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 4 Chambers in 2 Rows
#3	82.70'	0.002 af	<b>1.00'D x 87.50'H Vertical Cone/Cylinder</b>
		0.005 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	82.70'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	87.00'	<b>4.0" Horiz. Orifice/Grate X 2.00 C= 0.600</b> Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.03 hrs HW=83.20' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=82.70' (Free Discharge)

↳2=Orifice/Grate ( Controls 0.00 cfs)

### Summary for Pond 3P: Bio-Retention

Inflow Area = 16,394 sf, 32.56% Impervious, Inflow Depth = 0.31" for 2 Year event  
 Inflow = 0.06 cfs @ 12.16 hrs, Volume= 419 cf  
 Outflow = 0.06 cfs @ 12.28 hrs, Volume= 419 cf, Atten= 0%, Lag= 7.4 min  
 Discarded = 0.06 cfs @ 12.28 hrs, Volume= 419 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Peak Elev= 86.50' @ 12.28 hrs Surf.Area= 800 sf Storage= 3 cf

Plug-Flow detention time= 0.9 min calculated for 419 cf (100% of inflow)

Center-of-Mass det. time= 0.9 min ( 939.0 - 938.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	86.50'	850 cf	<b>Custom Stage Data (Prismatic) Listed below (Recalc)</b>
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
86.50	800	0	0
87.50	900	850	850

Device	Routing	Invert	Outlet Devices
#1	Discarded	86.50'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	87.50'	<b>30.0' long (Profile 4) Broad-Crested Rectangular Weir</b> Head (feet) 0.49 0.98 1.48 Coef. (English) 2.77 2.97 3.21



Discarded OutFlow Max=0.15 cfs @ 12.28 hrs HW=86.50' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=86.50' (Free Discharge)

↳2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 5P: Roof Infiltration**

Inflow Area = 1,200 sf, 100.00% Impervious, Inflow Depth = 2.87" for 2 Year event  
 Inflow = 0.08 cfs @ 12.08 hrs, Volume= 287 cf  
 Outflow = 0.03 cfs @ 12.03 hrs, Volume= 287 cf, Atten= 67%, Lag= 0.0 min  
 Discarded = 0.03 cfs @ 12.03 hrs, Volume= 287 cf  
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs  
 Peak Elev= 83.51' @ 12.36 hrs Surf.Area= 0.003 ac Storage= 0.001 af

Plug-Flow detention time= 21.3 min calculated for 287 cf (100% of inflow)  
 Center-of-Mass det. time= 21.3 min ( 778.4 - 757.1 )

Volume	Invert	Avail.Storage	Storage Description
#1A	82.70'	0.003 af	<b>8.17'W x 17.44'L x 2.33'H Field A</b> 0.008 af Overall - 0.001 af Embedded = 0.006 af x 40.0% Voids
#2A	83.20'	0.001 af	<b>ADS_StormTech SC-310 +Cap x 4 Inside #1</b> Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap 4 Chambers in 2 Rows
#3	82.70'	0.002 af	<b>1.00'D x 87.50'H Vertical Cone/Cylinder</b>
		0.005 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	82.70'	<b>8.270 in/hr Exfiltration over Surface area</b>
#2	Primary	87.00'	<b>4.0" Horiz. Orifice/Grate X 2.00 C= 0.600</b> Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.03 hrs HW=83.20' (Free Discharge)

↳1=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=82.70' (Free Discharge)

↳2=Orifice/Grate ( Controls 0.00 cfs)

**Summary for Link 1L: Flow to Wetland**

Inflow Area = 86,450 sf, 21.42% Impervious, Inflow Depth = 0.04" for 2 Year event  
 Inflow = 0.03 cfs @ 12.40 hrs, Volume= 321 cf  
 Primary = 0.03 cfs @ 12.40 hrs, Volume= 321 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.01 hrs

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment P1: Existing house area</b>	Runoff Area=22,330 sf 24.39% Impervious Runoff Depth=0.64" Tc=6.0 min CN=53 Runoff=0.25 cfs 1,193 cf
<b>Subcatchment P2: Left side of Road</b>	Runoff Area=10,349 sf 31.97% Impervious Runoff Depth=0.90" Tc=6.0 min CN=58 Runoff=0.20 cfs 780 cf
<b>Subcatchment P3: Right side of Road</b>	Runoff Area=4,289 sf 47.12% Impervious Runoff Depth=1.33" Tc=6.0 min CN=65 Runoff=0.14 cfs 475 cf
<b>Subcatchment P4: East side new lot</b>	Runoff Area=19,106 sf 0.00% Impervious Runoff Depth=0.11" Tc=6.0 min CN=39 Runoff=0.01 cfs 176 cf
<b>Subcatchment P5: West side new lot</b>	Runoff Area=11,582 sf 0.00% Impervious Runoff Depth=0.07" Tc=6.0 min CN=37 Runoff=0.00 cfs 64 cf
<b>Subcatchment P6: Prop House</b>	Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=4.26" Tc=6.0 min CN=98 Runoff=0.12 cfs 426 cf
<b>Subcatchment P6A: Prop House</b>	Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=4.26" Tc=6.0 min CN=98 Runoff=0.12 cfs 426 cf
<b>Subcatchment P7: To Bio-Retention</b>	Runoff Area=16,394 sf 32.56% Impervious Runoff Depth=0.90" Tc=6.0 min CN=58 Runoff=0.32 cfs 1,236 cf
<b>Pond 1P: Road Infiltration</b>	Peak Elev=89.10' Storage=0.005 af Inflow=0.35 cfs 1,256 cf Discarded=0.11 cfs 1,256 cf Primary=0.00 cfs 0 cf Outflow=0.11 cfs 1,256 cf
<b>Pond 2P: Roof Infiltration</b>	Peak Elev=84.04' Storage=0.002 af Inflow=0.12 cfs 426 cf Discarded=0.03 cfs 426 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 426 cf
<b>Pond 3P: Bio-Retention</b>	Peak Elev=86.64' Storage=111 cf Inflow=0.32 cfs 1,236 cf Discarded=0.16 cfs 1,236 cf Primary=0.00 cfs 0 cf Outflow=0.16 cfs 1,236 cf
<b>Pond 5P: Roof Infiltration</b>	Peak Elev=84.04' Storage=0.002 af Inflow=0.12 cfs 426 cf Discarded=0.03 cfs 426 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 426 cf
<b>Link 1L: Flow to Wetland</b>	Inflow=0.25 cfs 1,433 cf Primary=0.25 cfs 1,433 cf

**Total Runoff Area = 86,450 sf Runoff Volume = 4,778 cf Average Runoff Depth = 0.66"**  
**78.58% Pervious = 67,935 sf 21.42% Impervious = 18,515 sf**



Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment P1: Existing house area</b>	Runoff Area=22,330 sf 24.39% Impervious Runoff Depth=1.00" Tc=6.0 min CN=53 Runoff=0.47 cfs 1,867 cf
<b>Subcatchment P2: Left side of Road</b>	Runoff Area=10,349 sf 31.97% Impervious Runoff Depth=1.34" Tc=6.0 min CN=58 Runoff=0.33 cfs 1,153 cf
<b>Subcatchment P3: Right side of Road</b>	Runoff Area=4,289 sf 47.12% Impervious Runoff Depth=1.86" Tc=6.0 min CN=65 Runoff=0.21 cfs 663 cf
<b>Subcatchment P4: East side new lot</b>	Runoff Area=19,106 sf 0.00% Impervious Runoff Depth=0.26" Tc=6.0 min CN=39 Runoff=0.03 cfs 422 cf
<b>Subcatchment P5: West side new lot</b>	Runoff Area=11,582 sf 0.00% Impervious Runoff Depth=0.19" Tc=6.0 min CN=37 Runoff=0.01 cfs 183 cf
<b>Subcatchment P6: Prop House</b>	Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=5.06" Tc=6.0 min CN=98 Runoff=0.14 cfs 506 cf
<b>Subcatchment P6A: Prop House</b>	Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=5.06" Tc=6.0 min CN=98 Runoff=0.14 cfs 506 cf
<b>Subcatchment P7: To Bio-Retention</b>	Runoff Area=16,394 sf 32.56% Impervious Runoff Depth=1.34" Tc=6.0 min CN=58 Runoff=0.52 cfs 1,827 cf
<b>Pond 1P: Road Infiltration</b>	Peak Elev=89.53' Storage=0.009 af Inflow=0.54 cfs 1,817 cf Discarded=0.11 cfs 1,733 cf Primary=0.07 cfs 84 cf Outflow=0.18 cfs 1,817 cf
<b>Pond 2P: Roof Infiltration</b>	Peak Elev=84.46' Storage=0.003 af Inflow=0.14 cfs 506 cf Discarded=0.03 cfs 506 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 506 cf
<b>Pond 3P: Bio-Retention</b>	Peak Elev=86.88' Storage=314 cf Inflow=0.52 cfs 1,827 cf Discarded=0.16 cfs 1,827 cf Primary=0.00 cfs 0 cf Outflow=0.16 cfs 1,827 cf
<b>Pond 5P: Roof Infiltration</b>	Peak Elev=84.46' Storage=0.003 af Inflow=0.14 cfs 506 cf Discarded=0.03 cfs 506 cf Primary=0.00 cfs 0 cf Outflow=0.03 cfs 506 cf
<b>Link 1L: Flow to Wetland</b>	Inflow=0.47 cfs 2,556 cf Primary=0.47 cfs 2,556 cf

**Total Runoff Area = 86,450 sf Runoff Volume = 7,128 cf Average Runoff Depth = 0.99"**  
**78.58% Pervious = 67,935 sf 21.42% Impervious = 18,515 sf**

Time span=0.00-40.00 hrs, dt=0.01 hrs, 4001 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 P1: Existing house area** Runoff Area=22,330 sf 24.39% Impervious Runoff Depth=1.64"  
 Tc=6.0 min CN=53 Runoff=0.88 cfs 3,058 cf

**Subcatchment P2: Left side of Road** Runoff Area=10,349 sf 31.97% Impervious Runoff Depth=2.08"  
 Tc=6.0 min CN=58 Runoff=0.55 cfs 1,790 cf

**Subcatchment P3: Right side of Road** Runoff Area=4,289 sf 47.12% Impervious Runoff Depth=2.72"  
 Tc=6.0 min CN=65 Runoff=0.31 cfs 973 cf

**Subcatchment P4: East side new lot** Runoff Area=19,106 sf 0.00% Impervious Runoff Depth=0.60"  
 Tc=6.0 min CN=39 Runoff=0.12 cfs 952 cf

**Subcatchment P5: West side new lot** Runoff Area=11,582 sf 0.00% Impervious Runoff Depth=0.48"  
 Tc=6.0 min CN=37 Runoff=0.05 cfs 459 cf

**Subcatchment P6: Prop House** Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=6.26"  
 Tc=6.0 min CN=98 Runoff=0.18 cfs 626 cf

**Subcatchment P6A: Prop House** Runoff Area=1,200 sf 100.00% Impervious Runoff Depth=6.26"  
 Tc=6.0 min CN=98 Runoff=0.18 cfs 626 cf

**Subcatchment P7: To Bio-Retention** Runoff Area=16,394 sf 32.56% Impervious Runoff Depth=2.08"  
 Tc=6.0 min CN=58 Runoff=0.87 cfs 2,836 cf

**Pond 1P: Road Infiltration** Peak Elev=89.81' Storage=0.011 af Inflow=0.86 cfs 2,763 cf  
 Discarded=0.11 cfs 2,223 cf Primary=0.35 cfs 540 cf Outflow=0.46 cfs 2,763 cf

**Pond 2P: Roof Infiltration** Peak Elev=87.03' Storage=0.004 af Inflow=0.18 cfs 626 cf  
 Discarded=0.03 cfs 613 cf Primary=0.06 cfs 13 cf Outflow=0.08 cfs 626 cf

**Pond 3P: Bio-Retention** Peak Elev=87.35' Storage=719 cf Inflow=0.87 cfs 2,836 cf  
 Discarded=0.17 cfs 2,836 cf Primary=0.00 cfs 0 cf Outflow=0.17 cfs 2,836 cf

**Pond 5P: Roof Infiltration** Peak Elev=87.03' Storage=0.004 af Inflow=0.18 cfs 626 cf  
 Discarded=0.03 cfs 613 cf Primary=0.06 cfs 13 cf Outflow=0.08 cfs 626 cf

**Link 1L: Flow to Wetland** Inflow=1.09 cfs 5,036 cf  
 Primary=1.09 cfs 5,036 cf

**Total Runoff Area = 86,450 sf Runoff Volume = 11,321 cf Average Runoff Depth = 1.57"**  
**78.58% Pervious = 67,935 sf 21.42% Impervious = 18,515 sf**



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

### SITE DESCRIPTION

#### **Project Name and Location: (Latitude, Longitude, or Address)**

#271 Main Street  
Lynnfield, MA 01940

#### **Owner Name and Address**

Thomas & Audrey Hickman, Zina Greenwood  
271 Main Street  
Lynnfield, MA 01940

#### **Applicant Name and Address**

Audrey Hickman  
271 Main Street  
Lynnfield, MA 01940

#### **Description: (Purpose and Types of Soil Disturbing Activities)**

The proposed project is the subdivision of a single lot with an existing single family house to create a second lot with a second single family house, driveway, roadway, stormwater BMPs, and all appurtenant site work. Soil disturbing activities include installation of erosion and sediment control devices; excavation; drainage system and utility installation; stormwater BMP installation and construction; house construction; road and driveway paving; and landscaping.

#### **Sequence of Major Activities**

The order of activities shall be as follows:

1. Install erosion and sediment control devices
2. Clear vegetation from road and lot areas.
3. Excavate and stockpile topsoil
4. Stabilize stockpiles within 14 days of last construction activity in that area
5. Stabilize exposed surfaces where the period of exposure shall be more than two months, but less than twelve months within 14 days of last construction activity in that area
6. Commence grading and excavation activities.
7. Commence roadway and stormwater management area construction (grade to subgrade elevations, install drainage structures; install utilities, install gravel to appropriate elevations, install binder coat of pavement followed by curbing).
8. Develop individual lots (grade yard, driveway and foundation areas, install drainage, septic and utility structures, complete driveway and house construction, grade to finish elevations).

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

9. Install binder coat of pavement followed by curbing
10. Loam and seed all disturbed areas.
11. Install final pavement course and final inspection of all stormwater BMPs.

### **CONTROLS**

#### **Erosion and Sediment Control Stabilization Practices**

**The Site Contractor / Project Manager ("Manager") is responsible for ensuring that erosion and sedimentation control practices and controls are followed upon commencement of, and during project construction.**

#### **A. Protecting and Minimizing Exposed Areas**

The project will temporarily leave bare earth open to erosion. Steps shall be taken to minimize this area of exposure by preserving existing vegetation and providing soil stabilization. Equipment and trucks shall be routed only over the existing pavement or areas of proposed work and workers shall minimize foot traffic in vegetated areas adjacent to the work area as much as possible. During site work, utilization of stabilization techniques is necessary for controlling erosion on exposed areas, including grading, seeding and otherwise stabilizing the areas.

#### **B. Sediment And Erosion Control / Soil Stabilization**

- i) Prior to any construction occurring adjacent to identified resource areas (shown on the plan and/or marked in the field), proper erosion and siltation barriers shall be installed so that throughout and until completion of construction, those areas will be afforded maximum protection. Temporary stockpiles of soil shall be surrounded with an erosion control barrier to prevent sediments from exiting the subject property. All erosion control barriers must be maintained in functioning condition and periodically inspected until areas of bare soil are stabilized to ensure that they are in functioning condition. Any accumulations of sediments present along erosion control barriers shall be removed as soon as possible after deposition in order to ensure the effectiveness of all sedimentation controls.

On sites where grading or other work will occur on moderately steep slopes (3:1 and greater) located immediately upgradient of wetlands, the contractor shall work on one portion of the slope at a time, ensuring the stability of the disturbed soil by immediately loaming and seeding the slope, or otherwise vegetating the slope as desired, and installing erosion control mats (straw or cocconut fiber designed for the slope steepness). If work is interrupted and the slope is to be left bare or otherwise unstabilized for duration of a day or more, a series of erosion control fences oriented parallel to the slope.



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

### **Vegetational Covers**

#### **Temporary Vegetational Cover**

Any area proposed for removal of vegetation where soil will be exposed for more than 10 days shall be mulched or otherwise treated to prevent erosion. On sediment-producing areas in the buffer zone, where the period of exposure will be more than 30 days, the following procedures should be followed for a cover of annual rye. When bare soils are not completely graded and vegetated by September 30 of any year, winter rye shall be planted as specified in table and mulched with three (3) inches of hay or straw.

- a. Install needed surface water control measures.
  - b. Perform all cultural operations at right angles to the slope.
  - c. Establish grass or other ground cover species as recommended in the attached excerpt (pgs 144 -146) from Massachusetts Erosion and Sedimentation Guidelines for Urban and Suburban Areas, 2003.
1. Permanent Vegetational Cover

To reduce damages from the potential incidence of sedimentation and runoff to other properties, and to avoid erosion on the site itself, a permanent type cover shall be established in disturbed areas located adjacent to resource areas immediately upon completion of grading. Seeding herbaceous cover is usually the most economical and practical way to stabilize any large area. For this site, all disturbed areas where lawns are desired will be seeded in fall during the period of August 1 to October 1; or in spring by May 15 with a commercial lawn mixture utilizing standard landscape methods and as recommended by the seed manufacturer. Grass sod or landscape plantings may be used instead of seed, if preferred.

In upland/ buffer zone areas, outside of lawn locations, where an erosion control - wildlife seed mixture is desired, prepare soil and use one of grass seed mixes #1 through #6 as recommended in the attached excerpts (pgs 136 -139) from Massachusetts Erosion and Sedimentation Guidelines for Urban and Suburban Areas 2003, to establish a stable, permanent cover.

### **REFERENCES**

Department of Environmental Protection, Bureau of Resource Protection and U.S. Environmental Protection Agency, Massachusetts Erosion and Sedimentation Guidelines for Urban and Suburban Areas: A Guide for Planners, Designers and Municipal Officials. Massachusetts Executive Office of Environmental Affairs, Boston, Massachusetts, Reprint: May 2003.

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### Seeding Dates

Seeding operations should be performed as an early spring seeding (April 1-May 15) with the use of cold treated seed. A late fall early winter dormant seeding (November 1 - December 15) can also be made, however the seeding rate will need to be increased by 50%.

### Seeding Methods

Seeding should be performed by one of the following methods:

- Drill seedings (de-awned or de-bearded seed should be used unless the drill is equipped with special features to accept awned seed).
- Broadcast seeding with subsequent rolling, cultipacking or tracking the seeding with small track construction equipment. Tracking should be oriented up and down the slope.
- Hydroseeding with subsequent tracking. If wood fiber mulch is used, it should be applied as a separate operation after seeding and tracking to assure good seed to soil contact.

### Mulch

Mulch the seedings with straw applied at the rate of ½ tons per acre. Anchor the mulch with erosion control netting or fabric on sloping areas.

### Seed Mixtures for Permanent Cover

Recommended mixtures for permanent seeding are provided on the following pages. Select plant species which are suited to the site conditions and planned use. Soil moisture conditions, often the major limiting site factor, are usually classified as follows:

*Dry* - Sands and gravels to sandy loams. No effective moisture supply from seepage or a high water table.

*Moist* - Well drained to moderately well drained sandy loams, loams, and finer; or coarser textured material with moderate influence on root zone from seepage or a high water table.

*Wet* - All textures with a water table at or very near the soil surface, or with enduring seepage.

When other factors strongly influence site conditions, the plants selected must also be tolerant of these conditions.



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

Permanent Seeding Mixtures					
Mix	Site	Seed Mixture	Seed, Pounds per:		Remarks
			Acre	1,000 sf	
1	Dry	Little Bluestem	10	0.25	<ul style="list-style-type: none"> <li>* Use Warm Season planting procedure.</li> <li>* Roadsides</li> <li>* Sand and Gravel Stabilization</li> <li>* Clover requires inoculation with nitrogen-fixing bacteria</li> <li>* Rates for this mix are for PLS.</li> </ul>
		or Broomsedge	1	0.10	
		Tumble Lovegrass*	10	0.25	
		Switchgrass	2	0.10	
		Bush Clover*	1	0.10	
2	Dry	Deertongue	15	0.35	<ul style="list-style-type: none"> <li>* Use Warm Season planting procedures.</li> <li>* Acid sites/Mine spoil</li> <li>* Clover requires inoculation with nitrogen-fixing bacteria.</li> <li>* Rates for this mix are for PLS.</li> </ul>
		Broomsedge	10	0.25	
		Bush Clover*	2	0.10	
		Red Top	1	0.10	
3	Dry	Big Bluestem	10	0.25	<ul style="list-style-type: none"> <li>* Rates for this mix are for PLS.</li> <li>* Use Warm Season planting procedures.</li> <li>* Eastern Prairie appearance</li> <li>* Sand and Gravel pits.</li> <li>* Golf Course Wild Areas</li> <li>* Sanitary Landfill Cover seeding</li> <li>* Wildlife Areas</li> <li>* OK to substitute Poverty Dropseed in place of Red Top/Ryegrass.</li> <li>* Rates for this mix are for PLS.</li> </ul>
		Indian Grass	10	0.25	
		Switchgrass	10	0.25	
		Little Bluestem	10	0.25	
		Red Top or	1	0.10	
		Perennial Ryegrass	10	0.25	
4	Dry	Flat Pea	25	0.60	<ul style="list-style-type: none"> <li>* Use Cool Season planting procedures</li> <li>* Utility Rights-of-Ways (tends to suppress woody growth)</li> </ul>
		Red Top or	2	0.10	
		Perennial Ryegrass	15	0.35	
5	Dry	Little Bluestem	5	0.10	<ul style="list-style-type: none"> <li>* Use Warm Season planting procedures.</li> <li>* Coastal sites</li> <li>* Rates for Bluestem and Switchgrass are for PLS.</li> </ul>
		Switchgrass	10	0.25	
		Beach Pea*	20	0.45	
		Perennial Ryegrass	10	0.25	
6	Dry - Moist	Red Fescue	10	0.25	<ul style="list-style-type: none"> <li>* Use Cool Season planting procedure.</li> <li>* Provides quick cover but is non-aggressive; will tend to allow indigenous plant colonization.</li> <li>* General erosion control on variety of sites, including forest roads, skid trails and landings.</li> </ul>
		Canada Bluegrass	10	0.25	
		Perennial Ryegrass	10	0.25	
		Red Top	1	0.10	
7	Moist-Wet	Switchgrass	10	0.25	<ul style="list-style-type: none"> <li>* Use Warm Season planting procedure.</li> <li>* Coastal plain/flood plain</li> <li>* Rates for Bluestem and Switchgrass are for PLS.</li> </ul>
		Virginia Wild Rye	5	0.10	
		Big Bluestem	15	0.35	
		Red Top	1	0.10	

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A sample wetlands seed mix developed by The New England Environmental Wetland Plant Nursery is shown on the following page.

### Wetland Seed Mixture

The New England Environmental Wetland Plant Nursery has developed a seed mixture which is specifically designed to be used in wetland replication projects and stormwater detention basins. It is composed of seeds from a variety of indigenous wetland species. Establishing a native wetland plant understory in these areas provides quick erosion control, wildlife food and cover, and helps to reduce the establishment of undesirable invasive species such as Phragmites and purple loosestrife (*Lythrum salicaria*). The species have been selected to represent varying degrees of drought tolerance, and will establish themselves based upon microtopography and the resulting variation in soil moisture.



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Common Name ( <i>Scientific Name</i> )	% in Mix	Comments
Lurid Sedge ( <i>Carex lurida</i> )	30	A low ground cover that tolerates mesic sites in addition to saturated areas; prolific seeder in second growing season.
Fowl Meadow Grass ( <i>Glyceria Canadensis</i> )	25	Prolific seed producer that is a valuable wildlife food source.
Fringed Sedge ( <i>Carex crinita</i> )	10	A medium to large sedge that tolerates saturated areas; good seed producer.
Joe-Pye Weed ( <i>Eupatoriadelphus maculatus</i> )	10	Flowering plant that is valuable for wildlife cover. Grows to 4 feet.
Brook Sedge ( <i>Carex spp., Ovales group</i> )	10	Tolerates a wide range of hydrologic conditions.
Woolgrass ( <i>Scirpus cyperinus</i> )	5	Tolerates fluctuating hydrology.
Boneset ( <i>Eupatorium perfoliatum</i> )	5	Flowering Plant that is valuable for wildlife cover. Grows to 3 feet.
Tussock Sedge ( <i>Carex stricta</i> )	<5	Grows in elevated hummocks on wet sites, may grow rhizomonously on drier sites.
Blue Vervain ( <i>Verbena hastata</i> )	<5	A native plant that bears attractive, blue flowers.

The recommended application rate is one pound per 5,000 square feet when used as an understory cover. This rate should be increased to one pound per 2,500 square feet for detention basins and other sites which require a very dense cover. For best results, a late fall application is recommended. This mix is not recommended for standing water.

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### Maintenance

Inspect seeded areas for failure and make necessary repairs and reseed immediately. Conduct or follow-up survey after one year and replace failed plants where necessary.

If vegetative cover is inadequate to prevent rill erosion, overseed and fertilize in accordance with soil test results.

If a stand has less than 40% cover, reevaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand following seedbed preparation and seeding recommendations, omitting lime and fertilizer in the absence of soil test results. If the season prevents reseeding, mulch or jute netting is an effective temporary cover.

Seeded areas should be fertilized during the second growing season. Lime and fertilize thereafter at periodic intervals, as needed.

### References

North Carolina Department of Environment, Health, and Natural Resources, *Erosion and Sediment Control Field Manual*, Raleigh, NC, February 1991.

Personal communication, Richard J. DeVergilio, USDA, Natural Resources Conservation Service, Amherst, MA.

U.S. Environmental Protection Agency, *Storm Water Management For Construction Activities*, EPA-832-R-92-005, Washington, DC, September, 1992.

Washington State Department of Ecology, *Stormwater Management Manual for the Puget Sound Basin*, Olympia, WA, February, 1992.

### Seeding, Temporary

Planting rapid-growing annual grasses, small grains, or legumes to provide initial, temporary cover for erosion control on disturbed areas.

#### Purpose

To temporarily stabilize areas that will not be brought to final grade for a period of more than 30 working days.

To stabilize disturbed areas before final grading or in a season not suitable for permanent seeding.

Temporary seeding controls runoff and erosion until permanent vegetation or other erosion control measures can be established.

Root systems hold down the soils so that they are less apt to be carried offsite by storm water runoff or wind.

Temporary seeding also reduces the problems associated with mud and dust from bare soil surfaces during construction.



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### Where Practice Applies

On any cleared, unvegetated, or sparsely vegetated soil surface where vegetative cover is needed for less than one year. Applications of this practice include diversions, dams, temporary sediment basins, temporary road banks, and topsoil stockpiles.

Where permanent structures are to be installed or extensive re-grading of the area will occur prior to the establishment of permanent vegetation.

Areas which will not be subjected to heavy wear by construction traffic.

Areas sloping up to 10% for 100 feet or less, where temporary seeding is the only practice used.

### Advantages

This is a relatively inexpensive form of erosion control but should only be used on sites awaiting permanent planting or grading. Those sites should have permanent measures used.

Vegetation will not only prevent erosion from occurring, but will also trap sediment in runoff from other parts of the site.

Temporary seeding offers fairly rapid protection to exposed areas.

### Disadvantages/Problems

Temporary seeding is only viable when there is a sufficient window in time for plants to grow and establish cover. It depends heavily on the season and rainfall rate for success.

If sown on subsoil, growth will be poor unless heavily fertilized and limed. Because overfertilization can cause pollution of stormwater runoff, other practices such as mulching alone may be more appropriate. The potential for over-fertilization is an even worse problem in or near aquatic systems.

Once seeded, areas should not be travelled over.

Irrigation may be needed for successful growth. Regular irrigation is not encouraged because of the expense and the potential for erosion in areas that are not regularly inspected.

### Planning Considerations

Temporary seedings provide protective cover for less than one year. Areas must be reseeded annual or planted with perennial vegetation.

Temporary seeding is used to protect earthen sediment control practices and to stabilize denuded areas that will not be brought into final grade for several weeks or months. Temporary seeding can provide a nurse crop for permanent vegetation, provide residue for soil protection and seedbed preparation, and help prevent dust production during construction.

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Use low-maintenance native species wherever possible.

Planting should be timed to minimize the need for irrigation.

Sheet erosion, caused by the impact of rain on bare soil, is the source of most fine particles in sediment. To reduce this sediment load in runoff, the soil surface itself should be protected. The most efficient and economical means of controlling sheet and rill erosion is to establish vegetative cover. Annual plants which sprout rapidly and survive for only one growing season are suitable for establishing temporary vegetative cover. Temporary seeding is effective when combined with construction phasing so bare areas of the site are minimized at all times.

Temporary seeding may prevent costly maintenance operations on other erosion control systems. For example, sediment basin clean-outs will be reduced if the drainage area of the basin is seeded where grading and construction are not taking place. Perimeter dikes will be more effective if not choked with sediment.

Proper seedbed preparation and the use of quality seed are important in this practice just as in permanent seeding. Failure to carefully follow sound agronomic recommendations will often result in an inadequate stand of vegetation that provides little or no erosion control.

Soil that has been compacted by heavy traffic or machinery may need to be loosened. Successful growth usually requires that the soil be tilled before the seed is applied. Topsoiling is not necessary for temporary seeding; however, it may improve the chances of establishing temporary vegetation in an area.

### Planting Procedures

#### Time of Planting

Planting should preferably be done between April 1 and June 30, and September 1 through September 30. If planting is done in the months of July and August, irrigation may be required. If planting is done between October 1 and March 31, mulching should be applied immediately after planting. If seeding is done during the summer months, irrigation of some sort will probably be necessary.

#### Site Preparation

Before seeding, install needed surface runoff control measures such as gradient terraces, interceptor dike/swales, level spreaders, and sediment basins.

#### Seedbed Preparation

The seedbed should be firm with a fairly fine surface.

Perform all cultural operations across or at right angles to the slope. See **Topsoiling and Surface Roughening** for more information on seedbed preparation. A minimum of 2 to 4 inches of tilled topsoil is required.



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### Liming and Fertilization

Apply uniformly 2 tons of ground limestone per acre (100 lbs. per 1,000 Sq. Ft.) or according to soil test.

Apply uniformly 10-10-10 analysis fertilizer at the rate of 400 lbs. per acre (14 lbs. per 1,000 Sq. Ft.) or as indicated by soil test. Forty percent of the nitrogen should be in organic form.

Work in lime and fertilizer to a depth of 4 inches using any suitable equipment.

Species	Seedings for Temporary Cover		Recommended Seeding Dates
	Seeding Rates lbs/sq.ft. 1,000 Sq.Ft.	Acres	
Annual Ryegrass	1	40	April 1 to June 1 Aug. 15 to Sept. 15
Foxtail Millet	0.7	30	May 1 to June 30
Oats	2	80	April 1 to July 1 August 15 to Sept. 15
Winter Rye	3	120	Aug. 15 to Oct. 15

"Hydro-seeding" applications with appropriate seed-mulch-fertilizer mixtures may also be used.

### Seeding

Select adapted species from the accompanying table.

Apply seed uniformly according to the rate indicated in the table by broadcasting, drilling or hydraulic application.

Cover seeds with suitable equipment as follows:

- ..Rye grass            ¼ inch
- ..Millet                ½ to ¾ inch
- ..Oats                  1 to 1-1/2 inches
- ..Winter rye           1 to 1-1/2 inches.

### Mulch

Use an effective mulch, such as clean grain straw; tacked and/or tied down with netting to protect seedbed and encourage plant growth.

### Common Trouble Points

*Lime and fertilizer not incorporated to at least 4 inches*

May be lost to runoff or remain concentrated near the surface where they may inhibit germination.

*Mulch rate inadequate or straw mulch not tacked down*

Results in poor germination or failure, and erosion damage. Repair damaged areas, reseed and mulch.

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

### *Annual ryegrass used for temporary seeding*

Ryegrass reseeds itself and makes it difficult to establish a good cover of permanent vegetation.

### *Seed not broadcast evenly or rate too low*

Results in patchy growth and erosion.

### **Maintenance**

Inspect within 6 weeks of planting to see if stands are adequate. Check for damage after heavy rains. Stands should be uniform and dense. Fertilize, reseed, and mulch damaged and sparse areas immediately. Tack or tie down mulch as necessary.

Seeds should be supplied with adequate moisture. Furnish water as needed, especially in abnormally hot or dry weather or on adverse sites. Water application rates should be controlled to prevent runoff.

### **References**

Massachusetts Department of Environmental Protection, Office of Watershed Management, Nonpoint Source Program, Massachusetts *Nonpoint Source Management Manual*, Boston, Massachusetts, June, 1993.

North Carolina Department of Environment, Health, and Natural Resources, *Erosion and Sediment Control Field Manual*, Raleigh, NC, February 1991.

U.S. Environmental Protection Agency, *Storm Water Management For Construction Activities*, EPA-832-R-92-005, Washington, DC, September, 1992.

Washington State Department of Ecology, *Stormwater Management Manual for the Puget Sound Basin*, Olympia, WA, February, 1992.

### **Silt Curtain**

A temporary sediment barrier installed parallel to the bank of a stream or lake. Used to contain the sediment produced by construction operations on the bank of a stream or lake and allow for its removal.

### **Where Practice Applies**

The silt curtain is used along the banks of streams or lakes where sediment could pollute or degrade the stream or lake.



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

### **Structural Practices**

**Straw Wattle** – shall be installed as shown on the approved plans to help prevent erosion and sedimentation to the downstream wetland resources on the project.

**Catch Basin** – shall be fitted with “silt sack”-type devices during construction to prevent the accumulation of sediments in the catch basin sumps. Catch basins are to be cleaned as needed during construction using a truck-mounted vacuum device.

**Tracking Pad** - shall be installed in the initial stage of construction as shown on the approved plans to reduce deposition of sediments on the existing paved road.

### **Stormwater Management**

The proposed stormwater management plan in the drainage analysis outlines the impacts of stormwater runoff for the project as it related to the downstream areas of comparison. Elements incorporated in the design of the stormwater management plan include the following best management practices (BMPs):

1. Deep Sump Catch basins with Gas Traps
2. Stormceptor STC900 (Particle Separator)
3. HDPE Subsurface Detention Chambers
4. Bioretention area

Utilization of these BMPs as part of the overall watershed management plan will be instrumental in reducing the peak rate of runoff from the site into the wetland.

## OTHER CONTROLS

### **Waste Disposal:**

**Waste Materials:** all waste material shall be collected and stored in secure metal dumpsters rented from a licensed solid waste management company in Massachusetts. The dumpsters shall meet all local and State solid waste management regulations as outlined in 310 CMR 19.00. All trash and construction debris generated on site shall be disposed of in the dumpsters. The dumpsters shall be emptied as often as necessary during construction and transferred to an approved solid waste facility licensed to accept municipal solid waste and/or construction and demolition debris. No construction waste shall be buried on site. All personnel shall be instructed regarding the correct procedure for waste disposal.

**Hazardous Waste:** All hazardous waste materials shall be disposed of in a manner specified by local or State regulation or by the manufacturer. Site personnel shall be instructed in these practices.

**Sanitary Waste:** All sanitary waste shall be collected from portable units, as needed, by a septage hauler licensed in Massachusetts, in accordance with the requirements of the local Board of Health.



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

### **Offsite Vehicle Tracking:**

Construction entrance and exit shall be via Main Street. Accumulated sediments must be removed on a regular basis from the site entrance and adjacent roadway via street sweeping or hand sweeping operations as necessary.

## **TIMING OF CONTROLS/MEASURES**

As indicated in the Sequence of Major Activities, the installation of erosion and sediment control devices and installation of stabilized construction entrances shall be in place prior to major earth excavation activities. Areas where construction activities are exposed more than two months, but less than 12 months shall be stabilized with the temporary stabilization practices referred to above. Once construction activity has been completed in a particular area, that area shall then be stabilized with permanent seed and mulch.

## **MAINTENANCE/INSPECTION PROCEDURES**

### **Erosion and Sediment Control Inspection and Maintenance Practices**

The following items represent the inspection and maintenance practices that shall be used to maintain sediment and erosion control for the project.

1. All control measures shall be inspected at least once every fourteen (14) days and following any storm event of 0.5 inches or greater.
2. All measures shall be maintained in good working order; if a repair is necessary, it shall be initiated within 24 hours of the report.
3. Built up sediment shall be removed from erosion control when it has reached one-third the height of the wattle.
4. Siltation Control shall be inspected for depth of sediment and tears.
5. The catch basin grate shall be inspected for grate elevation relative to current surface condition; condition of silt sacks, and degree to which sediment has accumulated on the grate and in the sump of the catch basin.
6. Temporary and permanent seeding and any plantings shall be inspected for bare spots, washouts, and healthy growth.
7. A maintenance inspection report shall be prepared following each inspection. A copy of the report form to be completed by the inspector is attached with this document.
8. The Site Contractor/ Project Manager ("Manager") shall select three individuals who will be responsible for inspections, maintenance and repair activities. The "Manager" shall be responsible for filling out the inspection and maintenance report.
9. Personnel selected for inspections and maintenance responsibilities shall receive training from the "Manager". They will be trained in all the inspection and



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

maintenance practices necessary for keeping the erosion and sediment control devices used on site in good working order.

### **Non-Stormwater Discharges**

It is expected that the following non-stormwater discharges will occur from the site during the construction period:

1. Pavement wash waters
2. No non-stormwater discharges shall be directed to unstabilized earth surfaces.

## **INVENTORY FOR POLLUTION PREVENTION PLAN**

The materials or substances listed below are expected to be present on site during construction:

- Bituminous Concrete
- Concrete
- Petroleum Based Products
- Cleaning Solvents
- Adhesives
- Grout
- Masonry Block
- Fertilizers

## **SPILL PREVENTION**

The following are the material management practices that shall be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

### **Equipment fueling and Storage:**

Equipment and associated fuels and lubricants shall be stored in designated locations.

### **Good Housekeeping:**

The following good housekeeping practices must be followed on site during the construction project.

1. A concerted effort shall be made to store only enough product required to complete a particular task
2. All materials stored on site shall be stored in a neat and orderly fashion in their appropriate containers and, if possible, under a roof or other secure enclosure

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

3. Products shall be kept in their original containers with the original manufacture's label
4. Substances shall not be mixed with one another unless recommended by the manufacturer
5. Whenever possible, all of a product shall be used up before disposing of the container
6. Manufacture's recommendations for proper use and disposal shall be followed
7. The site superintendent shall inspect daily to ensure proper use and disposal of materials on site.

### **Hazardous Products:**

Then following practices are intended to reduce the risks associated with hazardous materials.

1. Products shall be kept in original containers unless they are not re-sealable
2. Where feasible, the original labels and material safety data shall be retained, whereas they contain important product information
3. If surplus product must be disposed, follow manufacturer's or local and State recommended methods for proper disposal.

### **PRODUCT SPECIFIC PRACTICES**

The following product specific practices shall be followed on site:

#### **Petroleum Products:**

All on site vehicles shall be monitored for leaks and receive regular preventative maintenance to reduce the risk of leakage. Petroleum products shall be stored in tightly sealed containers which are clearly labeled. Any bituminous concrete or asphalt substances used on site shall be applied according to the manufacturer's recommendations.

#### **Fertilizers:**

Fertilizers shall be applied in the minimum amounts recommended by the manufacturer. Once applied, fertilizers shall be worked into the soil to limit exposure to stormwater. Storage shall be in a covered shed or trailer. The contents of any partially used bags of fertilizers shall be transferred to a sealable plastic bag or bin to avoid spills.

#### **Paints:**

All containers shall be tightly sealed and stored when not required for use. Excess paint shall not be discharged into any catch basin, drain manhole, or any portion of the stormwater management system. Excess paint shall be properly disposed of according to manufacturer's recommendations or State and local regulations.



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

### **Concrete Trucks:**

Concrete trucks shall not be allowed to wash out or discharge surplus concrete or drum wash water on site.

### **SPILL CONTROL PRACTICES**

**The Site Contractor / Project Manager (“Manager”) is responsible for ensuring that materials spill control practices are followed upon commencement of, and during project construction.**

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

1. Manufacturer’s recommended methods for cleanup for on-site materials must be readily available at the construction office, and site personnel shall be made aware of the procedures and the location of the information.
2. Materials and equipment necessary for spill cleanup shall be kept in the material storage area on site. Equipment and materials shall include, but not be limited to brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand sawdust, and plastic and metal trash containers specifically for this purpose.
3. All spills shall be cleaned up immediately after discovery.
4. The spill area shall be kept well ventilated and personnel shall wear appropriate protective clothing to prevent injury from contact with hazardous substance.
5. Spills of toxic or hazardous material shall be reported to the appropriate State and/or local authority in accordance with local and/or State regulations.
6. The spill prevention plan shall be adjusted to include measures to prevent a particular type of spill from reoccurring and how to clean up the spill if there is another occurrence. A description of the spill, what caused it, and the clean up measures shall also be included.
7. The “Manager” shall be the spill preventions and cleanup coordinator. The “Manager” shall designate at least three other site personnel who will be trained in the spill control practices identified above.

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

271 Main Street  
LYNNFIELD, MASSACHUSETTS

## INSPECTION AND MAINTENANCE REPORT FORM

TO BE COMPLETED EVERY 14 DAYS AND WITHIN 24 HOURS OF  
A RAINFALL EVENT OF 0.5 INCHES OR GREATER

Date: \_\_\_\_\_

Inspector: \_\_\_\_\_

Inspector's Title: \_\_\_\_\_

Days Since Last Rainfall: \_\_\_\_\_

Amount of Last Rainfall \_\_\_\_\_

	BMP	BMP Installed? (circle one)		BMP Maintenance Required or Performed? (circle one)		Corrective Action Needed And Notes
		Yes	No	Yes	No	
1	Catch Basin with Gas Trap	Yes	No	Yes	No	
2	Erosion Control Barrier	Yes	No	Yes	No	
3	Siltsack	Yes	No	Yes	No	
4	Stormceptor STC900	Yes	No	Yes	No	
5	Subsurface Chambers	Yes	No	Yes	No	
6	Bioretention area	Yes	No	Yes	No	
7						

Additional Comments: \_\_\_\_\_

\_\_\_\_\_



Project File: LYF-1382  
Main Street  
Lynnfield, Massachusetts 01940

**OPERATION AND MAINTENANCE PLAN  
AND LONG-TERM POLLUTION PREVENTION PLAN**

**#271 Main Street  
Lynnfield, Massachusetts  
Date: August 13, 2020**



Hayes Engineering, Inc.  
603 Salem Street  
Wakefield, MA 01880  
Tel: (781) 246-2800  
Fax : (781) 246-7596

**OPERATION AND MAINTENANCE PLAN  
271 MAIN STREET  
LYNNFIELD, MASSACHUSETTS**

August 13, 2020

**GENERAL**

The management plan incorporates a combination of three or more of the following chain of structural Best Management Practices to improve the water quality of the stormwater runoff from the proposed roadway.

1. Deep Sump Catch Basin with hood
2. Proprietary Particle Separator
3. Subsurface Detention Chambers
4. Roadway Sweeping
5. Bioretention area

These stormwater management facilities have unique characteristics, uses, planning considerations and maintenance requirements. The maintenance requirements, as suggested by the DEP in "Volume 2 Chapter 2: Structural BMP Specifications for the Massachusetts Stormwater Handbook", and the suggested schedules, are summarized in the following sections. It is suggested that the following guidelines be adhered to for a one-year cycle following completion of the project, then adjusted, as necessary, based on the results of the required inspections, unless otherwise stated.

**Deep Sump Catch Basin**

- Inlets should be cleaned a minimum of four (4) times per year and inspected monthly.
- All sediments and hydrocarbons should be properly handled and disposed, in accordance with local, state and federal guidelines and regulations.

**Stormwater Management Areas (Subsurface Detention Chambers)**

Chamber maintenance is not generally required. However, Subsurface systems are prone to failure due to clogging. Regulating the sediment and petroleum product input to the proposed system is the priority maintenance activity. Sediments and any oil spillage should be trapped and removed before they reach the chambers. Catch basin and proprietary particle separator pre-treatment devices which flow into the infiltration system shall be regularly cleaned according to the maintenance schedules provided herein to prevent fine sediments and debris from entering and clogging the subsurface system. Hayes Engineering, Inc. recommends the following inspection schedule to ensure that the chambers function well into the future.

- The Contractor shall verify that the required crushed stone and geotechnical fabric materials are clean and free of sediments and petroleum residue prior to, during and after the chamber system installation.
- Inspections of the chamber system shall be made by a registered profession engineer after every major storm for the first few months after construction to verify that proper function has been achieved. During these initial inspections, water levels in the chambers should be measured and recorded in a permanent log over several days to check the drainage duration and verify that sediments are not accumulating. If ponded



water is present after 24 hours or an accumulation of sediment or debris is noted within the chambers, the Homeowners Association (or designated property manager) and engineer shall determine the cause for this condition and devise an action plan to improve system functionality. Any required maintenance or major repair will be documented in the permanent log book and be completed within seven business days, with a report of such to the Town's Engineer.

- Once the chamber system has been verified to perform as designed, interior chamber conditions shall be inspected at least annually. Post construction inspections (to be conducted through inspection ports) shall consist of documenting interior chamber and bed conditions, measured water depth, and presence of sediment. If inspection indicates that the system is clogged (ponding water present after 24 hours or sediment accumulations present), replacement or major repair actions may be required as determined by a professional engineer. In this case, the Homeowners Association (or designated property manager) and engineer shall determine the cause for this condition and devise an action plan. Any required maintenance or major repair will be documented in the permanent log book and be completed within seven business days, with a report of such to the Town Engineer.
- The inspection and maintenance responsibility for the subsurface system shall belong to the homeowners (or designated property manager).

### **Stormceptor STC 900 Water Quality Chamber**

Regulating the input to the proposed water quality system is the priority maintenance activity. Sediments and any oil spillage should be trapped and removed before they reach the chambers.

- Stormceptor chamber maintenance shall be performed on a regular basis as recommended by the manufacturer (described in the attached excerpt from the Stormceptor Maintenance Brochure obtained from the Stormceptor website ([www.stormceptor.com](http://www.stormceptor.com)) and as summarized below.
- Sediment removal is recommended annually, but is likely to vary widely based on site conditions and loadings. Typical maintenance cleaning can be done with a vacuum truck. Inspection for each of the Stormceptor units will include a quantification of the sediment load and oil and grease volumes. This is easily made from the surface with a tube dipstick with ball valve inserted through the cleanout pipe or other access port. Depths of sediment indicating maintenance are presented in the following table for the various models. Inspection of the internal structure should be part of the routine inspection plan. The units are designed to accept 15% of their capacity in solids annually based on maximum drainage area loading. Removal of sediment, oils, and grease from the system will depend on rates of accumulation. All sediment and oil waste materials shall be disposed of in accordance with all Federal, State, and Local regulations.

**REQUIRED MAINTENANCE \***

<u>Model</u>	<u>Sediment Depth (in.)</u>
Stormceptor Model 900	8*

\* based on 15% of the interceptor's sediment storage

**Roadway Sweeping**

In order to minimize the TSS load to the deep sump catch basins and those BMPs downstream it is planned to sweep the roadway four (4) times per year or more frequently if conditions require. Based upon actual experience and documentation a revised schedule may be submitted to the Town Engineer for approval.

**Bio-Retention Area**

Inspect and remove trash on a monthly basis. Mulch the area annually in the spring. Dead vegetation should be removed twice annually in the early spring and late fall. Remove dead vegetation and prune annually.

**Removal of Siltation Controls**

All siltation controls, including, but not limited to Straw Wattle, shall be removed, with the approval of the Town Engineer, as soon as practical after paving, re-vegetation and total stabilization of the site. Unvegetated areas remaining in the area of the siltation controls shall be loamed and seeded with the appropriate groundcover to ensure re-vegetation as rapidly as possible after the removal of the siltation controls. In the case of all proposed stormwater management facilities, during construction of the proposed stormwater management system the developer shall be the owner and party responsible for maintenance.

**Owner and Maintenance Responsibilities**

Once the development is complete, the homeowners will assume the responsibility of on-going maintenance, as well as the long-term pollution prevention plan, unless other legally-binding agreements are established with another entity.



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 271 Main Street  
 Lynnfield, MA 01940  
 August 13, 2020

**INSPECTION AND MAINTENANCE REPORT FORM  
 271 MAIN STREET  
 LYNNFIELD, MASSACHUSETTS**

TO BE COMPLETED FOR REQUIRED INSPECTIONS AND MAINTENANCE  
 AT THE FREQUENCY SPECIFIED IN THE OPERATION AND MAINTENANCE PLAN

Inspector: \_\_\_\_\_

Date: \_\_\_\_\_

Inspector's Title: \_\_\_\_\_

Days Since Last Rainfall: \_\_\_\_\_

Amount of Last Rainfall: \_\_\_\_\_

	BMP	BMP Installed at Grade? (circle one)		BMP Maintenance Required or performed? (circle one)		Corrective Action Needed And Notes
		Yes	No	Yes	No	
1	Catch Basin inlets And gas traps					
2	Stormceptor STC900					
3	Subsurface Detention					
4	Bioretention area					
5						
6						
7						

Additional Comments:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**LONG TERM POLLUTION PREVENTION PLAN  
271 MAIN STREET  
LYNNFIELD, MASSACHUSETTS**

- Good housekeeping practices: Prevent or reduce pollutant runoff from the project development through the use of street sweeping, erosion control and catch basin cleaning. It should be noted that we are not seeking credit for TSS removal with street sweeping for this project.
- Provisions for storing materials and waste products inside or under cover: All materials stored on site should be stored in a neat and orderly fashion in their appropriate containers and, if possible, under a roof or other secure enclosure. Waste products should be placed in secure receptacles until they are emptied by a licensed solid waste management company in Massachusetts.
- Vehicle washing controls: The project is comprised of single family house lots; therefore, the responsibility lies with the individual homeowners. The homeowners can prevent soap, scum and oily grit from entering the proposed drainage system by washing vehicles on the grass areas instead of the driveway or street.
- Requirements for routine inspections and maintenance of stormwater BMPs: Follow the guidelines outlined above.

- Spill prevention and response plans:

Prevention: All materials stored on site should be stored in a neat and orderly fashion in their appropriate containers and, if possible, under a roof or other secure enclosure. Products should be kept in their original containers with the original manufacturer's label. Products should not be mixed with one another unless recommended by the manufacturer. If possible, all of the product should be used up before disposing of the container. The Manufacturer's recommendations for proper use and disposal should be followed.

Response: Manufacturer's recommended methods for cleanup should be followed. Spills should be cleaned up immediately after discovery. The spill area shall be kept well ventilated and personnel shall wear appropriate protective clothing to prevent injury from contact with a hazardous substance. Spills of toxic or hazardous material shall be reported to the appropriate State and/or local authority in accordance with local and/or State regulations.

- Provisions for maintenance of lawns, gardens, and other landscaped areas: The project is comprised of single family house lots, therefore, these activities should be left up the individual homeowners to schedule and perform.
- Requirements for storage and use of fertilizers, herbicides, and pesticides (Should any questions arise about these materials the Order of Conditions for this project should be consulted if applicable):



Fertilizers: Fertilizers shall be applied in the minimum amounts recommended by the manufacturer. Once applied, fertilizers shall be worked into the soil to limit exposure to stormwater. Storage shall be stored under a roof or other secure enclosure. The contents of any partially used bags of fertilizers shall be transferred to a sealable plastic bag or bin to avoid spills.

Herbicides and Pesticides: Store herbicides and pesticides in original containers that are closed and labeled, in a secure area out of reach of children and pets. Avoid storing in damp areas where containers may become moist or rusty. Herbicides and Pesticides should not be stored near food. Follow the label instructions strictly about where and how much to apply. Do not put herbicides and pesticides in the trash or down the drain. Use rubber gloves when handling and use an appropriate cartridge mask if using products extensively.

- Pet waste management provisions: The project is comprised of single family house lots, therefore, the responsibility lies with the individual homeowners who own pets to perform the clean up and disposal of their pet waste.
- Provisions for operation and management of septic systems: The project is comprised of single family house lots; therefore, the septic systems are privately owned and the responsibility for these activities lies with the individual homeowners to schedule and perform.
- Provisions for solid waste management: Waste products should be placed in secure receptacles until they are emptied by a licensed solid waste management company in Massachusetts.
- Snow disposal and plowing plans relative to Wetland Resource Areas: Snow disposal should be in accordance with the Bureau of Resource Protection Snow Disposal Guidelines, Guideline No. BRPG01-01 effective December 21, 2015, a copy of which is attached.
- Winter Road Salt and/or Sand Use and Storage restrictions:

Road Salt: Use and storage should be in accordance with the Bureau of Resource Protection Drinking Water Program Guidelines on Deicing Chemical (Road Salt) Storage, Guideline No. DWSG97-1 effective December 19, 1997, a copy of which is attached.

Sand: Whenever possible, use of environmentally friendly alternatives, i.e. calcium chloride and sand instead of salt for melting ice should be considered.

- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan: The responsibility lies with the Homeowners Association.

O&M / LPPP  
271 Main Street  
Lynnfield, MA 01940  
August 13, 2020

Effective Date: March 8, 2001

Guideline No. BRPG01-01

Applicability: Applies to all federal, state, regional and local agencies, as well as to private businesses.

Supersedes: BRP Snow Disposal Guideline BRPG97-1 issued 12/19/97, and all previous snow disposal guidance

Approved by: Glenn Haas, Assistant Commissioner for Resource Protection

**PURPOSE:** To provide guidelines to all government agencies and private businesses regarding snow disposal site selection, site preparation and maintenance, and emergency snow disposal options that are acceptable to the Department of Environmental Protection, Bureau of Resource Protection.

**APPLICABILITY:** These Guidelines are issued by the Bureau of Resource Protection on behalf of all Bureau Programs (including Drinking Water Supply, Wetlands and Waterways, Wastewater Management, and Watershed Planning and Permitting). They apply to public agencies and private businesses disposing of snow in the Commonwealth of Massachusetts.

## INTRODUCTION

Finding a place to dispose of collected snow poses a challenge to municipalities and businesses as they clear roads, parking lots, bridges, and sidewalks. While we are all aware of the threats to public safety caused by snow, collected snow that is contaminated with road salt, sand, litter, and automotive pollutants such as oil also threatens public health and the environment.

As snow melts, road salt, sand, litter, and other pollutants are transported into surface water or through the soil where they may eventually reach the groundwater. Road salt and other pollutants can contaminate water supplies and are toxic to aquatic life at certain levels. Sand washed into waterbodies can create sand bars or fill in wetlands and ponds, impacting aquatic life, causing flooding, and affecting our use of these resources.

There are several steps that communities can take to minimize the impacts of snow disposal on public health and the environment. These steps will help communities avoid the costs of a contaminated water supply, degraded waterbodies, and flooding. Everything we do on the land has the potential to impact our water resources. Given the authority of local government over the use of the land, municipal officials and staff have a critically important role to play in protecting our water resources.

The purpose of these guidelines is to help municipalities and businesses select, prepare, and maintain appropriate snow disposal sites before the snow begins to accumulate through the winter.



## RECOMMENDED GUIDELINES

These snow disposal guidelines address: (1) site selection; (2) site preparation and maintenance; and (3) emergency snow disposal.

### 1. SITE SELECTION

The key to selecting effective snow disposal sites is to locate them adjacent to or on pervious surfaces in upland areas away from water resources and wells. At these locations, the snow meltwater can filter in to the soil, leaving behind sand and debris which can be removed in the springtime. The following areas should be avoided:

- Avoid dumping of snow into any waterbody, including rivers, the ocean, reservoirs, ponds, or wetlands. In addition to water quality impacts and flooding, snow disposed of in open water can cause navigational hazards when it freezes into ice blocks.
- Do not dump snow within a Zone II or Interim Wellhead Protection Area (IWPA) of a public water supply well or within 75 feet of a private well, where road salt may contaminate water supplies.
- Avoid dumping snow on MassDEP-designated high and medium-yield aquifers where it may contaminate groundwater (see the next page for information on ordering maps from MassGIS showing the locations of aquifers, Zone II's, and IWPA's in your community).
- Avoid dumping snow in sanitary landfills and gravel pits. Snow meltwater will create more contaminated leachate in landfills posing a greater risk to groundwater, and in gravel pits, there is little opportunity for pollutants to be filtered out of the meltwater because groundwater is close to the land surface.
- Avoid disposing of snow on top of storm drain catch basins or in stormwater drainage swales or ditches. Snow combined with sand and debris may block a storm drainage system, causing localized flooding. A high volume of sand, sediment, and litter released from melting snow also may be quickly transported through the system into surface water.

#### Site Selection Procedures

1. It is important that the municipal Department of Public Works or Highway Department, Conservation Commission, and Board of Health work together to select appropriate snow disposal sites. The following steps should be taken:
2. Estimate how much snow disposal capacity is needed for the season so that an adequate number of disposal sites can be selected and prepared.

3. Identify sites that could potentially be used for snow disposal such as municipal open space (e.g., parking lots or parks).
4. Sites located in upland locations that are not likely to impact sensitive environmental resources should be selected first.
5. If more storage space is still needed, prioritize the sites with the least environmental impact (using the site selection criteria, and local or MassGIS maps as a guide).

#### MassGIS Maps of Open Space and Water Resources

If local maps do not show the information you need to select appropriate snow disposal sites, you may order maps from MassGIS (Massachusetts Geographic Information System) which show publicly owned open spaces and approximate locations of sensitive environmental resources (locations should be field-verified where possible). Different coverages or map themes depicting sensitive environmental resources are available from MassGIS on the map you order. At a minimum, you should order the Priority Resources Map. The Priority Resources Map includes aquifers, public water supplies, MassDEP-approved Zone II's, Interim Wellhead Protection Areas, Wetlands, Open Space, Areas of Critical Environmental Concern, NHESP Wetlands Habitats, MassDEP Permitted Solid Waste facilities, Surface Water Protection areas (Zone A's) and base map features. The cost of this map is \$25.00. Other coverages or map themes you may consider, depending on the location of your city or town, include Outstanding Resource Waters and MassDEP Eelgrass Resources. These are available at \$25.00 each, with each map theme being depicted on a separate map. Maps should be ordered from [MassGIS](#). Maps may also be ordered by fax at 617-626-1249 (order form available from the MassGIS web site) or mail. For further information, contact MassGIS at 617-626-1189.

## 2. SITE PREPARATION AND MAINTENANCE

In addition to carefully selecting disposal sites before the winter begins, it is important to prepare and maintain these sites to maximize their effectiveness. The following maintenance measures should be undertaken for all snow disposal sites:

- A silt fence or equivalent barrier should be placed securely on the downgradient side of the snow disposal site.
- To filter pollutants out of the meltwater, a 50-foot vegetative buffer strip should be maintained during the growth season between the disposal site and adjacent waterbodies.
- Debris should be cleared from the site prior to using the site for snow disposal.
- Debris should be cleared from the site and properly disposed of at the end of the snow season and no later than May 15.



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August 13, 2020

### 3. EMERGENCY SNOW DISPOSAL

As mentioned earlier, it is important to estimate the amount of snow disposal capacity you will need so that an adequate number of upland disposal sites can be selected and prepared.

If despite your planning, upland disposal sites have been exhausted, snow may be disposed of near waterbodies. A vegetated buffer of at least 50 feet should still be maintained between the site and the waterbody in these situations. Furthermore, it is essential that the other guidelines for preparing and maintaining snow disposal sites be followed to minimize the threat to adjacent waterbodies.

Under extraordinary conditions, when all land-based snow disposal options are exhausted, disposal of snow that is not obviously contaminated with road salt, sand, and other pollutants may be allowed in certain waterbodies under certain conditions. In these dire situations, notify your Conservation Commission and the appropriate MassDEP Regional Service Center before disposing of snow in a waterbody.

Use the following guidelines in these emergency situations:

- Dispose of snow in open water with adequate flow and mixing to prevent ice dams from forming.
- Do not dispose of snow in saltmarshes, vegetated wetlands, certified vernal pools, shellfish beds, mudflats, drinking water reservoirs and their tributaries, Zone IIs or IWPA's of public water supply wells, Outstanding Resource Waters, or Areas of Critical Environmental Concern.
- Do not dispose of snow where trucks may cause shoreline damage or erosion.
- Consult with the municipal Conservation Commission to ensure that snow disposal in open water complies with local ordinances and bylaws.

#### FOR MORE INFORMATION

If you need more information, contact one of MassDEP's Regional Service Centers:

Northeast Regional Office, Wilmington, 978-694-3200  
Southeast Regional Office, Lakeville, 508-946-2714  
Central Regional Office, Worcester, 508-792-7683  
Western Regional Office, Springfield, 413-755-2214

or

Call Thomas Maguire of DEP's Bureau of Resource Protection in Boston at 617-292-5602.

O&M / LPPP  
271 Main Street  
Lynnfield, MA 01940  
August 13, 2020

Effective Date: December 19, 1997

Guideline No. DWSG97-1

Applicability: Applies to all parties storing road salt or other chemical deicing agents.

Supersedes: Fact Sheet: DEICING CHEMICAL (ROAD SALT) STORAGE (January 1996)

Approved by: Arleen O'Donnell, Asst. Commissioner for Resource Protection

**PURPOSE:** To summarize salt storage prohibition standards around drinking water supplies and current salt storage practices.

**APPLICABILITY:** These guidelines are issued on behalf of the Bureau of Resource Protection's Drinking Water Program. They apply to all parties storing road salt or other chemical deicing agents.

### **I. The Road Salt Problem:**

Historically, there have been incidents in Massachusetts where improperly stored road salt has polluted public and private drinking water supplies. Recognizing the problem, state and local governments have taken steps in recent years to remediate impacted water supplies and to protect water supplies from future contamination. As a result of properly designing storage sheds, new incidents are uncommon. These guidelines summarize salt storage prohibition standards around drinking water supplies and current salt storage practices.

### **II. Salt Pile Restrictions in Water Supply Protection Areas:**

Uncovered storage of salt is forbidden by Massachusetts General Law Chapter 85, section 7A in areas that would threaten water supplies. The Drinking Water Regulations, 310 CMR 22.21(2)(b), also restrict deicing chemical storage within wellhead protection areas (Zone I and Zone II) for public water supply wells, as follows: "storage of sodium chloride, chemically treated abrasives or other chemicals used for the removal of ice and snow on roads [are prohibited], unless such storage is within a structure designed to prevent the generation and escape of contaminated runoff or leachate." For drinking water reservoirs, 310 CMR 22.20C prohibits, through local bylaw, uncovered or uncontained storage of road or parking lot de-icing and sanding materials within Zone A at new reservoirs and at those reservoirs increasing their withdrawals under MGL Chapter 21G, the Water Management Act.

For people on a low-sodium diet, 20 mg/L of sodium in drinking water is consistent with the bottled water regulations' meaning of "sodium free." At 20 mg/L, sodium contributes 10% or less to the sodium level in people on a sodium-restricted diet. For more information contact: Catherine Sarafinas at 617-556-1070 or [catherine.sarafinas@state.ma.us](mailto:catherine.sarafinas@state.ma.us), or Suzanne Robert at 617-292-5620 or [suzanne.robert@state.ma.us](mailto:suzanne.robert@state.ma.us).



O&M / LPPP  
271 Main Street  
Lynnfield, MA 01940  
August 13, 2020

### **III. Salt Storage Best Management Practices (BMP):**

Components of an "environment-friendly" roadway deicing salt storage facility include:

- the right site = a flat site;
- adequate space for salt piles;
- storage on a pad (impervious/paved area);
- storage under a roof; and
- runoff collection/containment.

For more information, see The Salt Storage Handbook, 6th ed. Virginia: Salt Institute, 2006 (phone 703-549-4648 or <http://www.saltinstitute.org/publication/safe-and-sustainable-snowfighting/>).

### **IV. Salt Storage Practices of the Massachusetts Highway Department:**

The Massachusetts Highway Department (MHD) has 216 permanent salt storage sheds at 109 locations in the state. On leased land and state land under arteries and ramps, where the MHD cannot build sheds, salt piles are stored under impermeable material. This accounts for an additional 15 sites. The MHD also administers a program to assist municipalities with the construction of salt storage sheds. Of 351 communities, 201 municipalities have used state funds for salt storage facilities.

For more information about MHD's salt storage facilities, contact Paul Brown at the Massachusetts Highway Department, 10 Park Plaza, Boston, MA 02116 (phone 617-973-7792).

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

Permanent Seeding Mixtures					
Seed, Pounds per:					
Mix	Site	Seed Mixture	Acre	1,000 sf	Remarks
8	Moist	Creeping Bentgrass	5	0.10	* Use Cool Season planting procedures. * Pond Banks * Waterways/ditch banks
		Wet	Fringed Bromegrass	5	
		Fowl Meadowgrass	5	0.10	
		Bluejoint Reedgrass or Rice Cutgrass	2	0.10	
		Perennial Ryegrass	10	0.25	
9	Moist	Red Fescue	5	0.10	*Salt Tolerant * Fescue and Bentgrass provide low growing appearance, while Switchgrass provides tall cover for wildlife.
	Wet	Creeping Bentgrass	2	0.10	
		Switchgrass	8	0.20	
		Perennial Ryegrass	10	0.25	
10	Moist	Red Fescue	5	0.10	* Use Cool Season planting procedure. * Trefoil requires inoculation with nitrogen fixing bacteria. * Suitable for forest access roads, skid trails and other partial shade situations.
	Wet	Creeping Bentgrass	5	0.10	
		Virginia Wild Rye	8	0.20	
		Wood Reed Grass*	1	0.10	
		Showy Tick Trefoil*	1	0.10	
11	Moist	Creeping Bentgrass	5	0.10	* Use Cool Season planting procedure. * Suitable for waterways, pond or ditch banks. * Trefoil requires inoculation with nitrogen fixing bacteria.
	Wet	Bluejoint Reed Grass	1	0.10	
		Virginia Wild Rye	3	0.10	
		Fowl Meadow Grass	10	0.25	
		Showy Tick Trefoil*	1	0.10	
		Red Top	1	0.10	
12	Wet	Blue Joint Reed Grass	1	0.10	* Use Cool Season planting procedure. * OK to seed in saturated soil conditions, but not in standing water. * Suitable as stabilization seeding for created wetland. * All species in this mix are native to Massachusetts.
		Canada Manna Grass	1	0.10	
		Rice Cut Grass	1	0.10	
		Creeping Bent Grass	5	0.10	
		Fowl Meadow Grass	5	0.10	
13	Dry -	American Beachgrass	18*	18'	*Vegetative planting with dormant culms, 3-5 culms per planting centers
	Moist			centers	
14	Inter-	Smooth Cordgrass	12-18*	12-18*	* Vegetative planting with transplants. centers
	Tidal	Saltmeadow Cordgrass		centers	



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

### Notes:

\* Species such as Tumble Lovegrass, Fringed Bromegrass, Wood Reedgrass, Bush Clover and Beach Pea, while known to be commercially available from specific seed suppliers, may not always be available from your particular seed suppliers. The local Natural Resources Conservation Service office may be able to help with a source of supply. In the event a particular species listed in a mix can not be obtained, however, it may be possible to substitute another species.

*Seed mixtures by courtesy of Natural Resources Conservation Service, Amherst, MA.*

### (PLS) Pure Live Seed

Warm Season grass seed is sold and planted on the basis of pure live seed. An adjustment is made to the bulk rate of the seed to compensate for inert material and non-viable seed. Percent of pure live seed is calculated by multiplying the percent purity by the percent germination; (% purity) x (% germination) = percent PLS.

For example, if the seeding rate calls for 10 lbs./acre PLS and the seed lot has a purity of 70% and germination of 75%, the PLS factor is:

$$(.70 \times .75) = .53$$

$$10 \text{ lbs. divided by } .53 = \text{approx. } 19 \text{ lbs.}$$

Therefore, 19 lbs of seed from the particular lot will need to be applied to obtain 10 lbs. of pure live seed.

### Special Note

Tall Fescue, Reed Canary Grass, Crownvetch and Birdsfoot Trefoil are no longer recommended for general erosion control use in Massachusetts due to the invasive characteristics of each. If these species are used, it is recommended that the ecosystem of the site be analyzed for the effects species invasiveness may impose. The mixes listed in the above mixtures include either species native to Massachusetts or non-native species that are not perceived to be invasive, as per the Massachusetts Native Plant Advisory Committee.

### Wetlands Seed Mixtures

For newly created wetlands, a wetlands specialist should design plantings to provide the best chance of success. Do not use introduced, invasive plants like reed canarygrass (*Phalaris arundinacea*) or purple loosestrife (*Lythrum salicaria*). Using plants such as these will cause many more problems than they will solve.

The following grasses all thrive in wetland situations:

- ☞ Fresh Water Cordgrass (*Spartina pectinata*)
- ☞ Marsh/Creeping Bentgrass (*Agrostis stolonifera*, var. *Palustris*)
- ☞ Broomsedge (*Andropogon virginicus*)
- ☞ Fringed Bromegrass (*Bromus ciliatus*)
- ☞ Blue Joint Reed Grass (*Calamagrostis canadensis*)
- ☞ Fowl Meadow Grass (*Glyceria striata*)
- ☞ Riverbank Wild Rye (*Elymus riparius*)
- ☞ Rice Cutgrass (*Leersia oryzoides*)
- ☞ Stout Wood Reed (*Cinna arundinacea*)
- ☞ Canada Manna Grass (*Glyceria canadensis*)

# PLANS



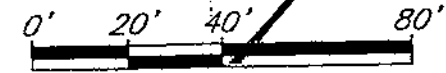
# Watershed Map in LYNNFIELD, MASS.

Hayes Engineering, Inc.  
Civil Engineers & Land Surveyors  
603 Salem Street  
Wakefield, MA 01880

Telephone: 781.246.2800  
Facsimile: 781.246.7596  
www.hayeseng.com

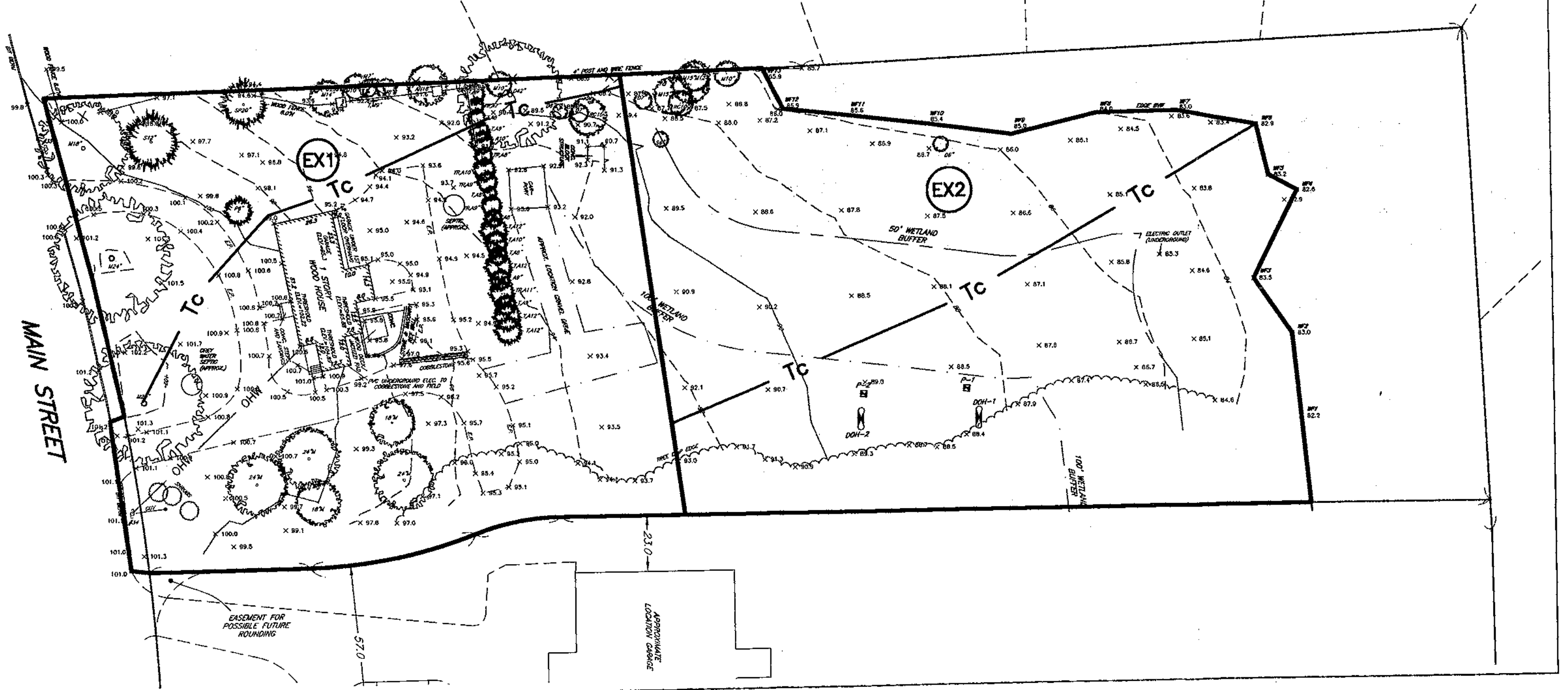
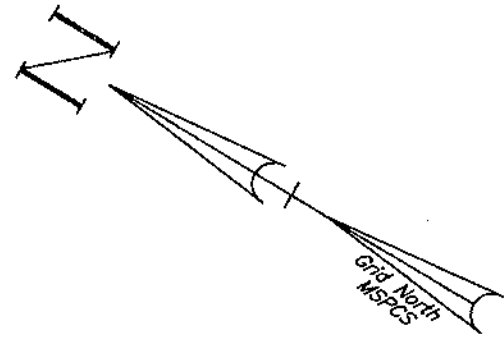
*Hayes*

Scale: 1" = 40'



August 13, 2020

## Existing Conditions



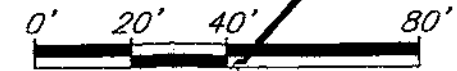
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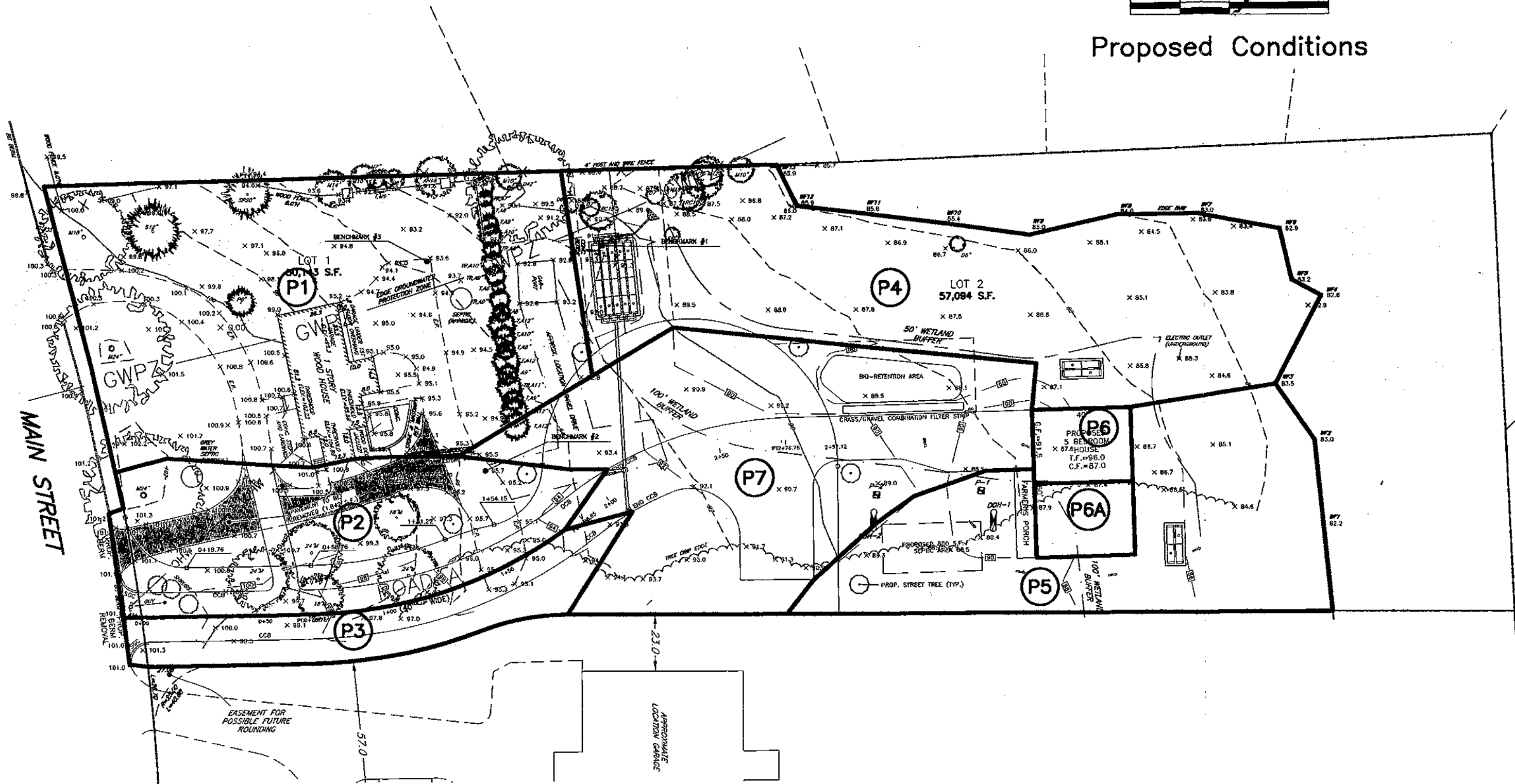
*Hayes*

Scale: 1" = 40'



August 13, 2020

## Proposed Conditions



M:\L\12012020\main\MSPCS.dwg, 8/17/2020 9:30:50 AM, ERI



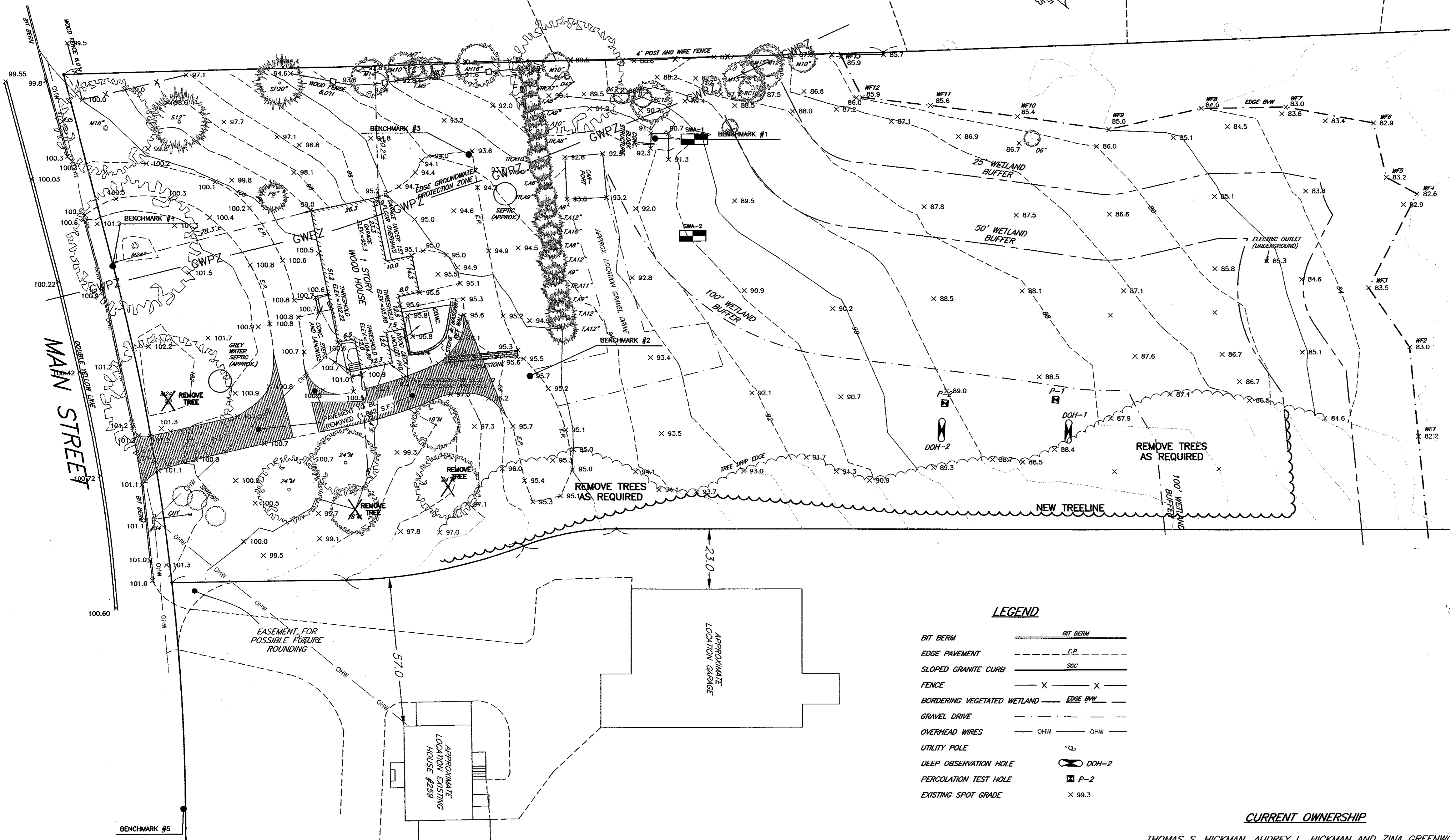
**TREE ABBREVIATIONS:**  
 A - ARBOR  
 AH - ASH  
 D - DECIDUOUS  
 M - MAPLE  
 RC - RUM CHERRY  
 S - SUMAC  
 SP - SPRUCE  
 T - TWIN  
 TR - TRIPLE  
 P - PINE

CLERK'S CERTIFICATION ON THE PLAN

DATE: September 28, 2022

I, Linda Emerson, Town Clerk of the Town of Lynnfield, do hereby certify that the notice of approval of this plan by the planning board has been received and recorded at this office and that notice of appeal was received during the 20 days next to after such receipt and recording of said notice, which appeal has been dismissed with prejudice pursuant to a stipulation of dismissal, in Essex Superior Court civil action number 21 77 C V 00523.

Linda A. Emerson  
 LINDA EMERSON, TOWN CLERK



**LEGEND**

BIT BERM	---
EDGE PAVEMENT	---
SLOPED GRANITE CURB	---
FENCE	X - X - X
BORDERING VEGETATED WETLAND	---
GRAVEL DRIVE	---
OVERHEAD WIRES	OHW
UTILITY POLE	⊙
DEEP OBSERVATION HOLE	⊙ DOH-2
PERCOLATION TEST HOLE	⊙ P-2
EXISTING SPOT GRADE	X 99.3

--- DENOTES STONE BOUND TO BE SET BY OWNER UNLESS OTHERWISE NOTED. (TO BE SUPERVISED BY A MASSACHUSETTS PROFESSIONAL LAND SURVEYOR)

**EXISTING CONDITIONS & DEMOLITION PLAN**

Seal: PETER J. O'GREN, CIVIL ENGINEER, No. 27145, REG. PROFESSIONAL ENGINEER, 9/23/22

Scale: 0' 10' 20' 40' 60'

**DEFINITIVE PLAN**  
 ROAD A  
 LYNNFIELD, MASS.  
 ASSESSORS MAP 33 LOT 288

DEVELOPER/OWNER: AUDREY HICKMAN, 271 MAIN STREET, LYNNFIELD, MA 01940

Engineer: Hayes Engineering, Inc., 603 Salem Street, Wakefield, Mass. 01880, www.hayeseng.com

Scale: 1"=20' August 13, 2020

10		
9		
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7		
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4	Clerk Certification Change	9-28-2022
3	Peer Review Comments	5-5-2021
2	Peer Review Comments	4-28-2021
1	Peer Review Comments	3-24-2021
No.	Revision	Date

Application Filed: Oct 30, 2020  
 Final Plan Filed: Sept 28, 2022  
 Hearing Date: Nov 18, 2020  
 Plan Approved: May 5, 2021  
 Plan Signed: Sept 28, 2022

**GENERAL NOTES:**

- ALL CLEARING, EXCAVATING, AND FILLING WILL BE PERFORMED IN ACCORDANCE WITH SECTION 8.2.1 OF THE RULES & REGULATIONS OF THE PLANNING BOARD GOVERNING THE SUBDIVISION OF LAND IN LYNNFIELD, MASSACHUSETTS (R&R) SECTION 7.5
- CONTOURS IN WETLAND AREA AND UNDER TREE COVER TAKEN FROM LIDAR.

**BENCHMARKS: DATUM NAVD88**

- #1 TOP DRILL HOLE IN CONCRETE ELEVATION=92.38
- #2 TOP TACK IN PAVEMENT ELEVATION=95.72
- #3 TOP TACK IN PAVEMENT ELEVATION=93.78
- #4 TOP STONE BOUND (DOWN 1') ELEVATION=101.02
- #5 TOP STONE BOUND (DOWN 3') ELEVATION=99.37

**REQUESTED WAIVERS**

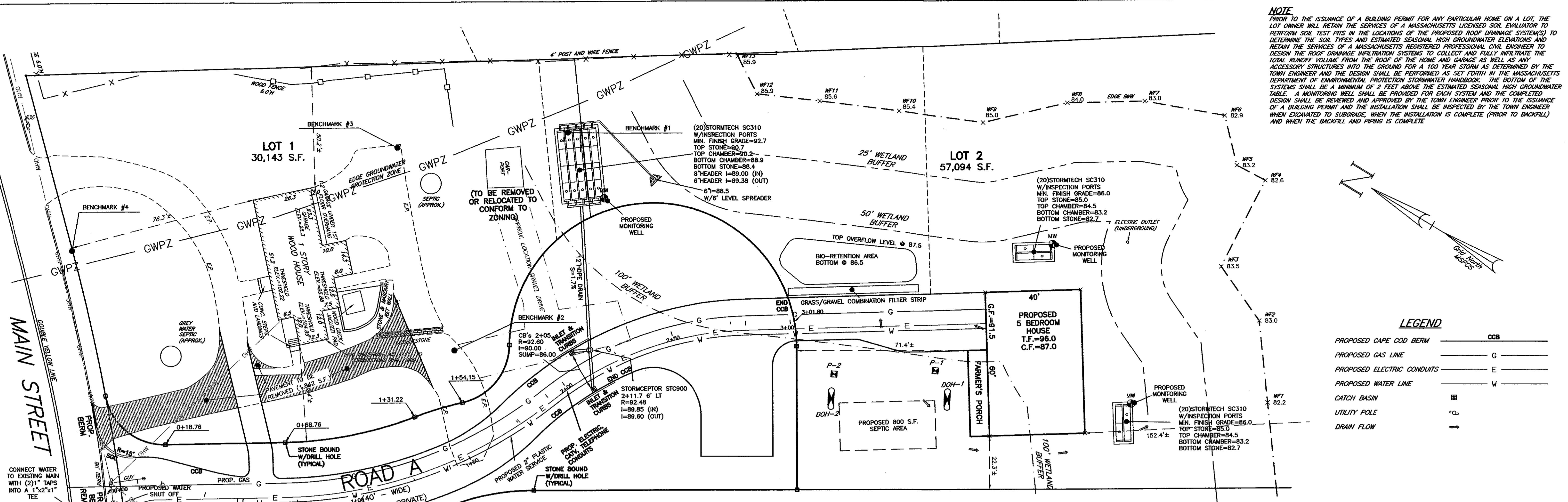
PLAN WAIVERS:  
 375-B.4.B(8) TO NOT SHOW REGULATED RESOURCES WITHIN 150' FROM THE SUBDIVISION. RESOURCES ARE SHOWN ON THE SUBDIVISION PROPERTY.

I CERTIFY THAT I HAVE CONFORMED WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS IN PREPARING THIS PLAN.

Hayes Engineering, Inc.

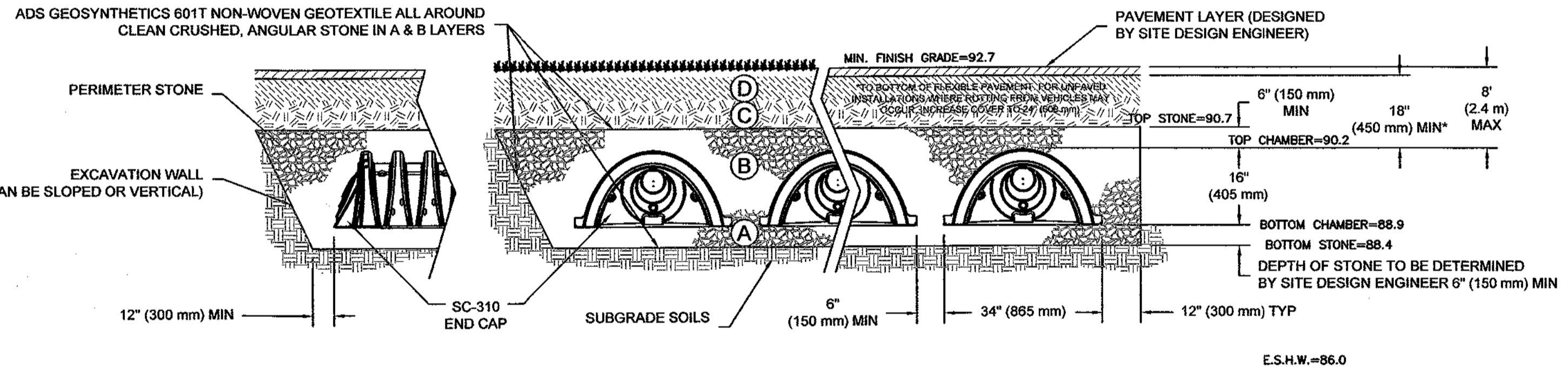


**NOTE**  
 PRIOR TO THE ISSUANCE OF A BUILDING PERMIT FOR ANY PARTICULAR HOME ON A LOT, THE LOT OWNER WILL RETAIN THE SERVICES OF A MASSACHUSETTS LICENSED SOIL EVALUATOR TO PERFORM SOIL TEST PITS IN THE LOCATIONS OF THE PROPOSED ROOF DRAINAGE SYSTEM(S) TO DETERMINE THE SOIL TYPES AND ESTIMATED SEASONAL HIGH GROUNDWATER ELEVATIONS AND RETAIN THE SERVICES OF A MASSACHUSETTS REGISTERED PROFESSIONAL CIVIL ENGINEER TO DESIGN THE ROOF DRAINAGE INFILTRATION SYSTEMS TO COLLECT AND FULLY INFILTRATE THE TOTAL RUNOFF VOLUME FROM THE ROOF OF THE HOME AND GARAGE AS WELL AS ANY ACCESSORY STRUCTURES INTO THE GROUND FOR A 100 YEAR STORM AS DETERMINED BY THE TOWN ENGINEER AND THE DESIGN SHALL BE PERFORMED AS SET FORTH IN THE MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION STORMWATER HANDBOOK. THE BOTTOM OF THE SYSTEMS SHALL BE A MINIMUM OF 2 FEET ABOVE THE ESTIMATED SEASONAL HIGH GROUNDWATER TABLE. A MONITORING WELL SHALL BE PROVIDED FOR EACH SYSTEM AND THE COMPLETED DESIGN SHALL BE REVIEWED AND APPROVED BY THE TOWN ENGINEER PRIOR TO THE ISSUANCE OF A BUILDING PERMIT AND THE INSTALLATION SHALL BE INSPECTED BY THE TOWN ENGINEER WHEN EXCAVATED TO SUBGRADE, WHEN THE INSTALLATION IS COMPLETE (PRIOR TO BACKFILL) AND WHEN THE BACKFILL AND PIPING IS COMPLETE.



**LEGEND**

PROPOSED CAPE COD BERM	CCB
PROPOSED GAS LINE	G
PROPOSED ELECTRIC CONDUITS	E
PROPOSED WATER LINE	W
CATCH BASIN	CB
UTILITY POLE	U
DRAIN FLOW	→



**STORMTECH SC-310 CROSS SECTION**  
 NOT TO SCALE

--- DENOTES STONE BOUND TO BE SET BY OWNER UNLESS OTHERWISE NOTED (TO BE SUPERVISED BY A MASSACHUSETTS PROFESSIONAL LAND SURVEYOR)

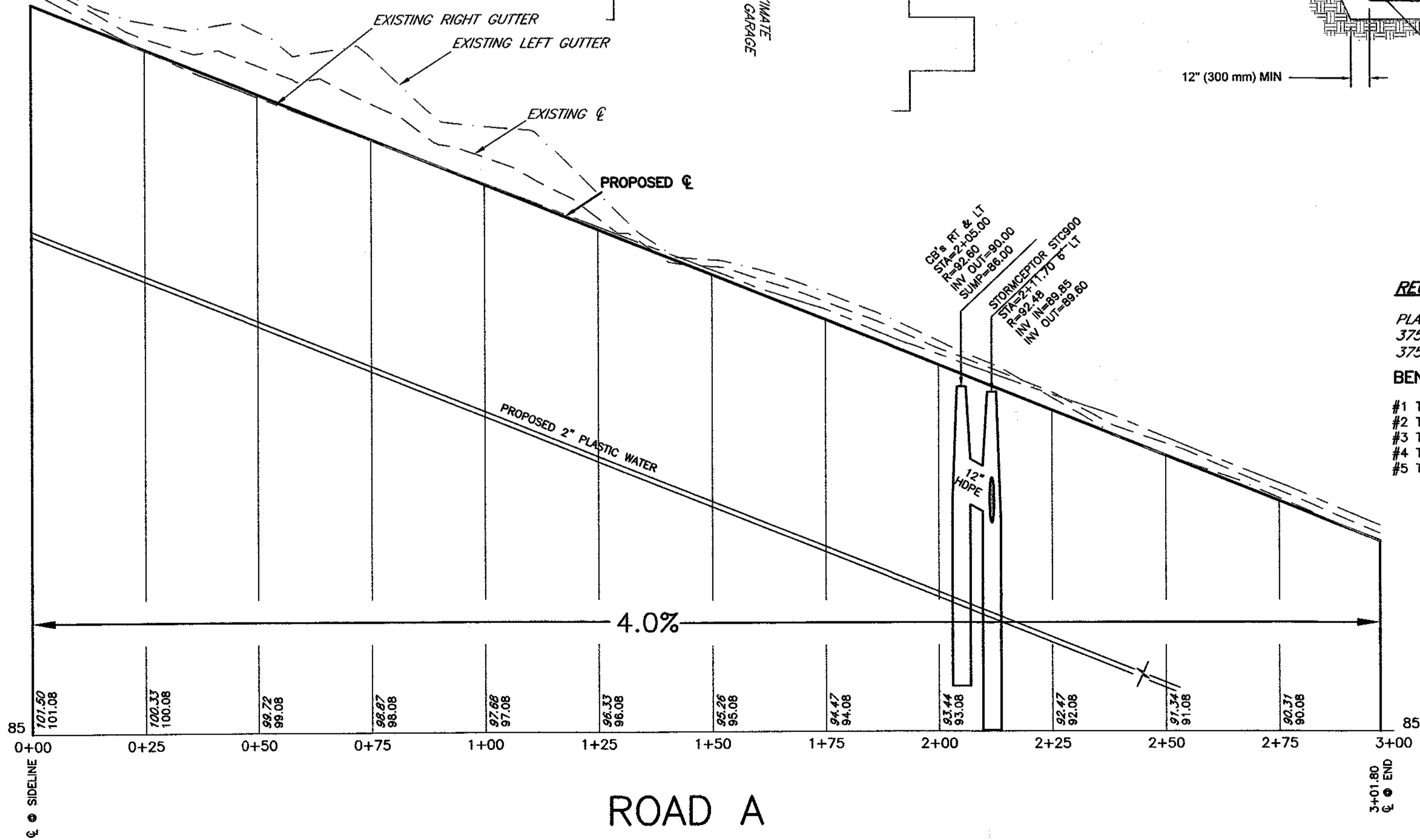
**CLERK'S CERTIFICATION ON THE PLAN**  
 DATE: September 28, 2022

I, Linda Emerson, Town Clerk of the Town of Lynnfield, do hereby certify that the notice of approval of this plan by the planning board has been received and recorded at this office and that notice of appeal was received during the 20 days next to after such receipt and recording of said notice, which appeal has been dismissed with prejudice pursuant to a stipulation of dismissal, in Essex Superior Court civil action number 21 77 C V 00523.

*Linda A. Emerson*  
 LINDA EMERSON, TOWN CLERK

I CERTIFY THAT I HAVE CONFORMED WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS IN PREPARING THIS PLAN.

*Hayes Engineering, Inc.*  
 HAYES ENGINEERING, INC.



**REQUESTED WAIVERS**

- PLAN WAIVERS:**  
 375-6.4.0(1)(d) SCALE OF THE PLAN IS 1"=20' HORIZONTAL AND 1"=2' VERTICAL.  
 375-6.4.0(2)(d) TO NOT SHOW ADJUTING HOUSES
- BENCHMARKS: DATUM NAVD88**
- #1 TOP DRILL HOLE IN CONCRETE ELEVATION=92.38
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  - #5 TOP STONE BOUND (DOWN 3') ELEVATION=99.37

**CURRENT OWNERSHIP**

THOMAS S. HICKMAN, AUDREY L. HICKMAN AND ZINA GREENWOOD  
 DEED REFERENCE: BOOK 10853 PAGE 62 ESSEX SOUTH  
 REGISTRY OF DEEDS  
 PLAN REFERENCE: PLAN BOOK 117 PLAN 7 ESSEX SOUTH  
 REGISTRY OF DEEDS  
 ASSESSOR'S PARCEL ID: 0033-0000-0288  
 #271 MAIN STREET

**PLAN AND PROFILE**

Seal: PETER J. OGDEN, CIVIL ENGINEER, No. 27145

*Hayes*

0' 10' 20' 40' 60'

**DEFINITIVE PLAN**  
 ROAD A  
 LYNNFIELD, MASS.  
 ASSESSORS MAP 33 LOT 288

DEVELOPER/OWNER: AUDREY HICKMAN, 271 MAIN STREET, LYNNFIELD, MA 01940

Engineer: Hayes Engineering, Inc., 603 Salem Street, Wakefield, Mass. 01880, www.hayeseng.com

Scale: 1"=20'(HOR.) & 2'(VERT.) August 13, 2020

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 Plan Signed: SEPT 28 2022

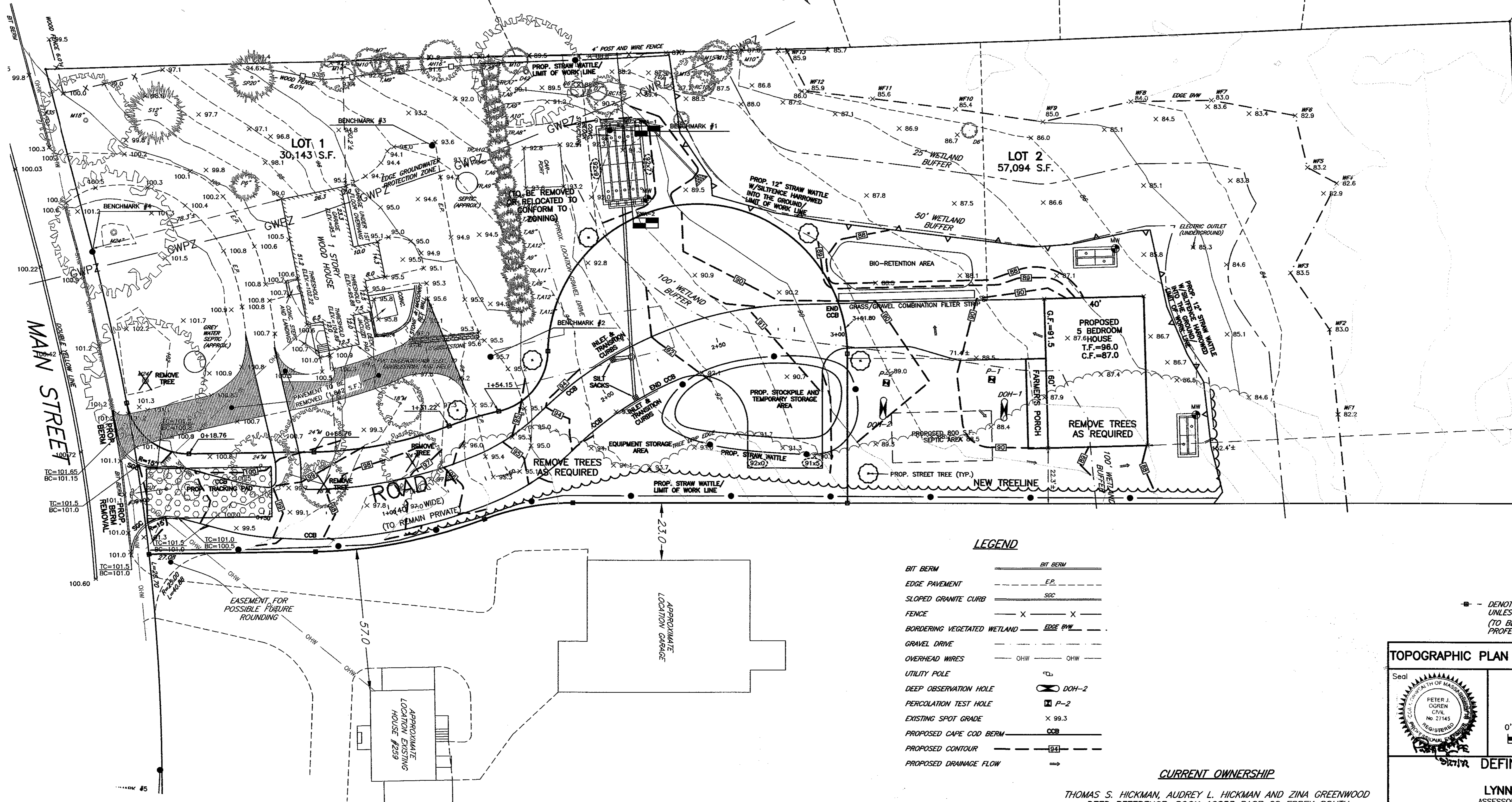
PROFILE SHEET 1 OF 1  
 SHEET 3 OF 6



DATE: September 28, 2022

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Linda A. Emerson  
LINDA EMERSON, TOWN CLERK



LEGEND

- BIT BERM
- EDGE PAVEMENT
- SLOPED GRANITE CURB
- FENCE
- BORDERING VEGETATED WETLAND
- GRAVEL DRIVE
- OVERHEAD WIRES
- UTILITY POLE
- DEEP OBSERVATION HOLE
- PERCOLATION TEST HOLE
- EXISTING SPOT GRADE
- PROPOSED CAPE COD BERM
- PROPOSED CONTOUR
- PROPOSED DRAINAGE FLOW

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DEED REFERENCE: BOOK 10853 PAGE 62 ESSEX SOUTH  
REGISTRY OF DEEDS  
PLAN REFERENCE: PLAN BOOK 117 PLAN 7 ESSEX SOUTH  
REGISTRY OF DEEDS  
ASSESSOR'S PARCEL ID: 0033-0000-0288  
#271 MAIN STREET

NOTE: ANY AREA THAT HAS BEEN DISTURBED AND WILL BE EXPOSED FOR MORE THAN 10 DAYS SHALL BE MULCHED OR OTHERWISE TREATED TO PREVENT EROSION. IF EXPOSURE WILL BE MORE THAN 30 DAYS, THE AREA SHALL BE COVERED WITH ANNUAL RYE.

THE TRACKING PAD SHALL BE INSTALLED IN THE INITIAL STAGE OF CONSTRUCTION.

ACCUMULATED SEDIMENTS MUST BE REMOVED ON A REGULAR BASIS FROM THE SITE ENTRANCE AND ADJACENT ROADWAY VIA STREET SWEEPING OR HAND SWEEPING AS NECESSARY.

EROSION CONTROLS SHALL BE INSPECTED AND MAINTAINED AT LEAST EVERY 14 DAYS AND FOLLOWING ANY STORM EVENT OF 0.5 INCHES OR GREATER.

NOTE: ALL DISTURBED AREAS TO BE LOAMED AND HYDRO-SEEDED.

BENCHMARKS: DATUM NAVD88

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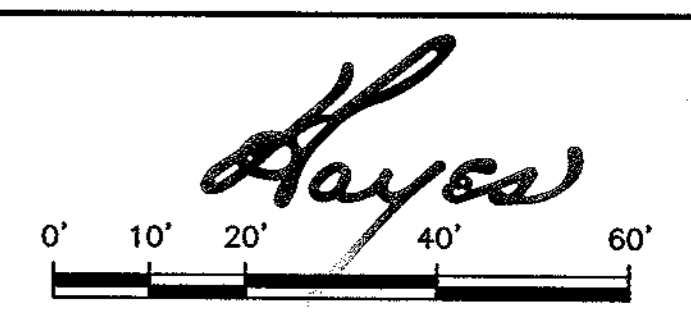
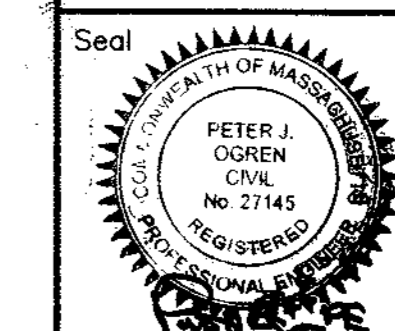
REQUESTED WAIVERS:

PLAN WAIVERS:  
375-6.4.D(2) TO SHOW TWO FOOT CONTOURS IN PLACE OF ONE FOOT CONTOURS.  
375-6.4.D(8) TO NOT SHOW TOP AND BOTTOM OF CURB ELEVATIONS.  
375-6.4.D(11) TO NOT SHOW STORMWATER DETAIL ON THIS SHEET.  
375-6.4.D(12) TO NOT SHOW SIGHT DISTANCES.

I CERTIFY THAT I HAVE CONFORMED WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS IN PREPARING THIS PLAN.

HAYES ENGINEERING, INC.

TOPOGRAPHIC PLAN & EROSION CONTROL PLAN



DEFINITIVE PLAN  
ROAD A  
LYNNFIELD, MASS.  
ASSESSORS MAP 33 LOT 288

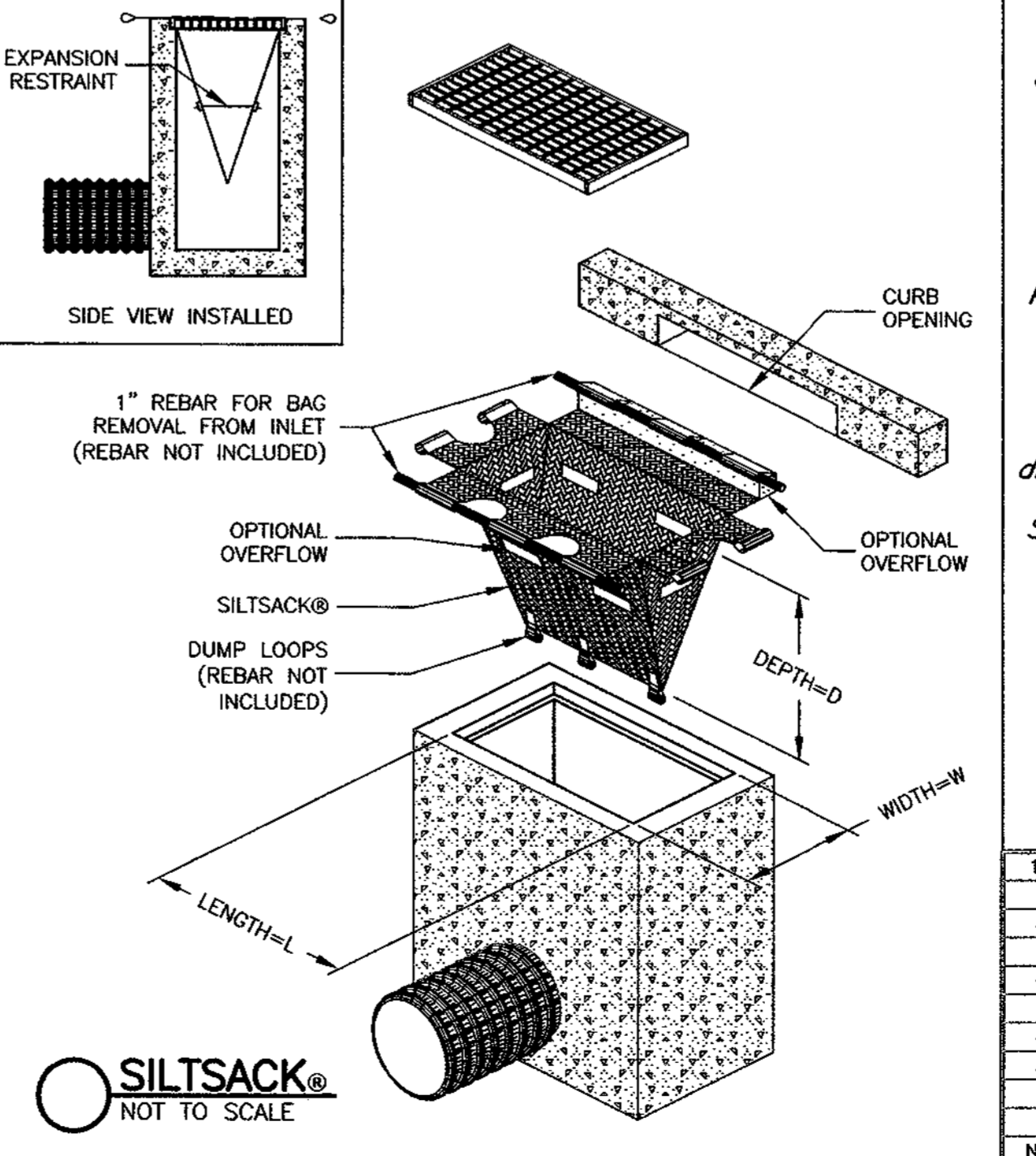
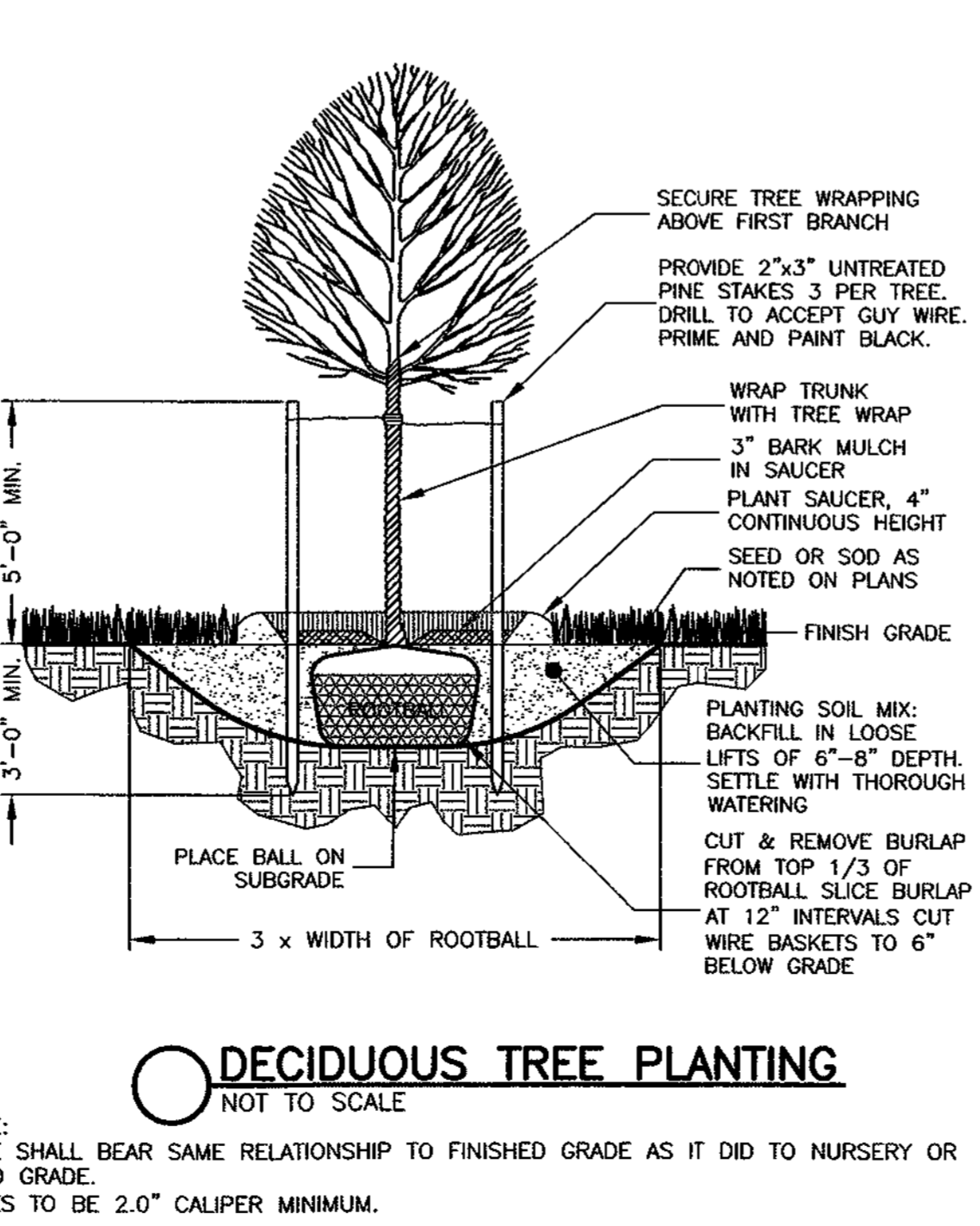
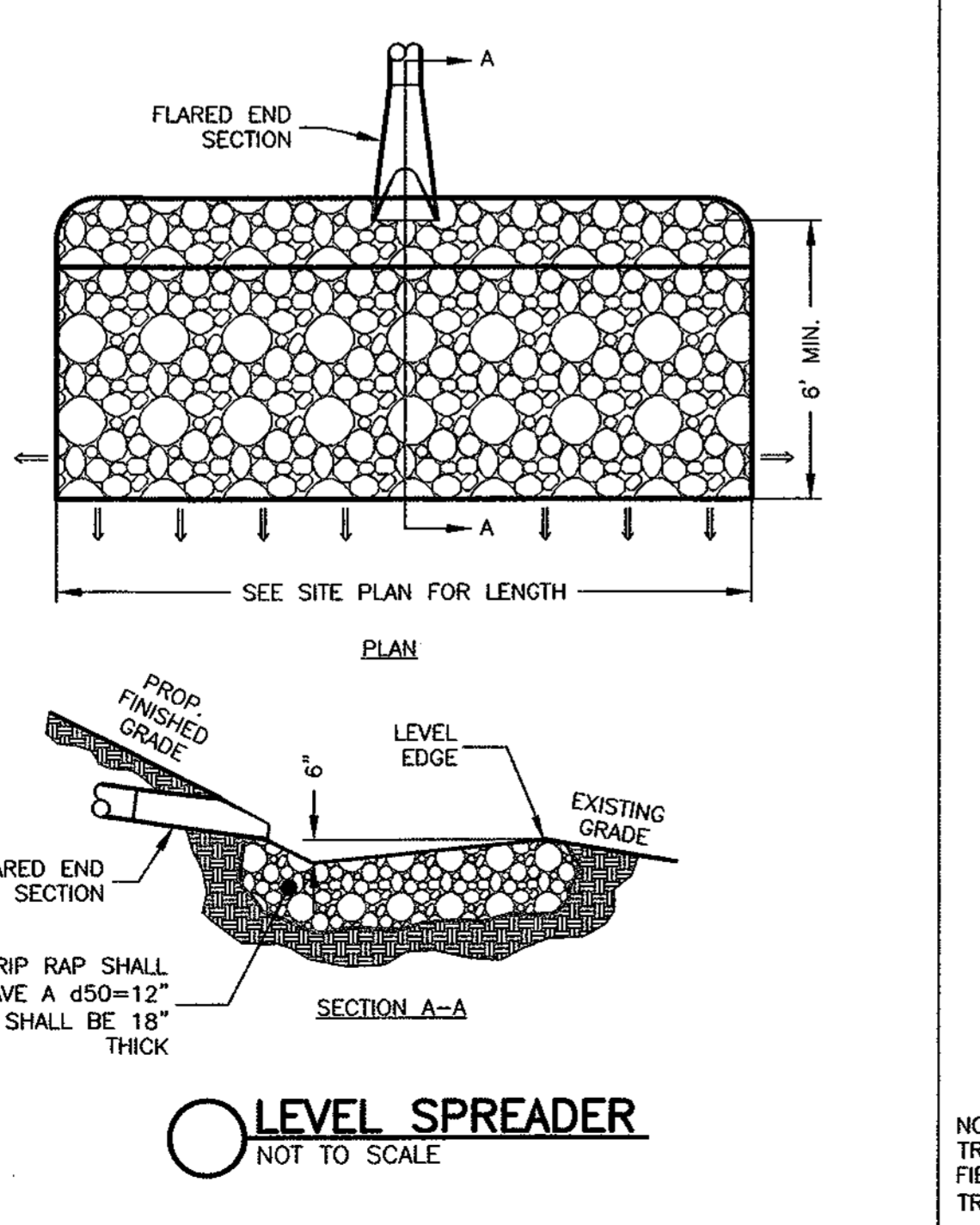
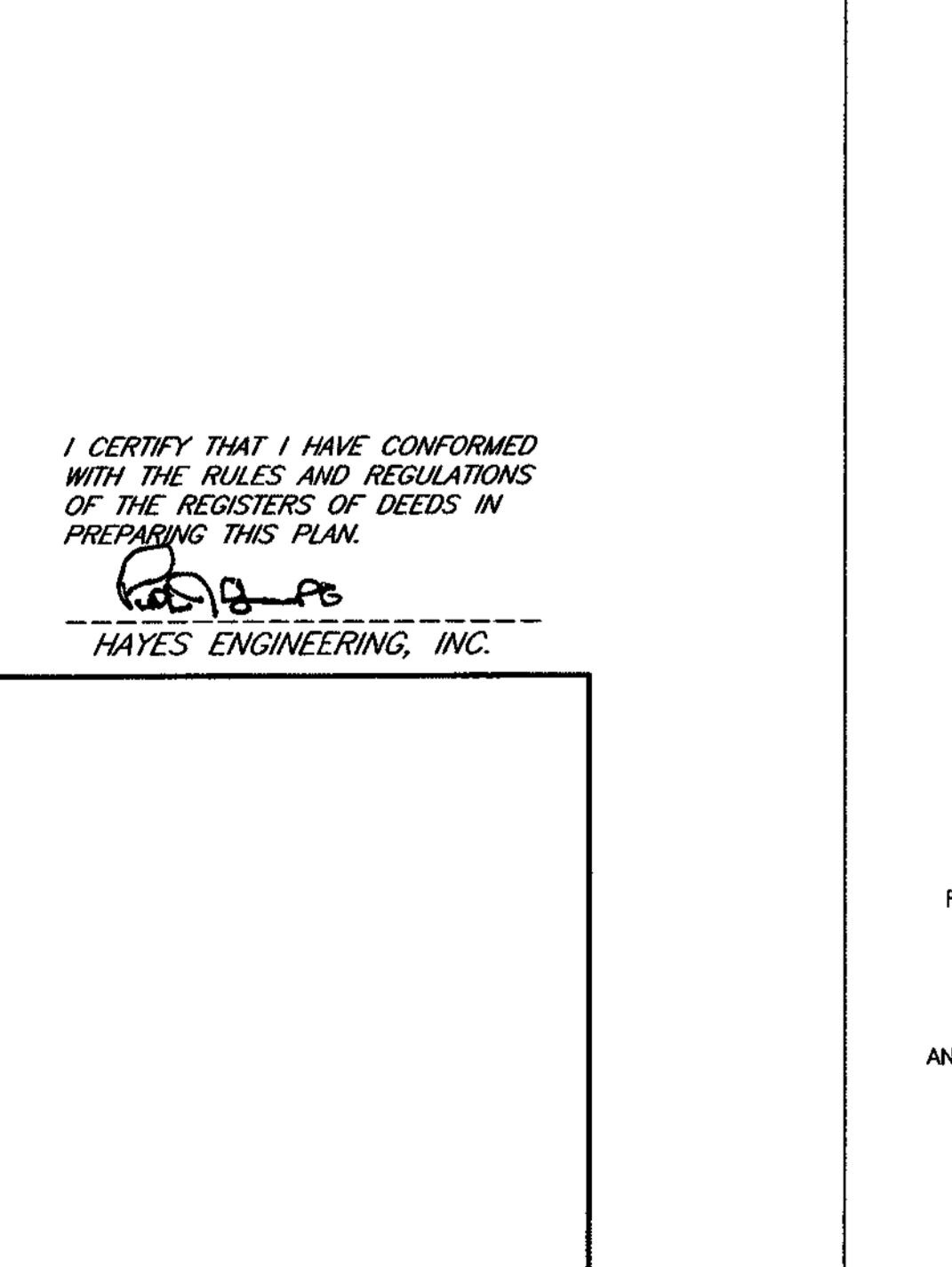
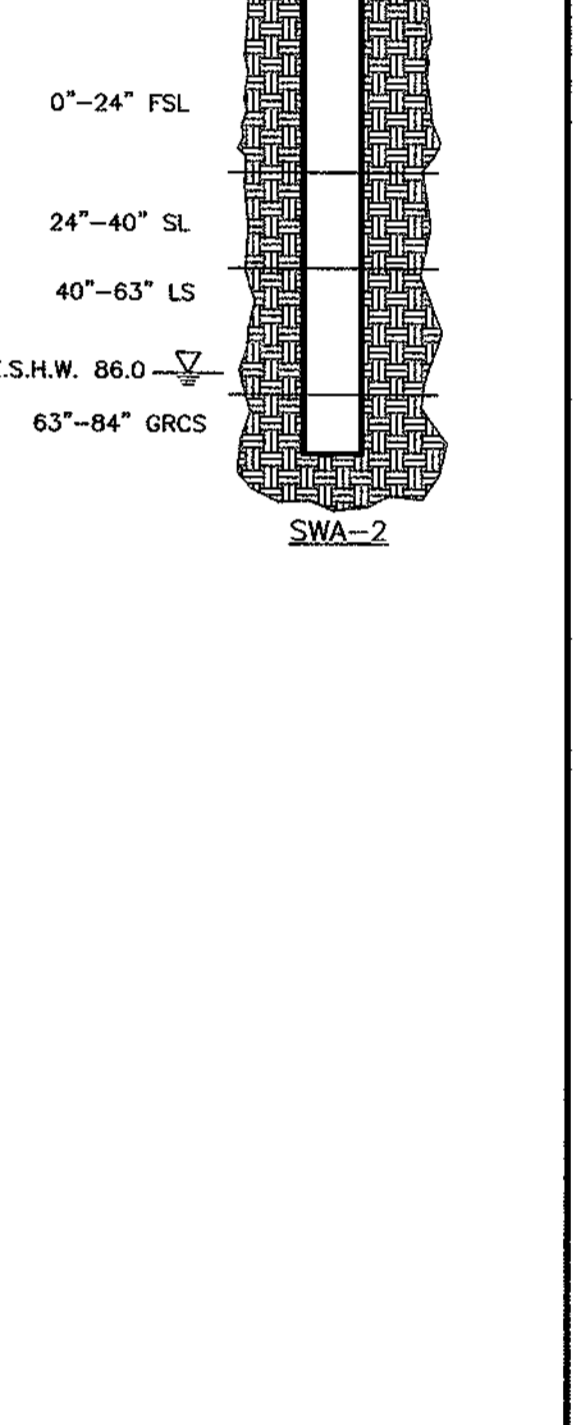
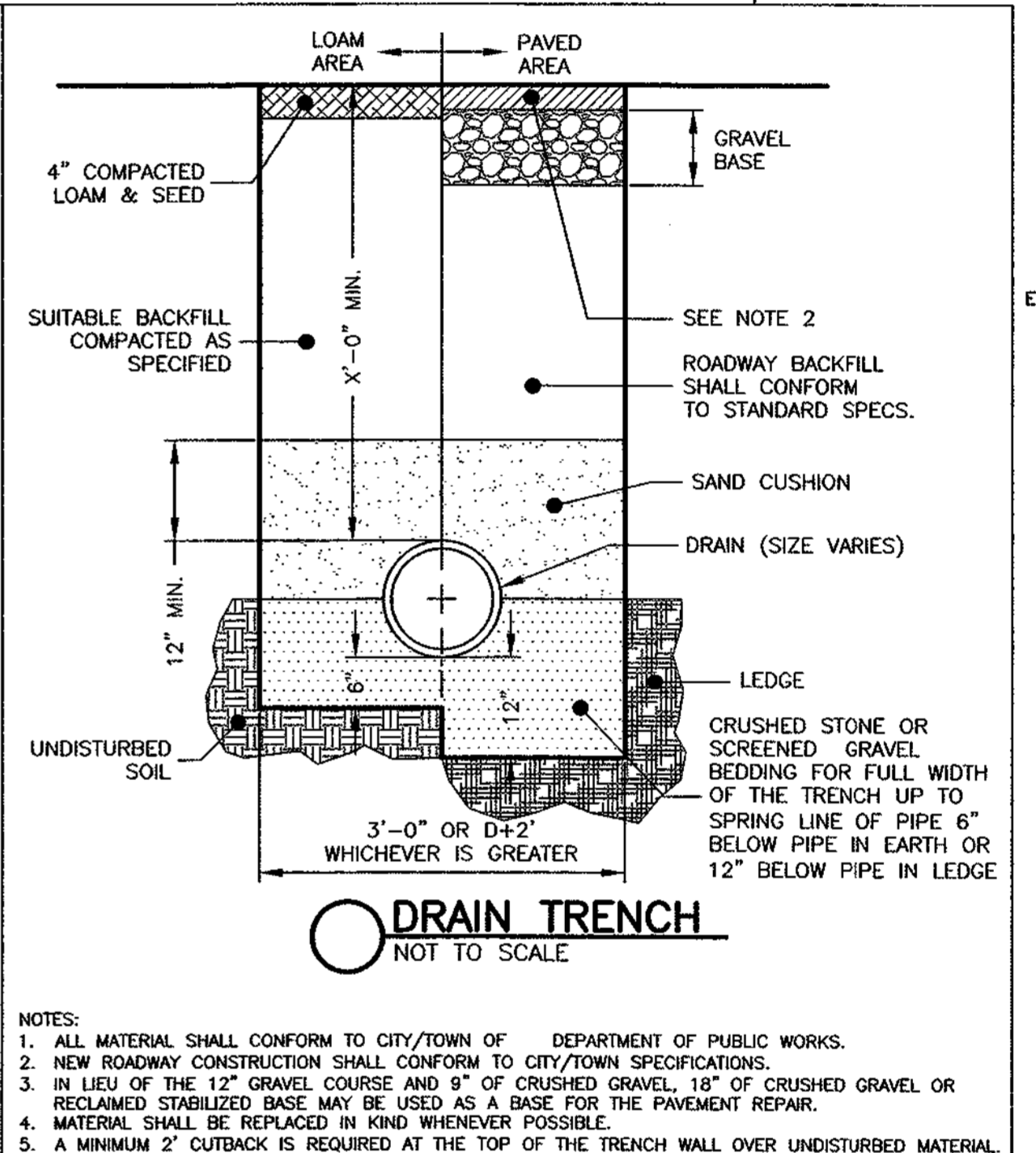
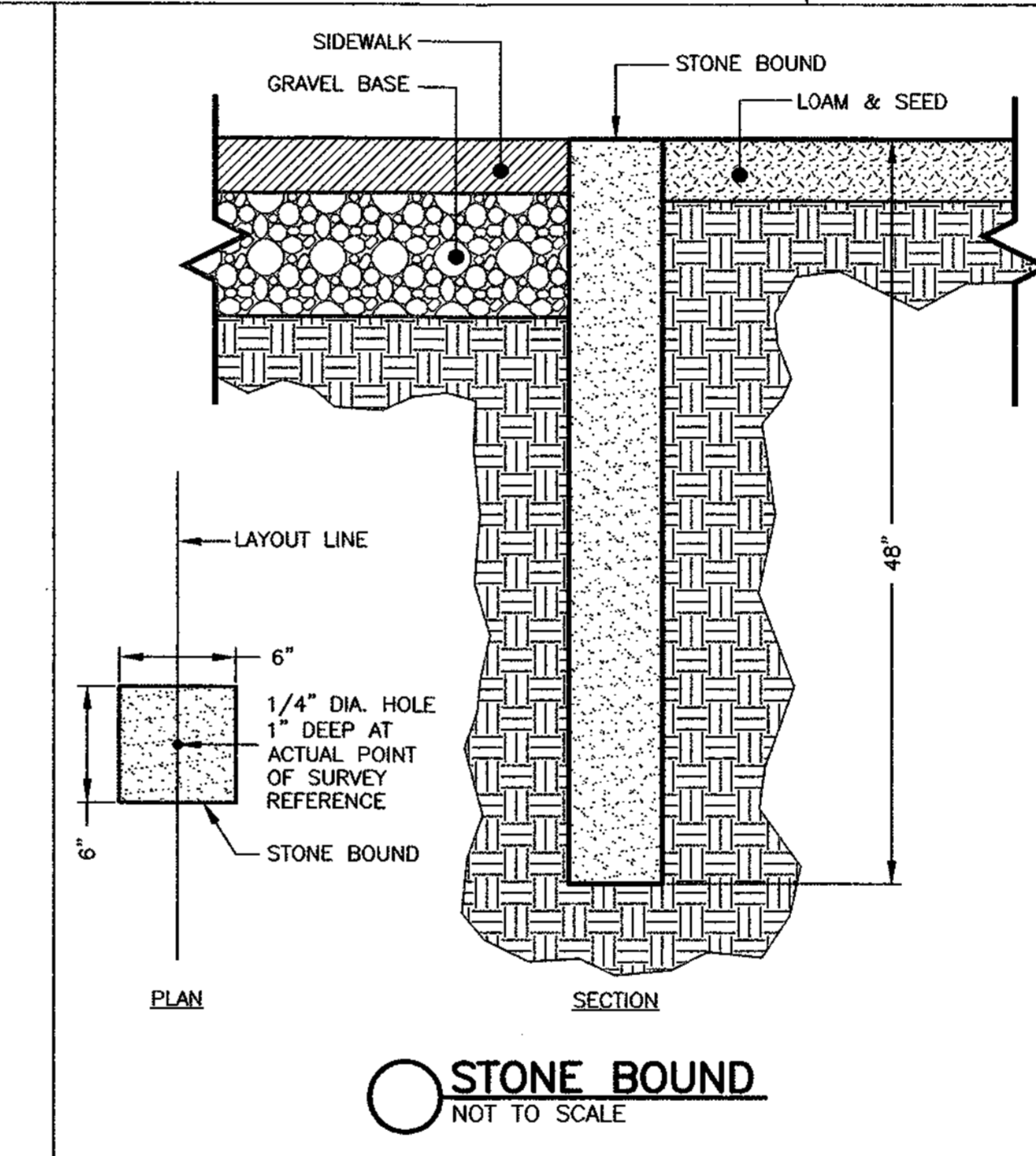
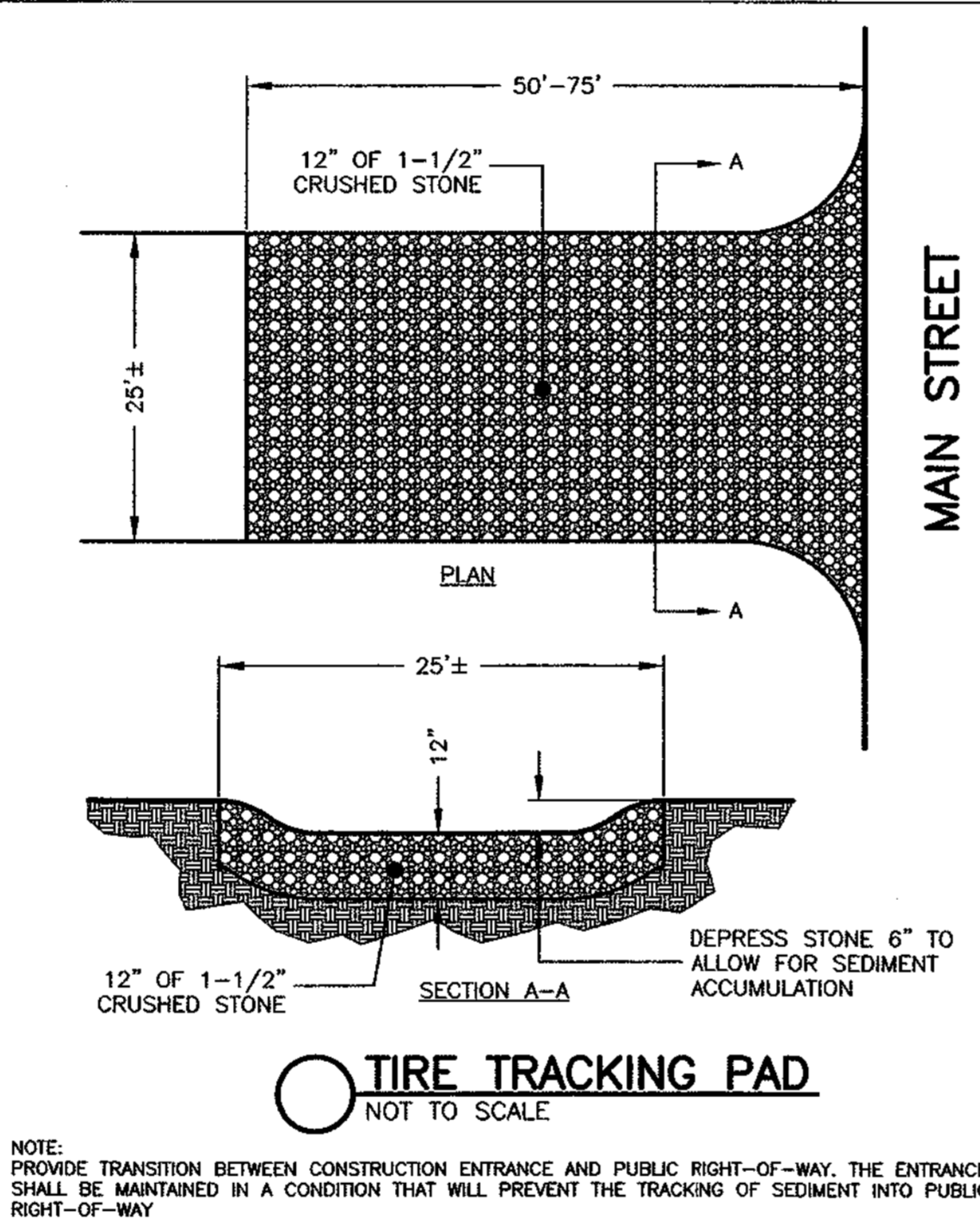
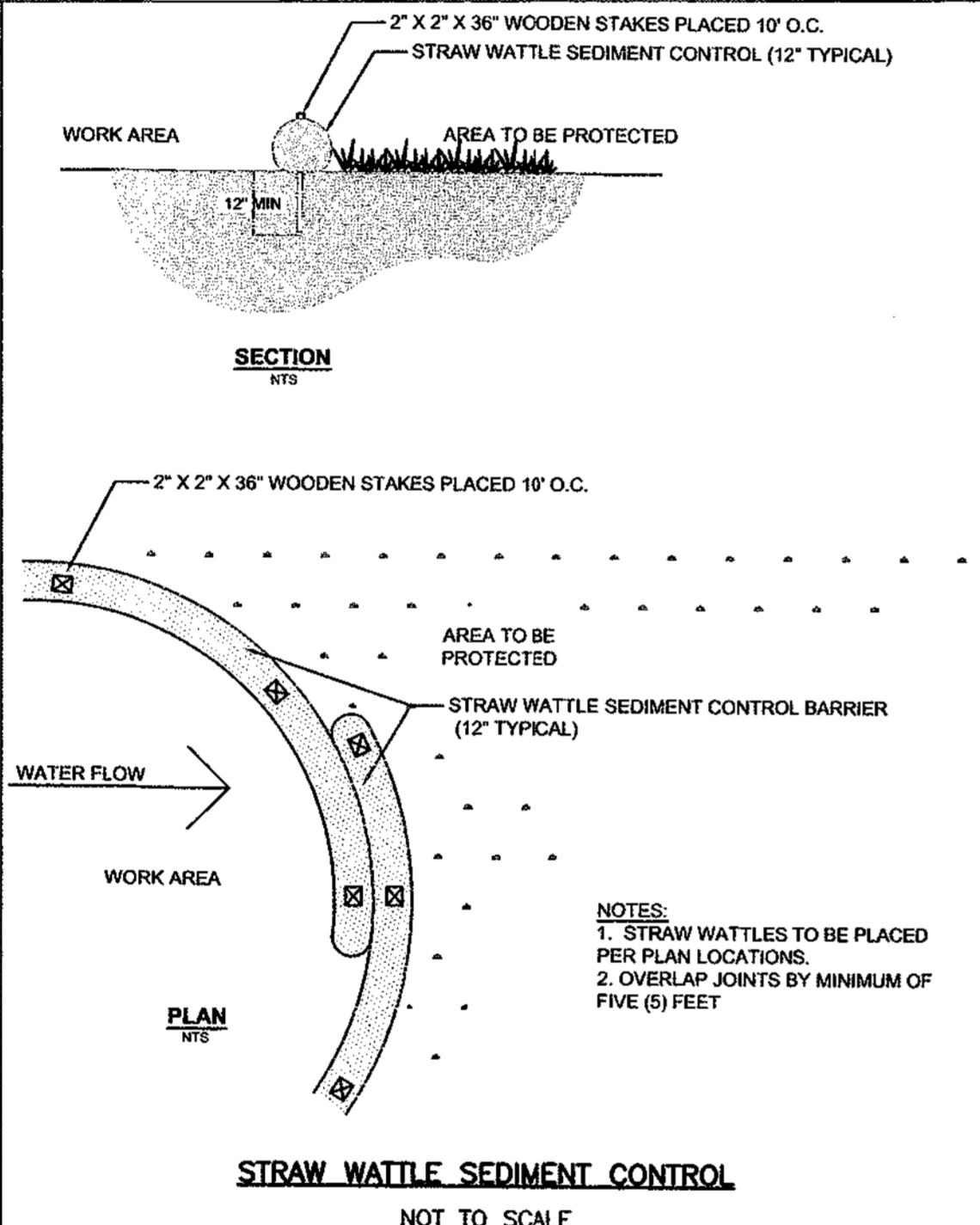
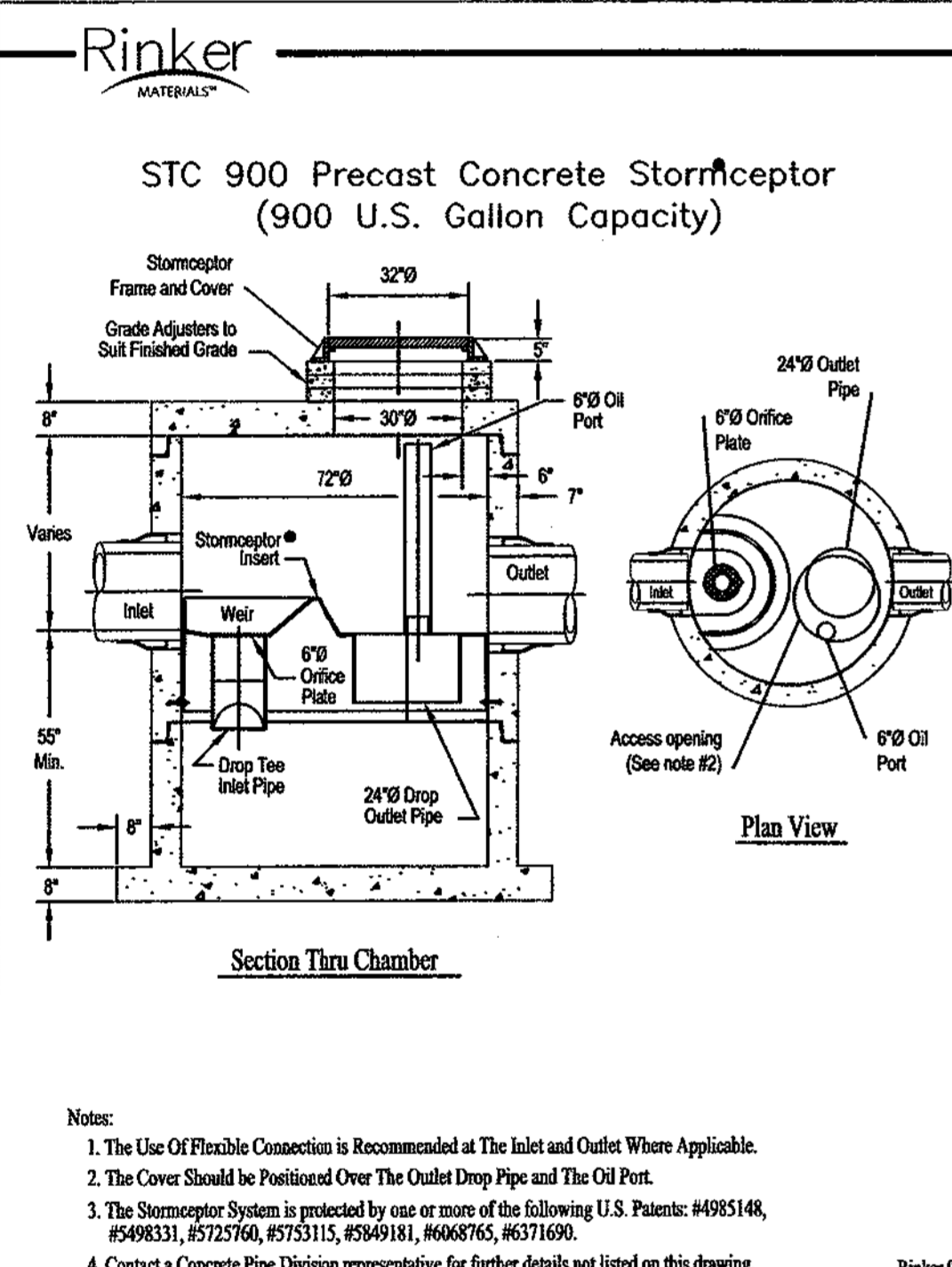
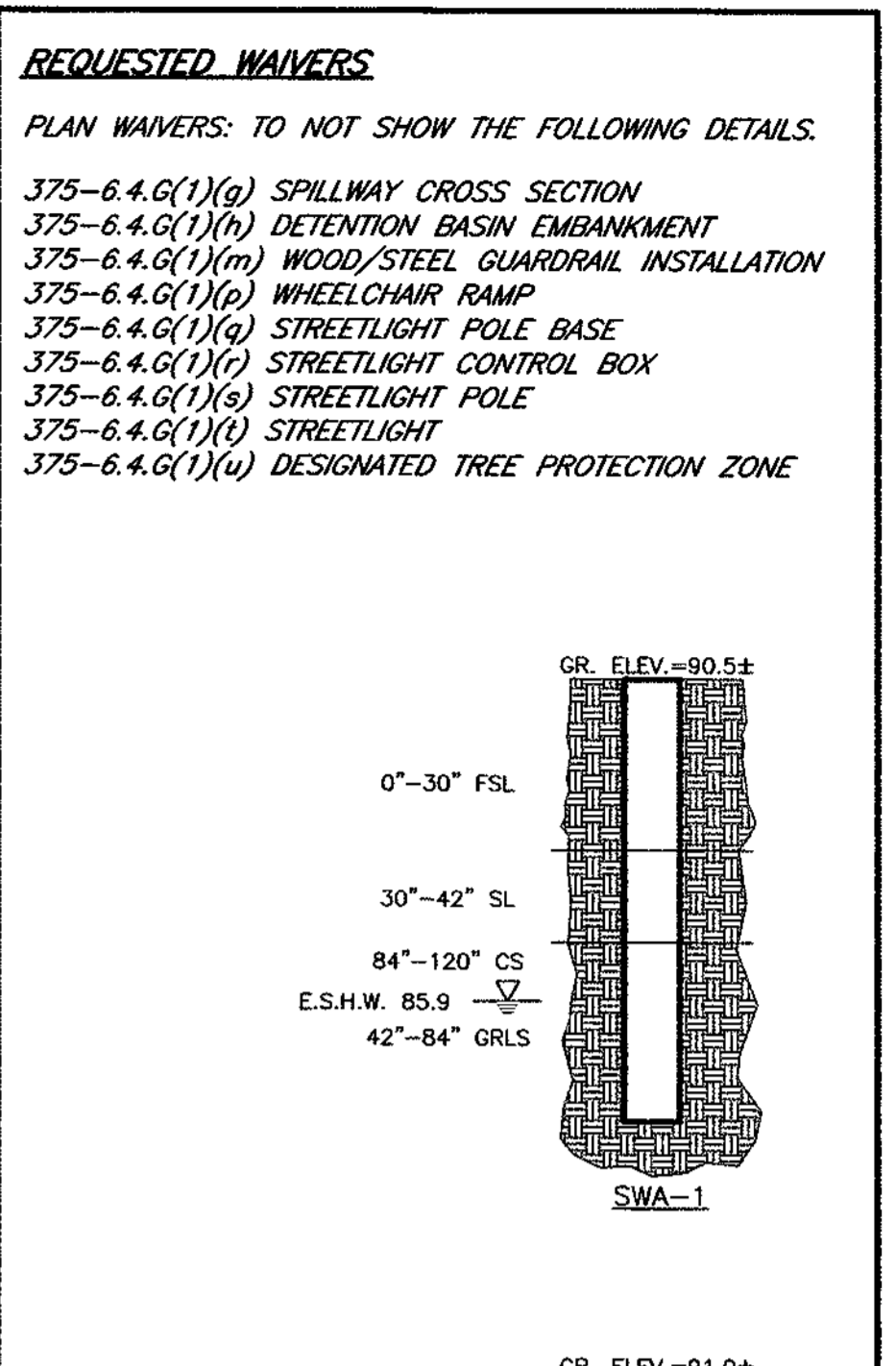
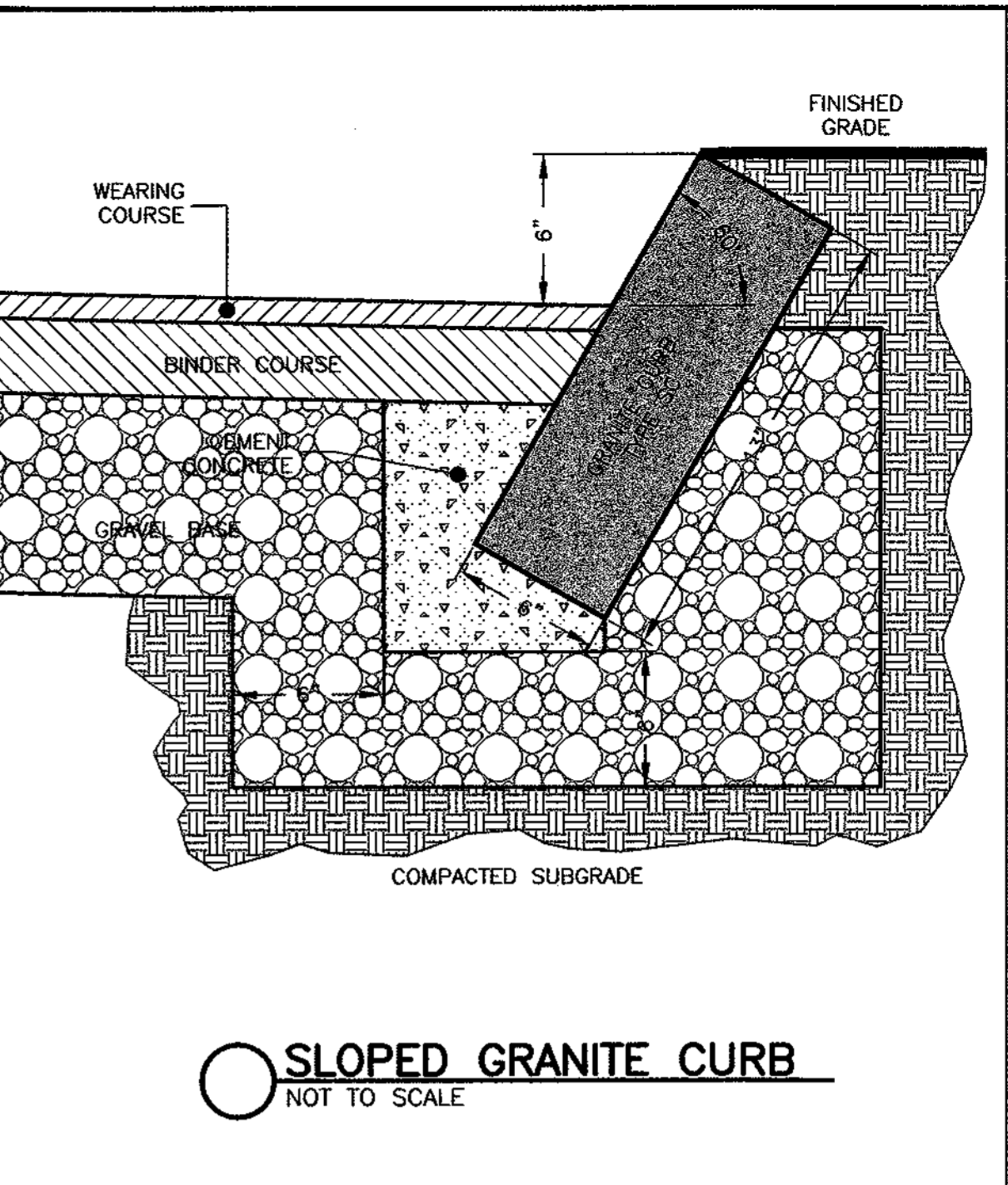
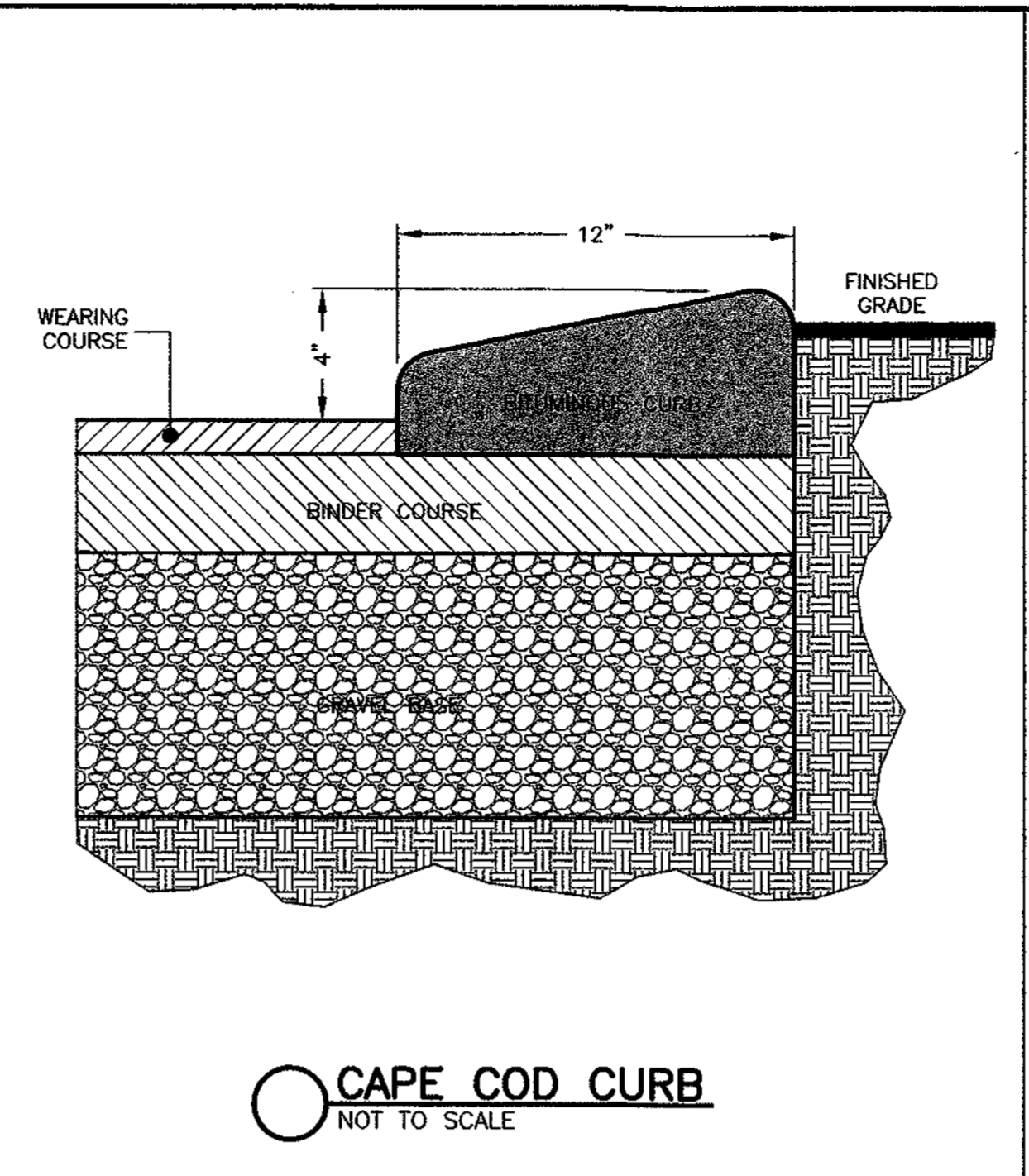
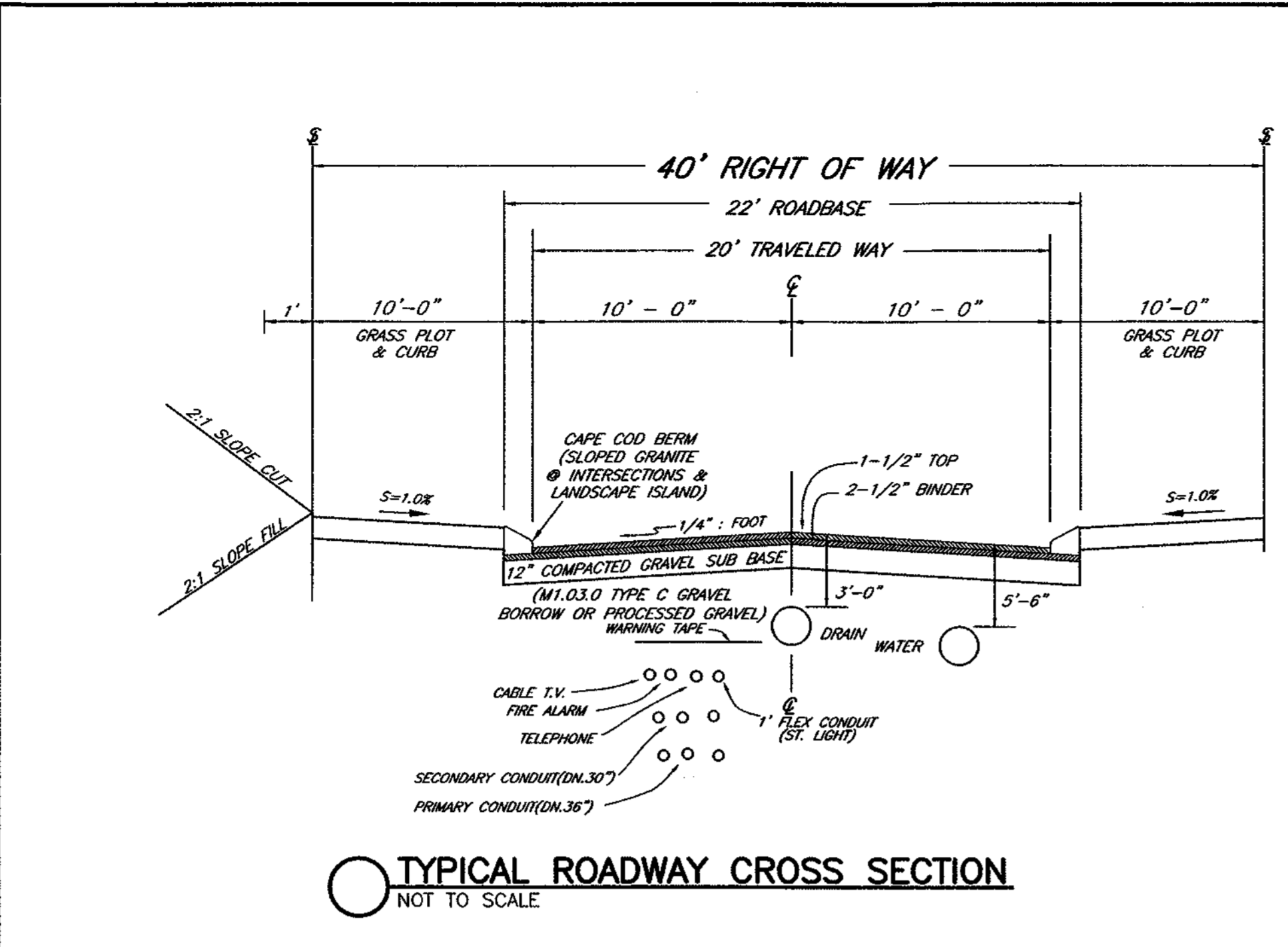
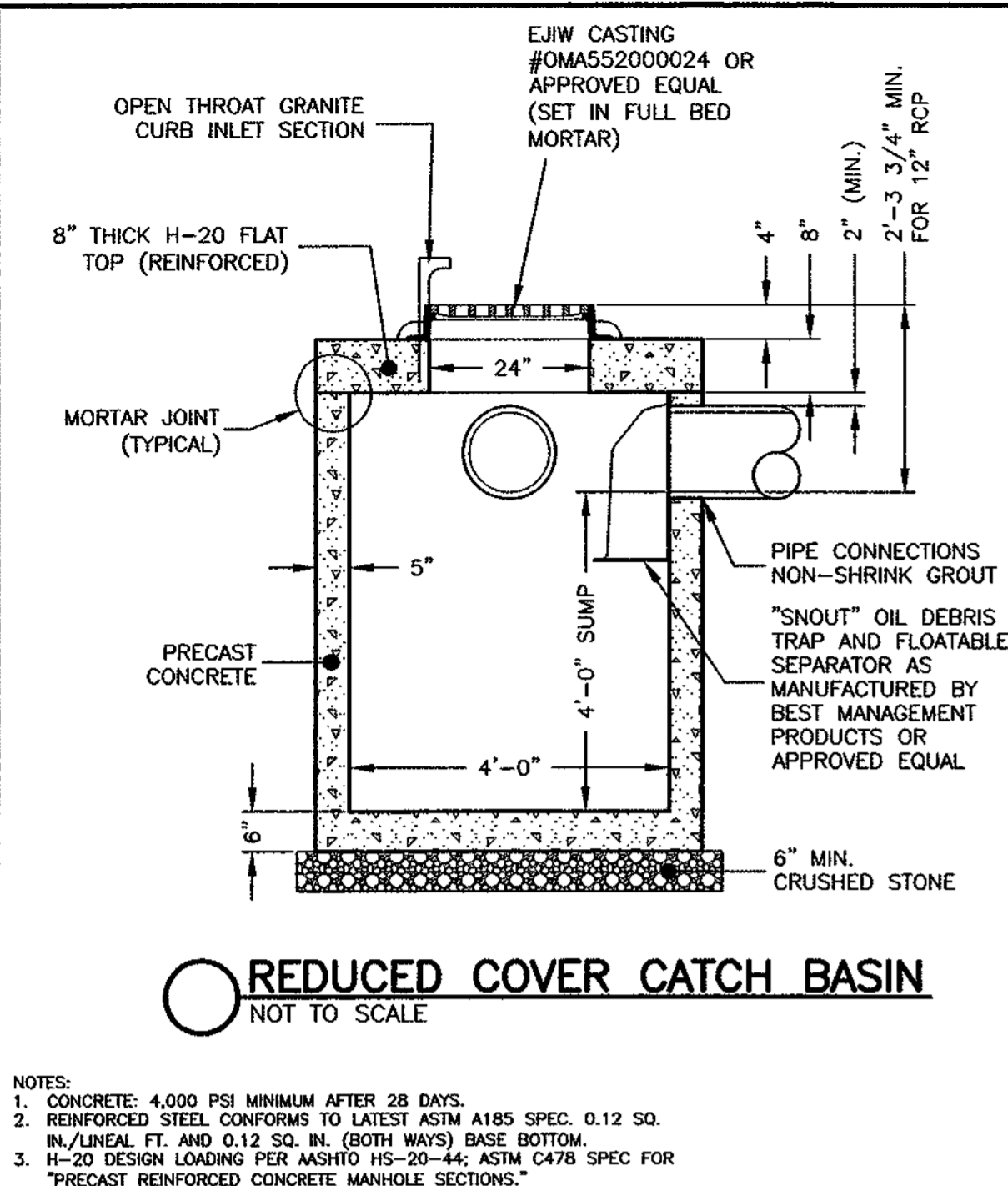
DEVELOPER/OWNER: AUDREY HICKMAN, 271 MAIN STREET, LYNNFIELD, MA 01940  
Engineer: Hayes Engineering, Inc., 603 Salem Street, Wakefield, Mass. 01880, www.hayeseng.com  
Scale: 1"=20'  
August 13, 2020

LYNNFIELD PLANNING BOARD  
Application Filed: Oct. 30, 2020  
Final Plan Filed: Sept. 28, 2022  
Hearing Date: Nov. 18, 2020  
Plan Approved: May 5, 2021  
Plan Signed: Sept. 28, 2022

TOPOGRAPHIC SHEET 1 OF 1  
SHEET 4 OF 6

No.	Revision	Date
10		
9		
8		
7		
6		
5		
4	Clerk Certification Change	9-28-2022
3	Peer Review Comments	5-5-2021
2	Peer Review Comments	4-28-2021
1	Peer Review Comments	3-24-2021
No.	Revision	Date





**CLERK'S CERTIFICATION ON THE PLAN**  
DATE: September 28, 2022

I, Linda Emerson, Town Clerk of the Town of Lynnfield, do hereby certify that the notice of approval of this plan by the planning board has been received and recorded at this office and that notice of appeal was received during the 20 days next to after such receipt and recording of said notice, which appeal has been dismissed with prejudice pursuant to a stipulation of dismissal, in Essex Superior Court civil action number 21 77 C V 00523.

Linda D. Emerson  
LINDA EMERSON, TOWN CLERK

**DETAIL SHEET**

Seal: FETER J. CIVIL ENGINEER, REG. NO. 27145

**DEFINITIVE PLAN**  
ROAD A  
LYNNFIELD, MASS.  
ASSESSORS' MAP 33 LOT 288

DEVELOPER/OWNER: AUDREY HICKMAN, 271 MAIN STREET, LYNNFIELD, MA 01940  
Engineer: Hayes Engineering, Inc., 603 Salem Street, Wakefield, Mass. 01880, www.hayeseng.com

Scale: 1" = 20'

August 13, 2020

10		
9		
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4	Clerk Certification Change	9-28-2022
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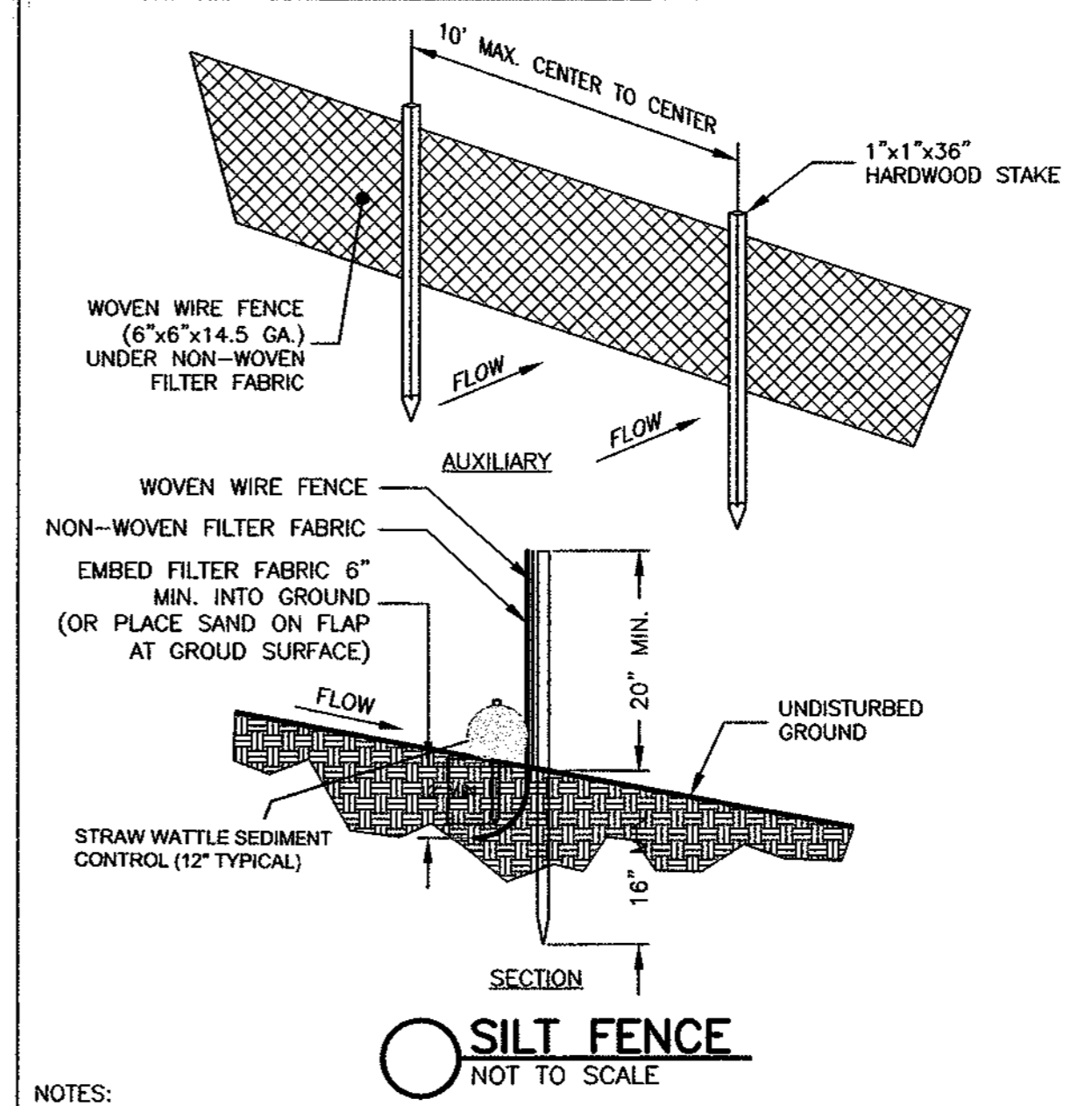
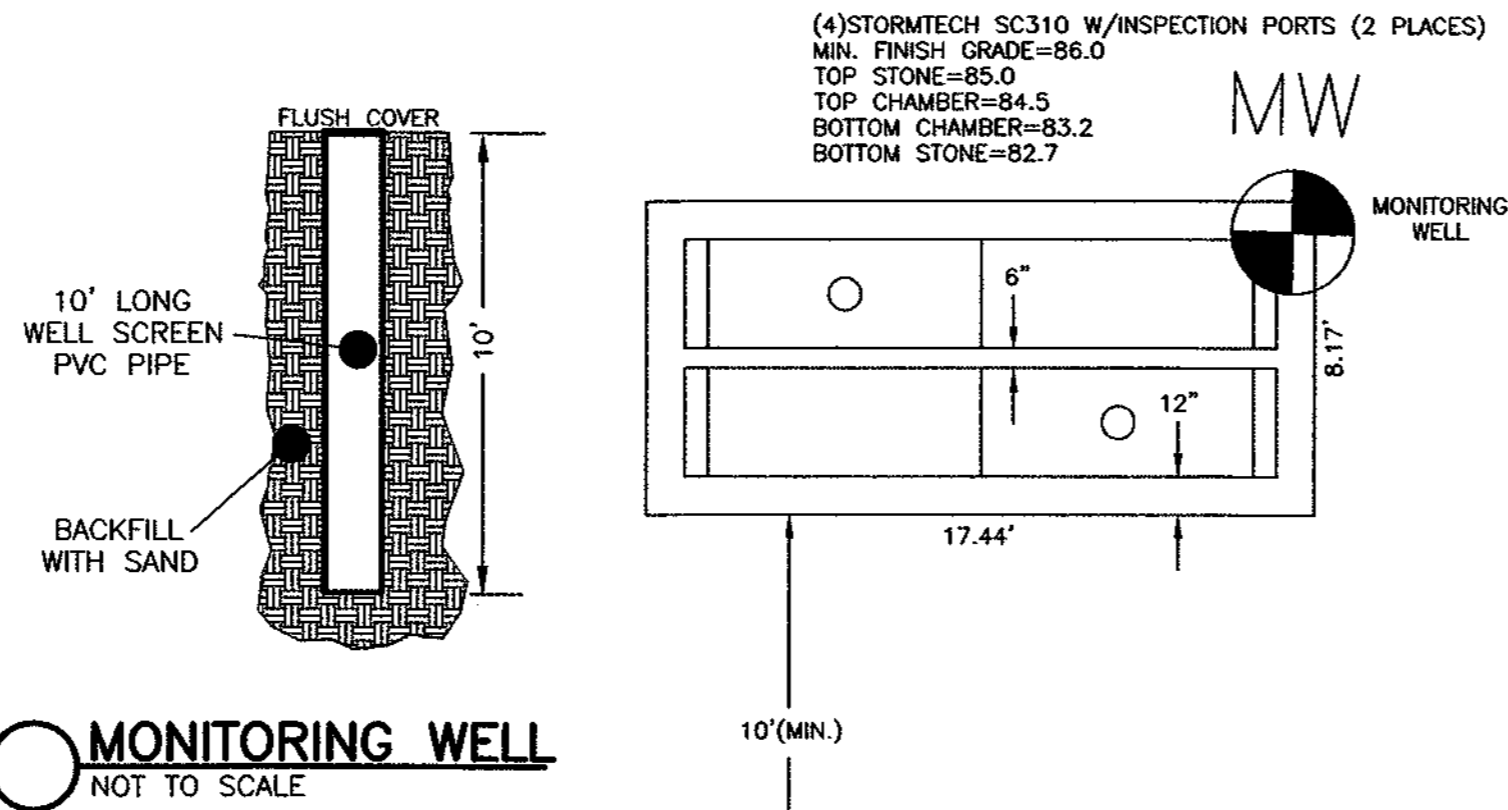
Application Filed: OCT 30, 2020  
Final Plan Filed: SEPT 28, 2022  
Hearing Date: NOV 18, 2020  
Plan Approved: MAY 5, 2021  
Plan Signed: SEPT 28, 2022

DETAIL SHEET 1 OF 2  
SHEET 5 OF 6

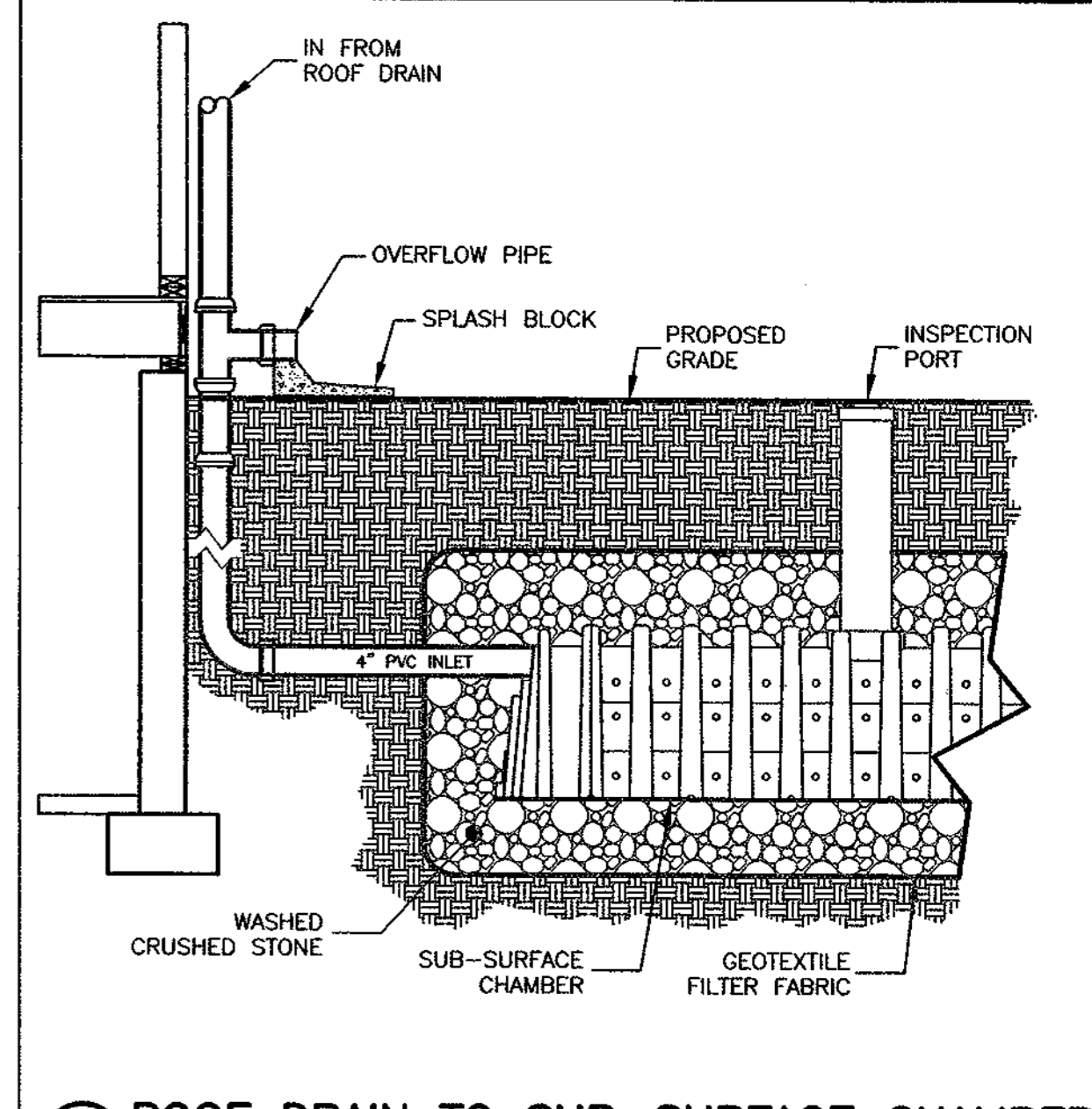


**ROADWAY INFILTRATION CHAMBER DETAIL**  
NOT TO SCALE

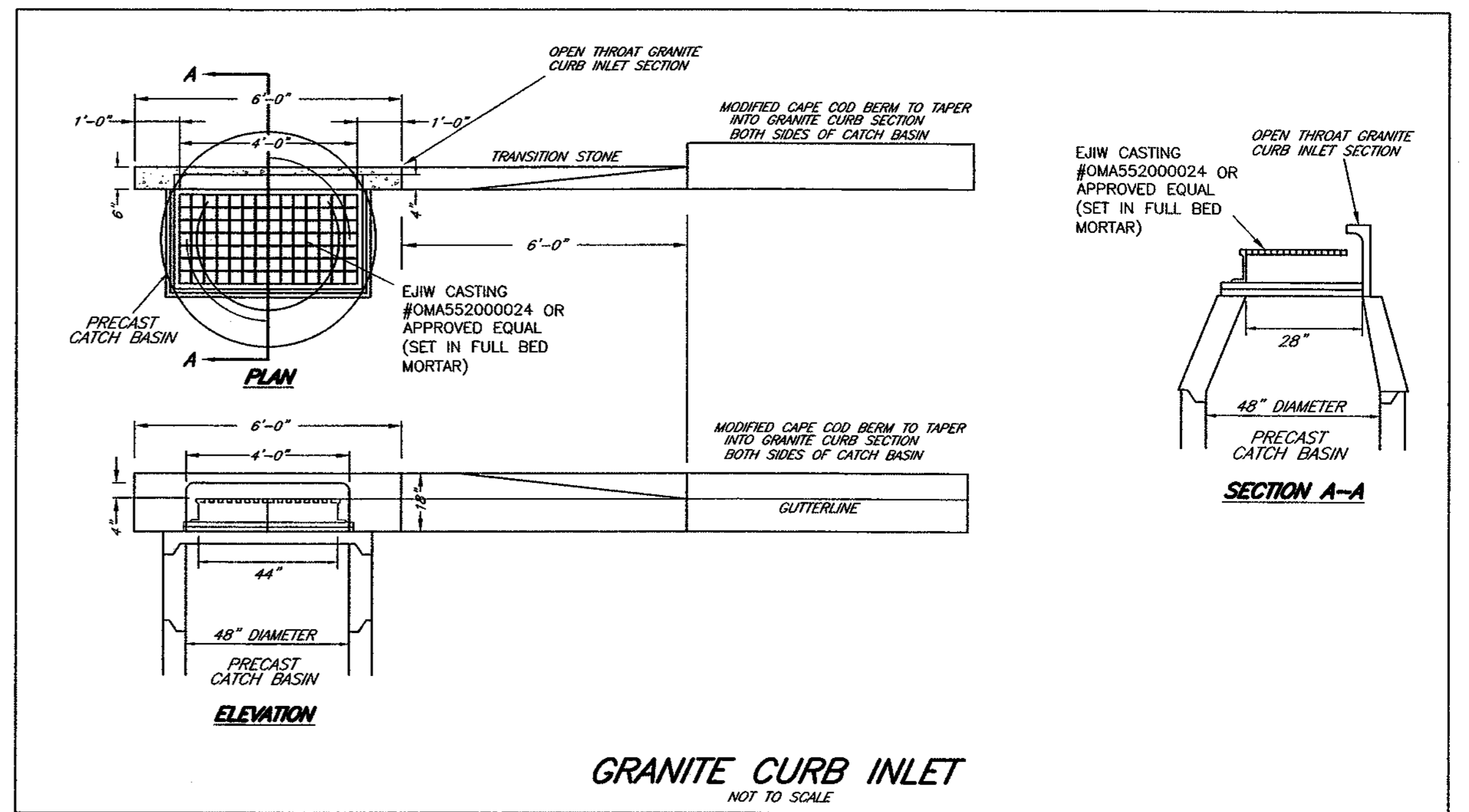
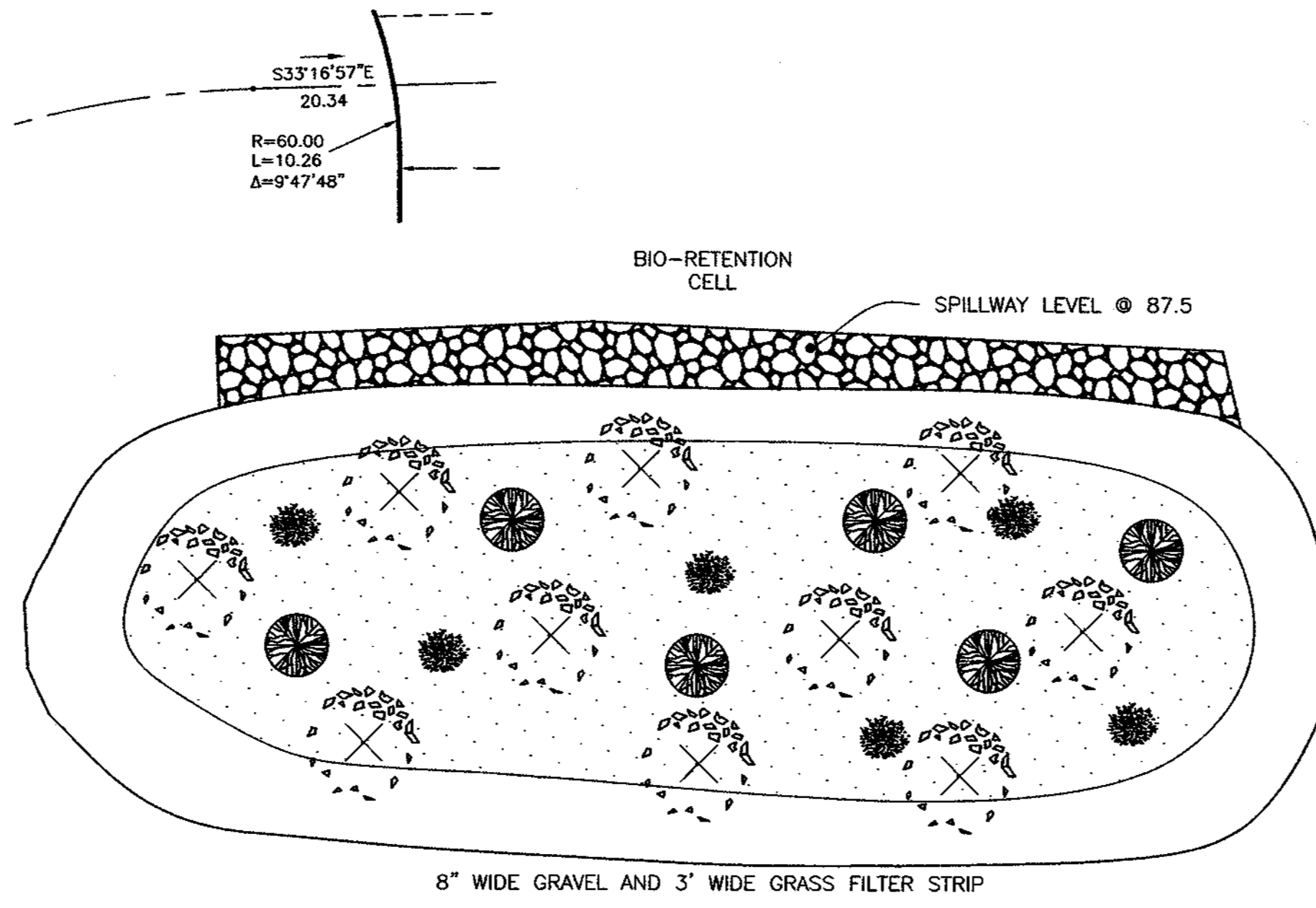
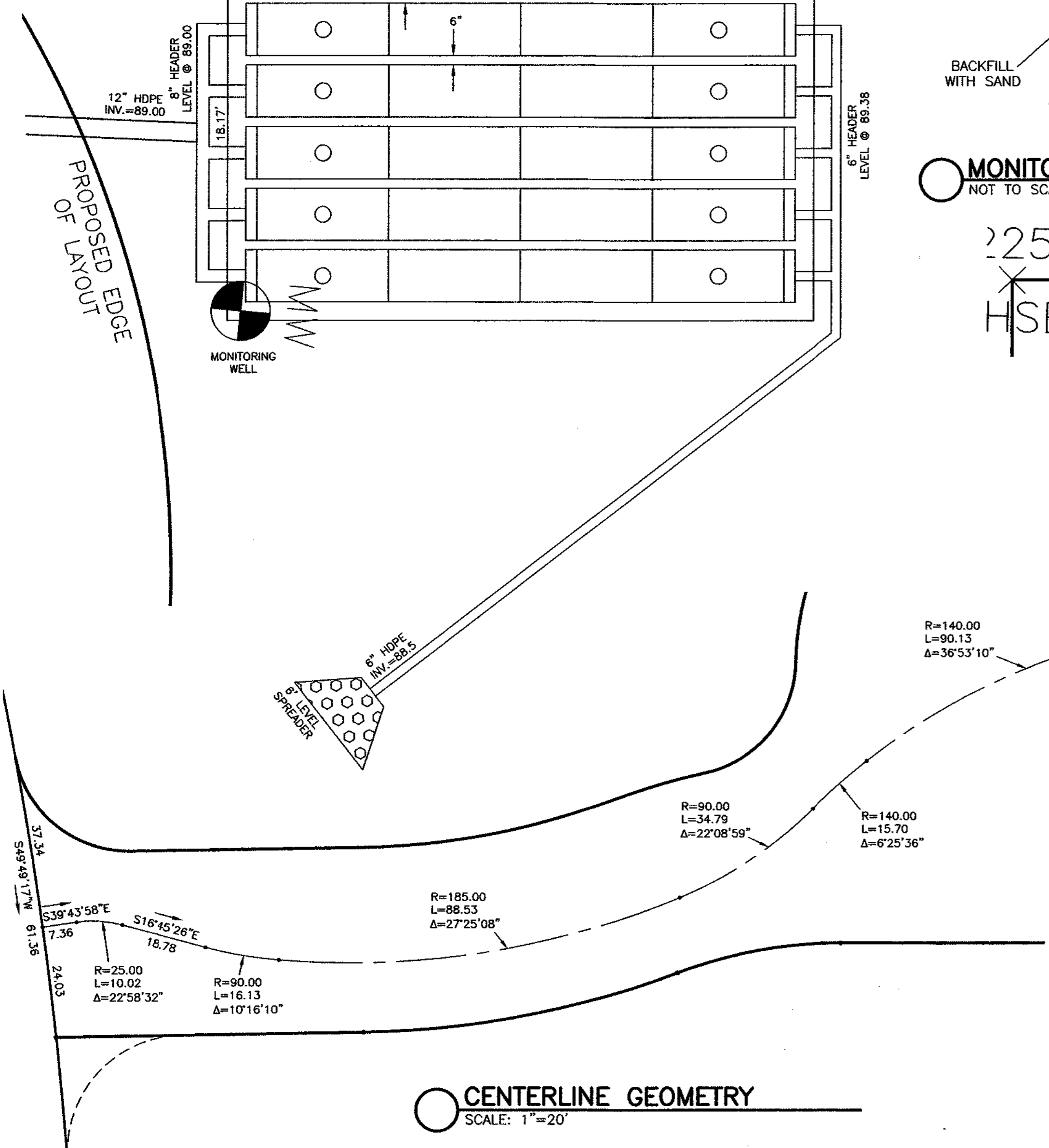
(20) STORMTECH SC310 W/INSPECTION PORTS  
MIN. FINISH GRADE=91.7  
TOP STONE=90.7  
TOP CHAMBER=90.2  
BOTTOM CHAMBER=88.9  
BOTTOM STONE=88.4  
8" HEADER I=89.00 (IN)  
6" HEADER I=89.38 (OUT)



NOTES:  
1. WOVEN WIRE FENCE (6"x6"x14.5 GA.) UNDER NON-WOVEN FILTER FABRIC TO BE USED AT ALL WETLAND CROSSINGS AND ALL AREAS WITHIN 25' OF THE WETLAND LINE. ALL OTHER LOCATIONS THE FILTER FABRIC TO BE UV RESISTANT POLYPROPYLENE WITH A MINIMUM WEIGHT OF 2.5 OZ./SQ.  
2. USE MULTIPLE ROWS OF SILT FENCE FOR LONG STEEP SLOPES IF NECESSARY.



NOTE:  
1. CHAMBERS SHALL BE INSTALLED A MINIMUM OF 10' FROM HOUSE.



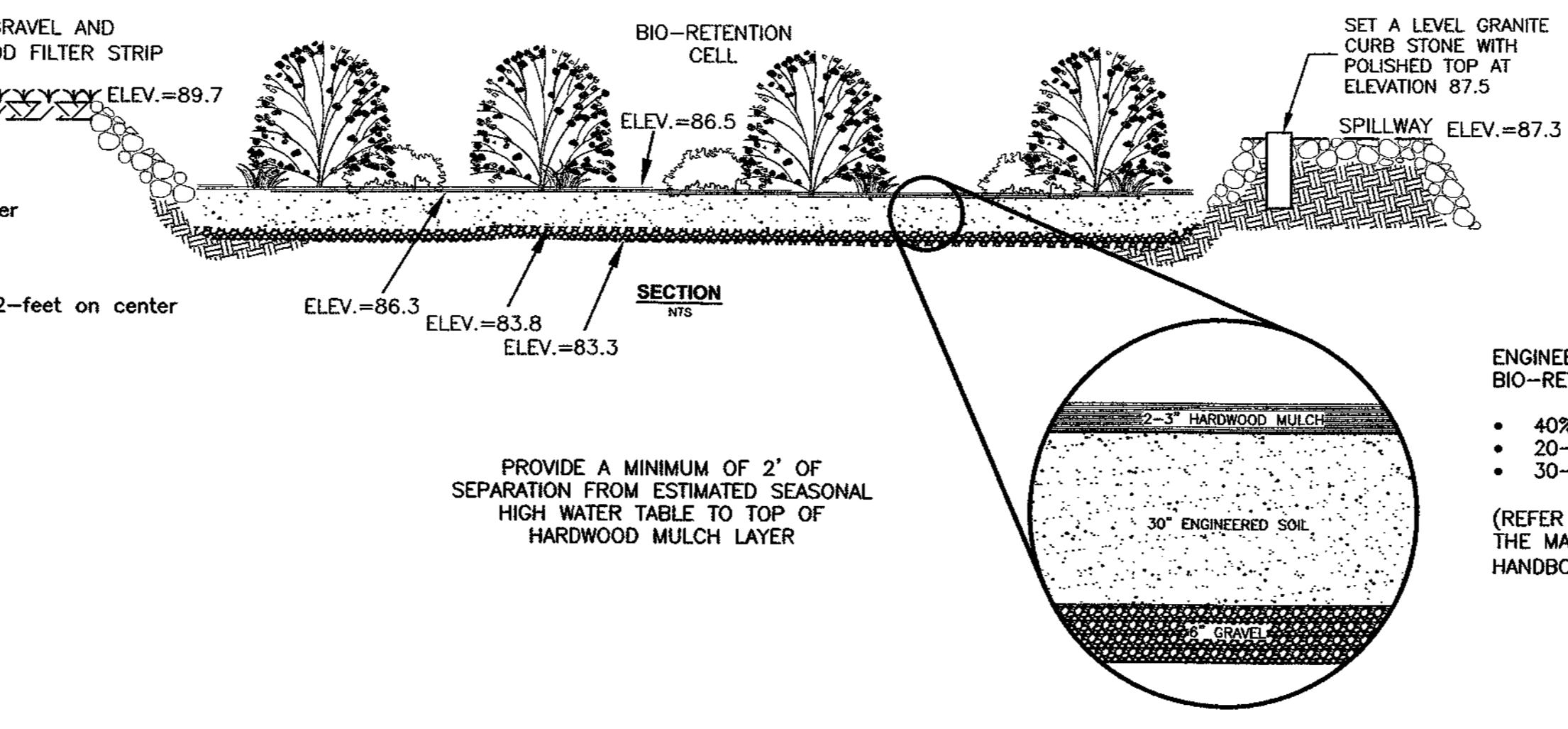
I CERTIFY THAT I HAVE CONFORMED WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS IN PREPARING THIS PLAN.  
**HAYES ENGINEERING, INC.**

- Agrostis Alba "Redtop" Perennial Grass 2-gal. planted 12-feet on center
- Juniperus horizontalis "Bar Harbor" "Creeping Juniper" 2-gal. planted 12-feet on center
- Viburnum dentatum "Arrow-wood" 2-gal. planted 8-feet on center

CLERK'S CERTIFICATION ON THE PLAN  
DATE: September 28, 2022

I, Linda Emerson, Town Clerk of the Town of Lynnfield, do hereby certify that the notice of approval of this plan by the planning board has been received and recorded at this office and that notice of appeal was received during the 20 days next to after such receipt and recording of said notice, which appeal has been dismissed with prejudice pursuant to a stipulation of dismissal, in Essex Superior Court civil action number 21 77 C V 00523.

Linda O. Emerson  
LINDA EMERSON, TOWN CLERK



ENGINEERED SOIL MIX FOR BIO-RETENTION SHALL CONSIST OF:  
• 40% SAND  
• 20-30% TOP SOIL; AND  
• 30-40% COMPOST  
(REFER TO VOLUME 2, CHAPTER 2 OF THE MASSACHUSETTS STORM WATER HANDBOOK)

10		
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3	Peer Review Comments	5-5-2021
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1	Peer Review Comments	3-24-2021
No.	Revision	Date

**DETAIL SHEET**

Seal: PETER J. O'GREN, CIVIL ENGINEER, REG. NO. 27145

**DEFINITIVE PLAN**  
ROAD A  
LYNNFIELD, MASS.  
ASSESSORS MAP 33 LOT 288

DEVELOPER/OWNER: AUDREY HICKMAN, 271 MAIN STREET, LYNNFIELD, MA 01940

Engineer: Hayes Engineering, Inc., 603 Salem Street, Wakefield, Mass. 01880, www.hayeseng.com

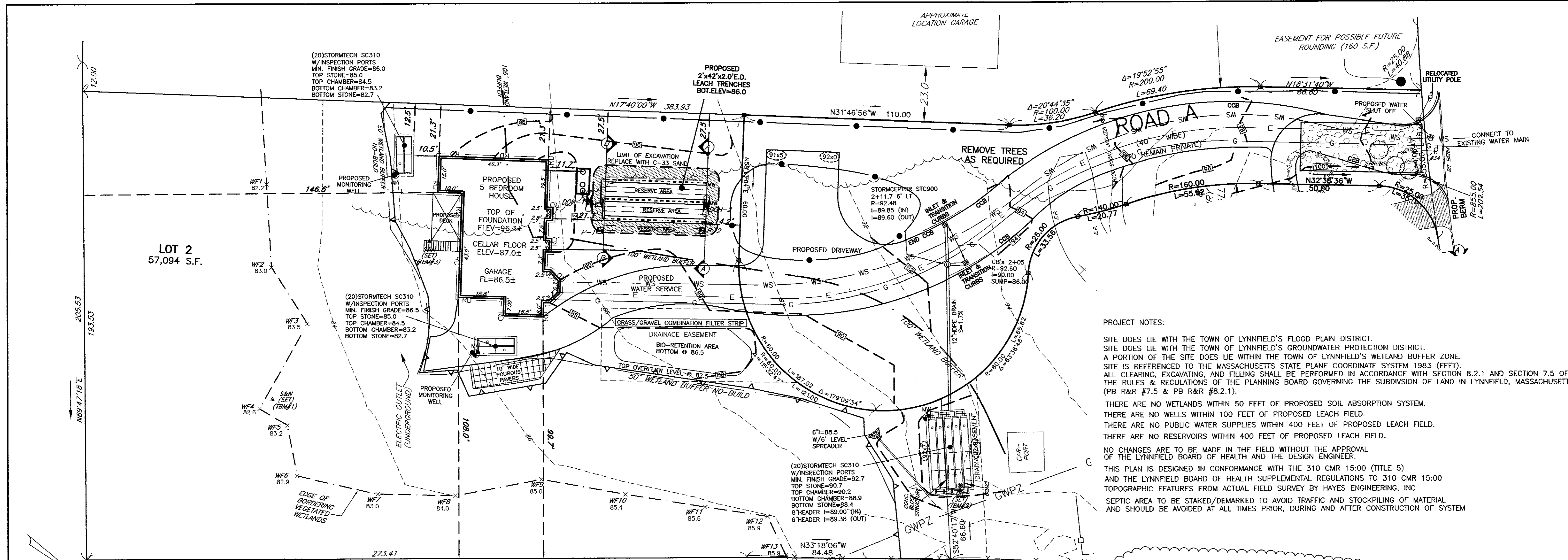
Scale: 1"=20' August 13, 2020

LYNNFIELD PLANNING BOARD

Application Filed: Oct 30, 2020  
Final Plan Filed: Sept 28, 2022  
Hearing Date: Nov 18, 2020  
Plan Approved: May 5, 2021  
Plan Signed: Sept 28, 2022

DETAIL SHEET 2 OF 2  
SHEET 6 OF 6





**PROJECT NOTES:**

SITE DOES NOT LIE WITH THE TOWN OF LYNNFIELD'S FLOOD PLAIN DISTRICT.  
 SITE DOES LIE WITH THE TOWN OF LYNNFIELD'S GROUNDWATER PROTECTION DISTRICT.  
 A PORTION OF THE SITE DOES LIE WITHIN THE TOWN OF LYNNFIELD'S WETLAND BUFFER ZONE.  
 SITE IS REFERENCED TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM 1983 (FEET).  
 ALL CLEARING, EXCAVATING, AND FILLING SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 8.2.1 AND SECTION 7.5 OF THE RULES & REGULATIONS OF THE PLANNING BOARD GOVERNING THE SUBDIVISION OF LAND IN LYNNFIELD, MASSACHUSETTS (PB R&R #7.5 & PB R&R #8.2.1).

THERE ARE NO WETLANDS WITHIN 50 FEET OF PROPOSED SOIL ABSORPTION SYSTEM.  
 THERE ARE NO WELLS WITHIN 100 FEET OF PROPOSED LEACH FIELD.  
 THERE ARE NO PUBLIC WATER SUPPLIES WITHIN 400 FEET OF PROPOSED LEACH FIELD.  
 THERE ARE NO RESERVOIRS WITHIN 400 FEET OF PROPOSED LEACH FIELD.

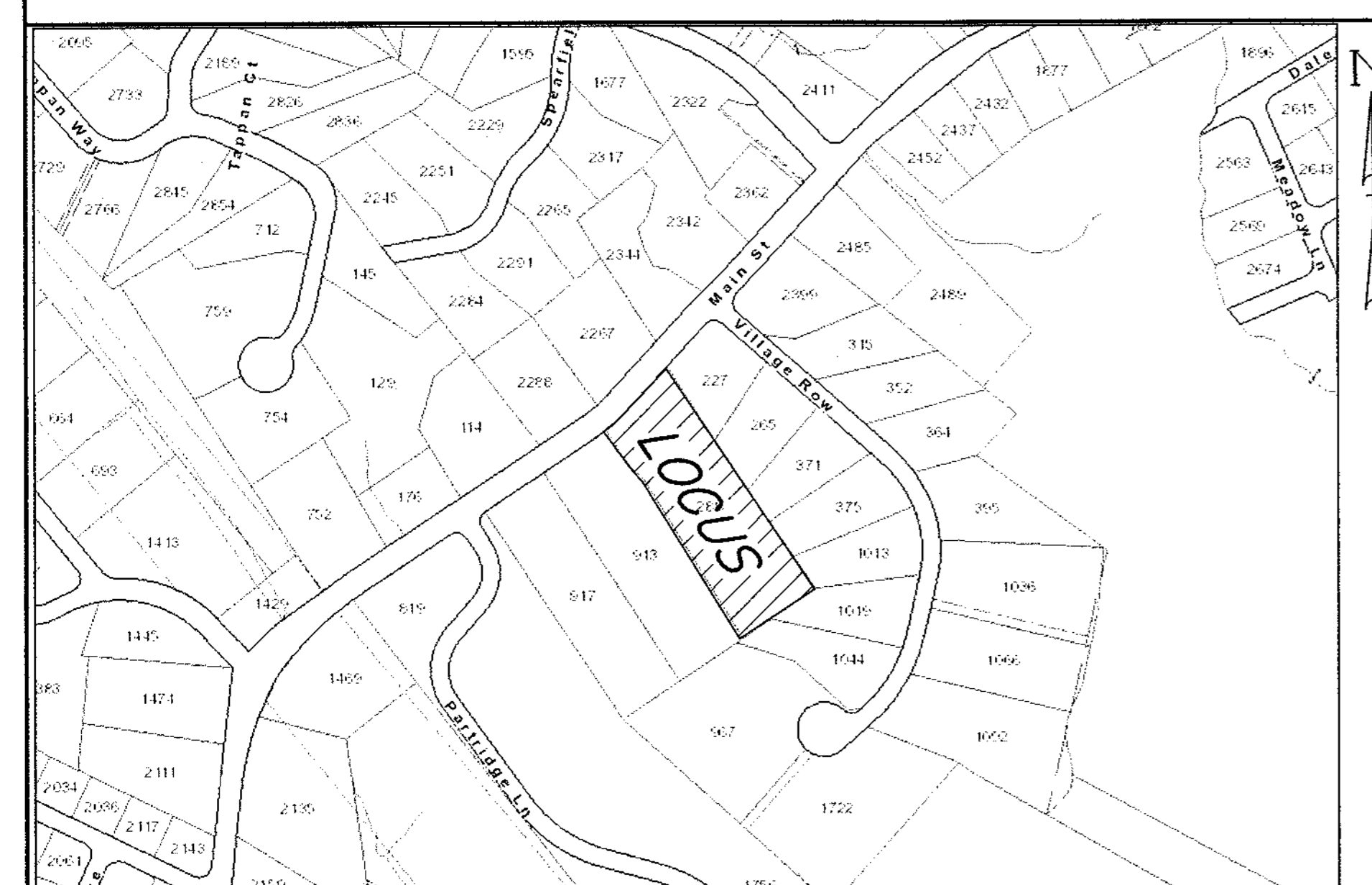
NO CHANGES ARE TO BE MADE IN THE FIELD WITHOUT THE APPROVAL OF THE LYNNFIELD BOARD OF HEALTH AND THE DESIGN ENGINEER.

THIS PLAN IS DESIGNED IN CONFORMANCE WITH THE 310 CMR 15:00 (TITLE 5) AND THE LYNNFIELD BOARD OF HEALTH SUPPLEMENTAL REGULATIONS TO 310 CMR 15:00 TOPOGRAPHIC FEATURES FROM ACTUAL FIELD SURVEY BY HAYES ENGINEERING, INC

SEPTIC AREA TO BE STAKED/DEMARKED TO AVOID TRAFFIC AND STOCKPIILING OF MATERIAL AND SHOULD BE AVOIDED AT ALL TIMES PRIOR, DURING AND AFTER CONSTRUCTION OF SYSTEM

I CERTIFY THAT I AM CURRENTLY APPROVED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION PURSUANT TO 310 CMR 15.017 TO CONDUCT SOIL EVALUATIONS AND THAT THE ABOVE ANALYSIS HAS BEEN PERFORMED BY ME CONSISTENT WITH THE REQUIRED TRAINING, EXPERTISE, AND EXPERIENCE DESCRIBED IN 310 CMR 15.017. I FURTHER CERTIFY THAT THE RESULTS OF MY SOIL EVALUATION, AS INDICATED ON THE ATTACHED SOIL EVALUATION FORMS, ARE ACCURATE AND IN ACCORDANCE WITH 310 CMR 15.100 THROUGH 15.107.

SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_



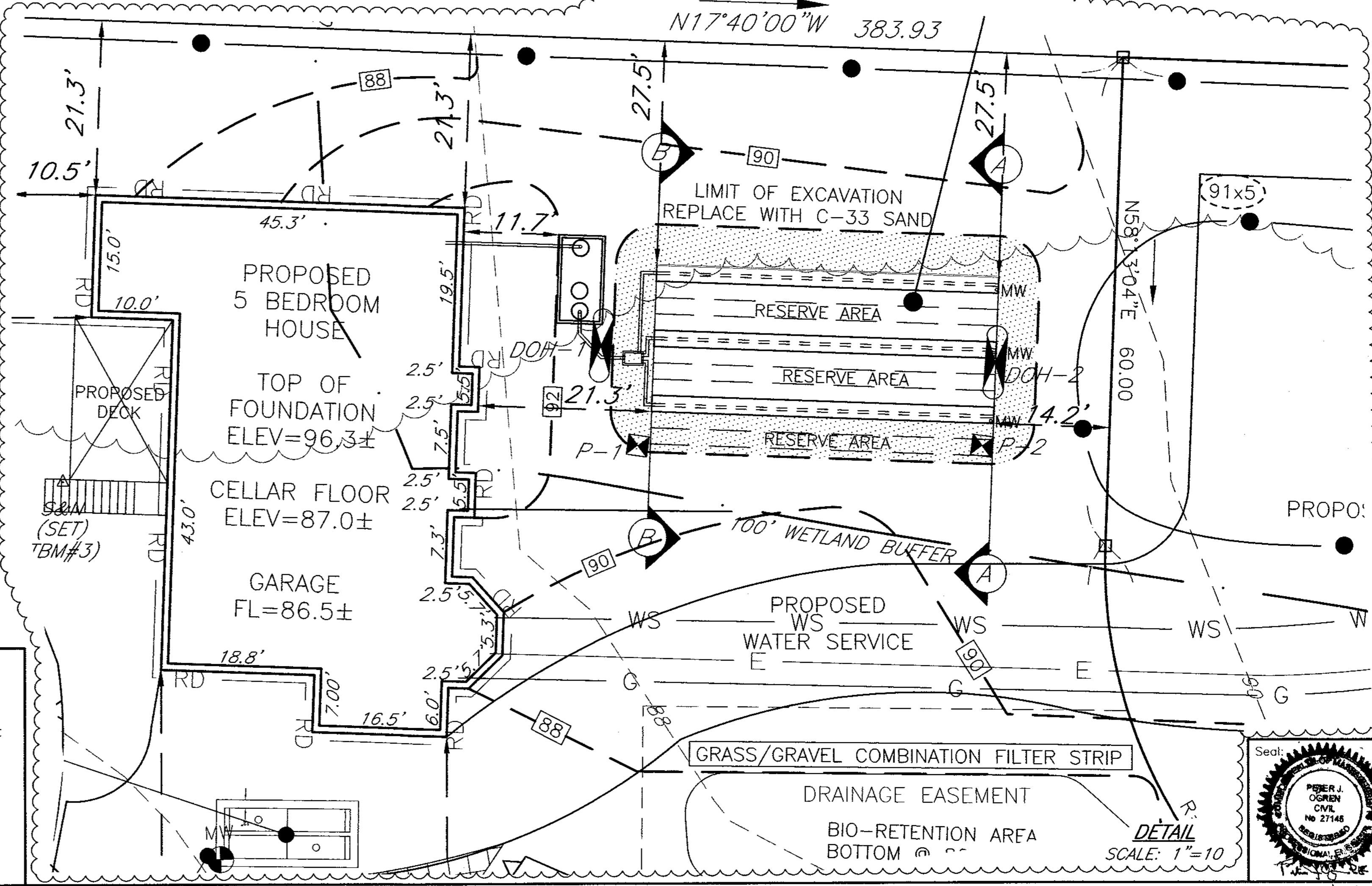
LOCUS MAP  
SCALE: 1"=300' SOURCE: LYNNFIELD GIS

**ZONE: RB**  
 MINIMUM SETBACKS:  
 FRONT = 40'  
 SIDE = 20'  
 REAR = 20'  
 MIN. FRONTAGE = 150'  
 MIN. LOT AREA = 30,000 SF

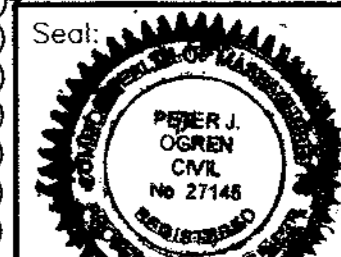
**LEGEND OF SYMBOLS & ABBREVIATIONS:**

• 100.0	EXIST. SPOT ELEVATION	⊕	TEST HOLE
- - - 100	EXIST. CONTOUR	⊠	PERC TEST
⊙ 100.0	PROP. SPOT ELEVATIONS	⊕	DRAIN MANHOLE
- - - 100	PROP. CONTOURS	⊠	CATCH BASIN
—	PROP. WATER SUPPLY LINE	⊕	WATER SUPPLY WELL
⊙ MW	PROP. INSPECTION PORT/MONITORING WELL		

**BENCHMARK REFERENCE DATUM: NAVD88**  
 TBM#1 TOP OF STAKE AND NAIL. ELEV.=82.94'  
 TBM#2 DRILL HOLE SET IN CONCRETE. ELEV.=92.38'  
 TBM#3 TOP OF STAKE AND NAIL. ELEV. 86.70



DETAIL  
SCALE: 1"=10'





**GENERAL NOTES:**

HAYES ENGINEERING, INC. HAS BEEN RETAINED TO FURNISH A SEPTIC SYSTEM DESIGN PLAN TO THE CLIENT BUT HAS NOT BEEN RETAINED TO CONSTRUCT OR SUPERVISE CONSTRUCTION OF THE SYSTEM.

IN VIEW OF SAME, NO GUARANTEE OR WARRANTY, EXPRESS OR IMPLIED, IS MADE TO THE CLIENT OR TO THE ULTIMATE USER RELATIVE TO ANY SYSTEM INSTALLED PURSUANT TO THE PLAN.

HAYES ENGINEERING, INC. DOES REPRESENT THAT THE PLAN MEETS THE REQUIREMENTS OF THE STATE CODE, TITLE 5, EXCEPT WHERE VARIANCES ARE NOTED.

- The general contractor is responsible for horizontal and vertical control of all system components.
- The plan shows the design of the subsurface sewage disposal system only. The system is designed for flows estimated under design criteria.
- System is designed only to accommodate sanitary sewage associated with normal domestic usage and consisting of water-carried putrescible waste.
- The system is not designed for garbage grinders.
- The system shall be vented through building plumbing as required by building code.
- Property lines and building locations are graphic only. Property lines not having been verified, no representation as to the accuracy or certification of those shown is implied or intended.
- Applicable zoning by-laws or other local regulations shall be confirmed by the owner prior to construction.
- The plan shows only those features that were visually apparent on the date of topography or the absence of subsurface structures, utilities, etc. does not mean that they do not exist.
- The installer of this system must be licensed by the local board of health.
- There are no existing wells within 100 feet of the proposed sewage disposal system, to the best of our knowledge, unless otherwise indicated.
- Disposal system areas are to be rock (scarified) before installation of stone. All stones exceeding 2 inches in diameter and all foreign material encountered during excavation are to be removed from the leaching area bed surface.
- Finished surface of the leaching area shall be graded to assure water runoff (2% minimum slope).
- All disturbed areas to be loamed, seeded, and maintained to prevent erosion.
- The septic tank shall be periodically inspected and maintained and should be pumped when sludge in the bottom exceeds 1/4 of the depth.
- Alternate manufacturers for concrete structures and equipment shown on these plans may be used upon the written approval of the design engineer. Alternate manufacturers will not be used if the use of their equipment requires design changes.
- If any part of this design is to be altered in any way, the design engineer as well as the approving authorities shall be notified in writing before construction.
- All work is to comply with the Commonwealth of Massachusetts Department of Environmental Protection State Sanitary Code, Title 5 and any local board of health supplementary regulations.
- The local board of health agent will conduct periodic inspections as needed.
- These plans and specifications are intended to be explanatory of the work to be done and of each other, but should any omission, errors, or discrepancies appear, they shall be subject to correction and interpretation by the design engineer thereby defining and fulfilling the intent of the plans.
- Contractor to notify engineer of any site condition differing from those indicated.
- All work and materials shall conform to the applicable sections of Title 5 of the State Environmental Code.
- Designer to submit an as-built plan of system within two weeks from final inspection.
- General contractor to check between benchmarks shown on this plan.
- All system components shall be marked with magnetic marking tape or a comparable means in order to locate them once buried.
- The soil absorption system shall have a minimum of one (1) inspection port consisting of a perforated four (4) inch pipe placed vertically down into the stone to the naturally occurring soil or sand fill below the stone. The pipe shall be capped with a screw type cap and accessible to within three (3) inches of finish grade.

**MATERIAL NOTES:**

Leach Bedding:

- Clean double washed stone shall be free of iron particles, fines and dust in place.
- Bottom stone in leach area shall be 3/4" to 1-1/2" double washed stone as indicated in note 1 above.
- Top stone in leach area shall be 1/8" to 1/2" double washed peastone for the minimum 2 inch layer of double washed peastone.

**CONSTRUCTION NOTES:**

- Excavate all topsoil, subsoil, and any other unsuitable material within the limits of excavation and replace to top of peastone elevation with select on-site or imported soil material, consisting of clean granular sand, free from organic matter and deleterious substances.
- Fill material shall not contain any material larger than 2 (two) inches. The fill material shall comply with Title 5, State Environmental Code 310 CMR 15.255 (3) as revised.
- Contractor to supply to the town a current sieve test analyses report at their own expense if required by the local approving authority.

**SOIL LOGS**

DEPTH (ft.)	SOIL HORIZON / LAYER	SOIL MATRIX COLOR-MOIST (MUNSELL)	REDOXIMORPHIC FEATURES (MOTTLES)	SOIL TEXTURE (USDA)	COARSE FRAGMENTS % BY VOLUME (GRAVEL, COBBLES & STONES)	SOIL STRUCTURE	SOIL CONSISTENCE (MOIST)	TEXTURE			
								g	s	cl	
00'-10"	Ap	10R 3/3		fs	0	0/0	gr	mfr			
10'-20"	Bw	10R 5/6		sl	0	0/0	m	mfr			
20'-24"	C1	2.5Y 6/4		ls	0	0/0	m	mfr			
60'-84"	C2	2.5Y 5/4		ls	40	20/30	m	mfr			Roots to 30"
84'-88"	C3	2.5Y 6/4	>95"	ls	0	0	m	mfr			Roots to 24"

**DEEP HOLE NUMBER: DOH 1** ELEVATION=88.4'  
 ESTIMATED SEASONAL HIGH GROUNDWATER TABLE GREATER THAN 90" DOWN AT ELEVATION = 88.4'

**DEEP HOLE NUMBER: DOH 2** ELEVATION=88.2'  
 ESTIMATED SEASONAL HIGH GROUNDWATER TABLE GREATER THAN 90" DOWN AT ELEVATION = 81.7'

**SOIL LOGS:**  
 DATE OF TESTING: JUNE 24, 2020  
 SOIL EVALUATOR: GORDON ROGERSON SE2074  
 BOARD OF HEALTH: LEO F. CORMIER

**LEACHING AREA CALCULATIONS:**  
 BOTTOM: (2'W)(42'L) = 84 S.F.  
 SIDES: (2)(2'D)(42'L) = 168 S.F.  
 LEACHING AREA PER TRENCH = 252 S.F.  
 TOTAL LEACH AREA PROVIDED: (3 TRENCHES)(252 S.F./TRENCH) = 756 S.F.

**PERCOLATION RATE:** P1: 4 min./in. @ 42"  
 P2: 4 min./in. @ 45"

**DESIGN DATA:**

NUMBER OF BEDROOMS: 5  
 DESIGN FLOW: 550 G.P.D./B.R.  
 DAILY FLOW: 5 x 110 = 550 G.P.D.  
 SEPTIC TANK REQUIRED: 550 GALLON x 2 = 1100 GAL  
 SEPTIC TANK USED: 1500 GAL 2 COMPARTMENT  
 LEACH AREA REQUIRED:  
 CLASS I SOILS LTAR = 0.74 G.P.D./S.F.  
 550 G.P.D./0.74 G.P.D./S.F. = 743 S.F.

LEACH AREA USED: 756 S.F.  
 NO GARBAGE DISPOSALS ALLOWED

