

January 22, 2026

NEX-2300100.00

Ms. Pamela Merrill  
Massachusetts Department of Environmental Protection  
Northeast Regional Office  
150 Presidential Way  
Woburn, MA 01801

*Sent via Electronic Mail*

SUBJECT: Response to Comments  
Notice of Intent: Replacement of Brandy Brow Culvert over East Meadow River  
Haverhill, Massachusetts  
DEP File No. 033-1591

Dear Ms. Merrill:

On behalf of the City of Haverhill, Greenman-Pedersen, Inc. (GPI) has prepared the enclosed information and supporting documents to respond to the comments issued by the Massachusetts Department of Environmental Protection Northeast Regional Office (MassDEP NERO) on January 7, 2026 for the proposed Replacement of Brandy Brow Culvert over the East Meadow River in Haverhill, MA. The original comments are provided below along with GPI's responses. Revised materials and supporting documents are enclosed with this letter as needed.

**Comment 1:** *It does not appear the MassDEP received a complete NOI application as we are missing all of the Figures referenced in the project narrative, including but not limited to the Hydraulic Report, and cut and fill chart.*

**Response 1:** We apologize for any confusion or difficulties this may have caused, GPI provided additional electronic copies of the Notice of Intent and all supporting documentation to MassDEP NERO on January 8, 2026. GPI can provide additional information or materials as needed.

**Comment 2:** *The proposed culvert replacement project should be filed under 310 CMR 10.53(8) rather than 310 CMR 10.53(3)(i).*

**Response 2:** Comment noted, the WPA Form 3 – Notice of Intent page 2 has been updated to reflect the project's filing under 310 CMR 10.53(8). The project narrative has also been revised to reflect this change. Page 2 of the WPA Form 3 – Notice of Intent and a revised version of the project narrative are included as enclosures.

**Comment 3:** *Although the site is still located within a Zone A, they cite to an outdated FEMA FIRM from 2012; the effective FIRM is dated July 8, 2025, and appears to have expanded on the downstream side of East Meadow River. Pursuant to 310 CMR 10.57(2)(a)3, when the NFIP Profile data is unavailable, BLSF shall be the maximum lateral extent of flood water that has been observed or recorded, and in the event of conflict, the proponent shall provide calculations, prepared by a PE, based on a design storm of 7-inches of precipitation in a 24-hour period, based on TR-55. This should be done to confirm whether additional filling of the 100-year floodplain (BLSF) will occur and to ensure the compensatory flood storage is being proposed at the correct elevations, up to and including the 100-year flood elevation.*

**Response 3:** Comment noted, the Notice of Intent project narrative has been modified to reference the correct FEMA FIRM. The revised project narrative, FEMA FIRM, and FEMA FIRMette for map panel 25009C0083G, dated July 8, 2025 are included as enclosures with this letter. As noted by MassDEP, the project is located within a ZONE A with no Base Flood Elevation (BFE) established. GPI was unable to identify any observations

or records regarding the maximum lateral extent of flood water. The limit of BLSF depicted on the plans is based on the water surface elevation (WSEL) for the 100-Year Storm event that was calculated as part of the Hydraulic Report. This WSEL was modelled using an NRCC 24-hr D 100-Year Rainfall event with a depth of 8.94". GPI would like to confirm whether or not MassDEP feels this methodology is appropriate or if the methodology outlined in the comment above is more appropriate.

**Comment 4:** *The NOI proposes to temporarily alter BVW, LUW, BLSF and RFA and permanently alter Bank, BLSF and RFA; however, the sites do not show any of this. Therefore, the site plans should be revised to show where all wetland resource area alteration is occurring, differentiating the alteration that is temporary versus permanent, and those wetland resource areas that are being restored in-kind or compensated.*

**Response 4:** GPI would like to confirm whether MassDEP feels that the project plans provided electronically on January 8, 2026 accurately depict the proposed alteration as outlined in the comment above. Sheet 4 of the plans includes the wetland resource boundaries and impacts in color as well as a legend identifying the line, hatch, and colors as well as the proposed resource area alteration totals. GPI has provided a supplemental plan sheet identifying work within RFA and BLSF with this letter as an enclosure. Please note that work within BLSF is coincident to work within RFA.

**Comment 5:** *It is not clear why 98 linear feet of Bank is being permanently altered and why it can't be restored.*

**Response 5:** The excavation and grading necessary to remove the existing culvert and install the proposed culvert will result in portions of the bank being excavated and the channel being widened. Though banks will be recreated / restored the impacts were quantified as permanent as the existing banks will be removed and new banks will be constructed in a new location.

**Comment 6:** *The site plans and profiles should also be revised to show the dimension(s) of the low-flow channel along with STA within the thalweg if it will vary in width.*

**Response 6:** The Notice of Intent Plans provided to MassDEP NERO on January 8, 2026 detail the low-flow channel on sheets 6, 9, 12, 14, 16, and 17 at elevation 60'. The low-flow channel as depicted in the originally submitted plans showed two areas of low flow. This has been revised to combine both the grades at elevation 60' and provide a longer, continuous channel that passes beneath the proposed culvert. The low-flow channel will act as a pool, providing aquatic organisms a suitable habitat that maintains natural water depth beneath the culvert. A revised plan set is included as an enclosure with this letter.

**Comment 7:** *The site plans and narrative should include how the BVW and BLSF will be restored, including a planting plan. and stabilized.*

**Response 7:** The project proposes a Wetland Seed Mix – Part Shade Mix, to restore temporarily disturbed areas of BVW. This seed mix is included under Item 755.45 of the Special Provisions for the Project. The project does not propose permanent impacts to BVW and therefore wetland replication is not anticipated. Please see the table below for the plant species included in this mix listed by botanical name, common name, and percent mix by weight.

<b><u>Botanical Name</u></b>	<b><u>Common Name</u></b>	<b><u>% Mix By Weight (PLS)</u></b>
Grass		
Poa palustris	Fowl Bluegrass	25.00%
Elymus riparius	Riverbank Wild Rye	19.00%
Carex lurida	Shallow Sedge	17.00%
Carex vulpinoidea	Fox Sedge	10.00%
Cinna arundinacea	Sweet Woodreed	5.00%

Sparganium eurycarpum	Giant Bur Reed Eco PA	4.00%
Carex scoparia	Broom sedge	4.00%
Carex lupulina	Hop Sedge	4.00%
Scirpus atrovirens	Green Bulrush	3.00%
Juncus effusus	Soft Rush	2.50%
Carex intumescens	Bladder Sedge	2.00%
Sparganium americanum	Burrweed	2.00%
Scirpus cyperinus	Woolgrass	1.00%
Carex crinita	Fringed Sedge	1.00%
Juncus tenuis	Path Rush	<u>0.50%</u>
		100.00%

The Project proposes a Woodland Edge Shade Mix to restore temporarily disturbed areas of RFA and BLSF. This seed mix is included under Item 765.453 of the Special Provisions for the Project. This seed mix consists of the following plant species:

<u>Botanical Name</u>	<u>Common Name</u>	<u>% Mix By Weight (PLS)</u>
<b>Grass</b>		
Elymus virginicus	Virginia Wild Rye	32.0%
Elymus riparius	Riverbank Wild Rye	28.0%
Schizachyrium scoparium 'Albany Pine'	Little Bluestem 'Albany Pine'	10.0%
Panicum clandestinum 'Tioga'	Deer Tongue 'Tioga'	5.0%
Cinna arundinacea	Sweet Woodreed	2.0%
Glyceria canadensis	Manna Grass	2.0%
Carex vulpinoidea	Fox Sedge	2.0%
Agrostis perennans	Upland Bentgrass	1.6%
Juncus tenuis	Path Rush	0.8%
Carex scoparia	Broom sedge	0.5%
Juncus effusus	Soft Rush	0.5%
		<b>84.4%</b>
<b>Herb/Forb</b>		
Chamaecrista fasciculata	Partridge Pea	4.0%
Heliopsis helianthoides	Ox-Eye Sunflower	3.0%
Zizia aurea	Golden Alexanders	2.0%
Geum canadense	White Avens	1.0%
Penstemon digitalis	Beard-tongue	1.0%
Aster macrophyllus	Bigleaf Aster - PA Ecotype	0.6%
Solidago caesia	Woodland Goldenrod	0.5%
Aster divaricatus	White Wood Aster	0.5%
Anemone virginiana	Thimbleweed	0.5%
Monarda fistulosa	Wild Bergamot	0.4%
Verbena hastata	Blue Vervain	0.4%

Solidago bicolor	White Goldenrod	0.3%
Aster prenanthoides	Zig Zag Aster	0.3%
Rudbeckia hirta-VT ecotype	Black-eyed Susan-VT ecotype	0.3%
Solidago odora	Licorice Scented Goldenrod	0.3%
Eupatorium fistulosum	Joe Pye Weed	0.3%
Lobelia siphilitica	Great blue lobelia	0.2%
		<b>15.6%</b>
		<b>100.0%</b>

In areas outside of the reconstructed stream channel, scour protection will consist of riprap with gravel packed voids. Loam and Woodland Edge Shade Mix seed will be spread on top of the riprap and gravel to fill voids and establish a vegetative layer. It is important to note that not all stone surfaces will be covered.

This information has been included in the revised project narrative and is included in the Special Provisions of the Project.

**Comment 8:** *It is not clear if the pebble count performed by LEC matches the proposed imported streambed substrate, and therefore, this should be clarified.*

**Response 8:** The special provisions which will be included in the contract bid documents include “Item 983.5 – Natural Streambed Material Removed and Re-laid”. This item indicates that the intent is for the contractor to stockpile natural streambed material from the excavated area on site for reuse in the embedment of the proposed culvert, however, the special provision also indicates that if for some reason there is not sufficient material on site for reuse, the contractor may supplement the material if it conforms with the result of the pebble count within a 5% tolerance by class. The special provision includes a table summarizing the results of the pebble count conducted by GPI’s Wetland Scientist on November 20, 2024 for reference.

Pebble Count Beyond Downstream Reach East Meadow River Downstream From Brandy Brow Road Culvert				
Performed by: Jason Bolduc, CWS, CSS Ryan Melchionno, PE			Date: 11/20/2024	
Class	Particle Size (mm)	Frequency	Percent	Cumulative Percent
fine sand	0.125-0.25	3	3%	3%
medium sand	0.25 - 0.5	8	8%	11%
coarse sand	0.5 - 1	10	10%	20%
very coarse sand	1 - 2	4	4%	24%
Subtotal =			24%	
very fine gravel	2 - 4	1	1%	25%
fine gravel	4 - 6	1	1%	26%
fine gravel	6 - 8		0%	26%
medium gravel	8 - 11		0%	26%
medium gravel	11 - 16	6	6%	32%
coarse gravel	16 - 22	5	5%	37%
coarse gravel	22 - 32	20	19%	56%
very coarse gravel	32- 45	15	14%	70%
very coarse gravel	45 - 64	14	13%	84%
Subtotal =			60%	
small cobble	64 - 90	11	11%	94%
medium cobble	90 - 128	3	3%	97%
large cobble	128 - 180		0%	97%
very large cobble	180 - 256	3	3%	100%
Subtotal =			16%	
Combined Total =		104	100%	100%

Per DER's input, the pebble count was conducted south beyond the downstream reach. The lagoon upstream of the existing culvert was not included in the pebble count and does not represent the natural conditions of the river.

**Comment 9:** *If filling and/or dredging of the ORW is proposed, a 401 Water Quality Certificate must be obtained from MassDEP prior to the commencement of work.*

**Response 9:** Comment noted, GPI has conducted early coordination with MassDEP on the need for a 401 Water Quality Certificate and is currently preparing an application to be filed in January 2026.

We hope that the response and revised materials provided herein have adequately addressed the comments provided by MassDEP NERO regarding the City of Haverhill's proposed Replacement of Brandy Brow Road Culvert Over East Meadow River in Haverhill, Massachusetts. If you have any additional comments or require additional information, please contact me at [amarquis@gpinet.com](mailto:amarquis@gpinet.com) or (978)-570-2559.

Sincerely,

**GREENMAN-PEDERSEN, INC.**



Alexa Marquis  
Environmental Analyst

enclosure(s)

Revised WPA Form 3 – Notice of Intent Page 2  
Revised Project Narrative  
FEMA FIRM and FEMA FIRMette 25009C0083G - Dated July 8, 2025  
Supplemental RFA and BLSF Impact Construction Plan (Sheet 4)  
Revised Notice of Intent Plan Set

cc: Rob Moore – City of Haverhill Conservation Department  
Harmony Wilson, Chair – City of Haverhill Conservation Commission

## **Revised WPA Form 3 – Notice of Intent Page 2**



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

Haverhill

City/Town

## A. General Information (continued)

### 6. General Project Description:

The project proposes to replace the Brandy Brow Road Culvert over East Meadow River and reconstruct the culvert's respective approaches to approximately 50 linear feet on either side. The existing open bottom concrete culvert is in poor condition and does not meet current Massachusetts Stream Crossing Standards.

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

- 1.  Single Family Home
- 2.  Residential Subdivision
- 3.  Commercial/Industrial
- 4.  Dock/Pier
- 5.  Utilities
- 6.  Coastal engineering Structure
- 7.  Agriculture (e.g., cranberries, forestry)
- 8.  Transportation
- 9.  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)

310 CMR 10.53(8)

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

a. County

2408

c. Book

b. Certificate # (if registered land)

380

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.

## **Revised Project Narrative**

**WPA FORM 3 – NOTICE OF INTENT****PROJECT NARRATIVE****1.0 Introduction**

On behalf of the City of Haverhill – Engineering Department, Greenman-Pedersen, Inc., (GPI) proposes the Replacement of Brandy Brow Road Culvert over East Meadow River in the City of Haverhill, Massachusetts (the Project). USGS and aerial locus maps of the Project limits are included in **Figure 1** and **Figure 2**, respectively.

The Project is located at the East Meadow River culvert crossing along Brandy Brow Road in the City of Haverhill, Massachusetts. The culvert is located approximately 0.25 miles west of the intersection of East Meadow Drive and Brandy Brow Road, adjacent to the residential property at 288 Brandy Brow Road. The Project includes the replacement of the existing culvert and the reconstruction of both the east and west roadway approaches to a point approximately 50 feet beyond the existing culvert structure. The project also includes narrowing the travel lanes over the existing structure to a width of 6 feet to allow for pedestrian access over the culvert and emergency response vehicles.

The Massachusetts Division of Ecological Restoration (DER) Stream Continuity Program provides state-wide assistance to communities interested in replacing degraded and/or undersized road-stream crossings with better designed culverts or bridges that meet improved environmental and flood resiliency criteria. The purpose of the Culvert Replacement Municipal Assistance Grant Program funding is to encourage municipalities to replace culverts with structures that meet these criteria as defined in the Massachusetts Stream Crossing Standards. This project has been selected to receive funding from the DER Culvert Replacement Municipal Assistant Grant Program.

This Notice of Intent (NOI) has been submitted under the Massachusetts Wetlands Protection Act, M.G.L. Chapter 131, Section 40 (the Act); work is proposed within areas Subject to Protection under the Act. Wetland resource area delineations were conducted within the project limits on January 26, 2024 by LEC Environmental Consultants, Inc., (LEC). Jurisdictional wetland resource areas within and adjacent to the project limits have been survey located and are depicted in **Attachment D**, Notice of Intent Plans. Jurisdictional wetland resource areas within the project limits include Bordering Vegetated Wetlands (BVW), Bank to perennial stream, Land Under Water Bodies and Waterways (LUWW), 200-foot Riverfront Area (RA), and Bordering Land Subject to Flooding (BLSF). The project will also result in work within the 100-foot Buffer Zone and the City of Haverhill's 25-foot No Build No Disturbance Zone and 50-foot No Build Zone. The Project is being filed under 310 CMR 10.53(8) of the Act as a culvert replacement project and demonstrates that the impacts of the crossing have been avoided, minimized, and mitigated where possible. The proposed crossing complies with the Massachusetts River and Stream Crossing Standards fully and is described further in **Section 8.3**.

**1.1 Purpose and Need**

The purpose of the Project is to replace the existing, failing culvert with a structure that can accommodate larger storm flows, provides better protection against erosion and scour, reduces resident vulnerability to changing climatic conditions, and improves access across the East Meadow River for pedestrians and emergency personnel over the culvert. The proposed horizontal and vertical alignment of Brandy Brow Road will largely match the existing conditions with minor variations. Proposed replacement of the culvert will improve natural stream processes

along East Meadow River and will allow aquatic species to access critical habitat upstream and downstream of the culvert. The new crossing will also benefit public safety, improve climate resiliency, and reduce the risk of infrastructure damage by accommodating larger storm flows. The Project will also accommodate recreational activities and improve access to the various hiking and wilderness paths to the west of the culvert. A detailed description of the improvements proposed by this project is provided in **Section 3.0**.

Within the project limits, existing operational and safety deficiencies include severe erosion of the culvert walls, putting the culvert at risk of structural failure. Failure of the culvert would eliminate access for residents and emergency services. In its existing condition, the culvert does not meet the Massachusetts Stream Crossing Standards. Please see **Appendix B** for Site Photographs.

### **1.2 Wetland Resource Areas and Work Subject to Filing**

All jurisdictional wetland resource areas within the project limits are associated with East Meadow River. The project will result in work within BVW, Bank to perennial stream, LUWW, 200-foot RA, and BLSF. A description of the classification and location of jurisdictional wetland resource areas within the project limits is described in **Section 2.2**.

### **1.3 City of Haverhill Wetland Protection Ordinance**

The City of Haverhill Conservation Commission generally maintains the same jurisdictional wetland resource area definitions as the Act and establishes a 25-foot No Build-No Disturbance Zone and 50-foot No Build Zone per the City of Haverhill Wetland Protection Ordinance (the Ordinance). The project will result in impacts to the 25-foot No Build-No Disturbance Zone and 50-foot No Build Zone.

The Ordinance defines the 25-foot No Build-No Disturbance Zone as:

*“An area set aside from development to allow for a buffer area between wetlands and buildings, zero to 25 feet from the flagged wetlands on the site where no disturbance or building is allowed...”*

The Ordinance defines the 50-foot No Build Zone as:

*“Twenty-five to 50 feet from the flagged wetlands on the site where no building is allowed.”*

### **1.4 Other Permits Required**

The work proposed by this project includes the replacement of Brandy Brow Road culvert, an activity which requires authorization under Massachusetts General Law Chapter 91, the waterway licensing program. A Chapter 91 WW04 Request for Determination of Applicability will be submitted concurrently with the NOI application to MassDEP to determine if the work will require a Chapter 91 License.

It is anticipated that the project will require a combined 401 Water Quality Certification (WQC) Dredge and 401 WQC Fill / Excavation Application (Form WW26) under 314 CMR 9.00 Section 401 of the Clean Water Act, for work proposed within an Outstanding Resource Water.

## **2.0 Existing Conditions**

### **2.1 Existing Site Conditions**

Brandy Brow Road in Haverhill is a local roadway within the existing city layout. The existing culvert conveys Brandy Brow Road over East Meadow River, a tributary to the Merrimack River

that receives flow from the Neal Pond Water Supply Land and Haverhill Well Fields. Brandy Brow Road transitions to an unpaved roadway to the west of the culvert and provides access to hiking and wilderness trails. These trails extend from the area adjacent to the Brandy Brow Road culvert north and west to the New Hampshire border in Plaistow, New Hampshire.

Four unnamed, perennial tributaries, depicted on the most recent USGS Topographic Map, originate approximately 7,000 feet north of the Project and flow through undeveloped forested uplands and wetlands, residential development, agricultural fields, and under paved roadways prior to discharging into Neal Pond. A beaver dam exists approximately 130 feet north of the Project where East Meadow River discharges from Neal Pond and flows beneath Brandy Brow Road via the existing culvert. The beaver dam creates a significant impoundment upstream of the existing culvert. The project does not propose any activities to or along the existing beaver dam. The East Meadow River continues flowing in a southerly direction for approximately 3.5 miles, discharging into and flowing from the Millvale Reservoir, and ultimately discharging into the Merrimack River.

The existing culvert consists of a single span concrete deck with encased steel stringers. The barrel of the existing culvert has an 8-foot open span with each abutment wall varying in width; the east abutment wall measures 5.7 feet and the west abutment wall measures 3.1 feet. The roadway varies in width but measures approximately 20 feet wide over the culvert. The total length of the culvert structure measures 36 feet. The abutments consist of dry stacked field stones which exhibit severe deterioration. The upstream ends of both abutments have been reconstructed with cast-in-place concrete. The northeast and northwest wingwalls consist of mortared cut granite blocks. The southeast and southwest wingwalls are reinforced concrete. The southwest wingwall has a mortared cut granite block retaining wall that extends 3 feet. All observed elements of the bridge are in extremely poor condition. Brandy Brow Road is closed to traffic over the culvert. The water level inside the culvert channel was observed to be approximately 20 inches deep on February 9, 2024.

In its existing condition, there are numerous deficiencies along this segment of Brandy Brow Road and Brandy Brow Road culvert including a lack of shoulders, a lack of railings and guardrails along the culvert, and structural deficiencies of bridge elements mentioned above. The existing culvert also fails to meet the Massachusetts Stream Crossing Standards.

Land uses adjacent to the project limits include residential single-family neighborhoods and wetlands / waterways located directly adjacent to the project limits associated with East Meadow River and Neal Pond. The project limits primarily consist of impervious area associated with the existing culvert structure.

## 2.2 Wetland Resource Areas

Wetland resource area delineations were conducted within the project limits on January 26, 2024 by LEC. Jurisdictional wetland resource areas within and adjacent to the project limits have been survey located and are depicted on the attached Notice of Intent Plans as **Attachment D**. Jurisdictional wetland resource areas within the project limits include BVW, Bank to perennial stream, LUWW, 200-foot Riverfront Area, and BLSF. The project will also result in work within the 100-foot Buffer Zone and the Ordinance's 25-foot No Build-No Disturbance Zone and 50-foot No Build Zone. An Environmental Constraints Map is provided as **Figure 3**. The Wetland Delineation Sketch is provided as **Appendix A**.

**2.2-1 Bank to Intermittent Stream**

Bank was delineated in one location proximate to the project limits and is associated with East Meadow River, a perennial stream. The stream crosses beneath Brandy Brow Road via single barrel concrete frame culvert with an open bottom. **Table 2.2-1A** provides a description of the delineated banks within the project limits.

**Table 2.2-1A**

Flag Series	Waterbody Name	Description / Notes
WF#B-100 To WF#B-112  And  WF#B-200 To WF#B-212	East Meadow River Perennial Stream	<p>The Bank along East Meadow River varies throughout the Site and is comprised of cobbles, rocks, mucky/mineral substrate, and wetland vegetation. Stone foundations occur along the Bank in proximity to the Brandy Brow Road culvert crossing. Generally, bank undercuts and scouring are common throughout the Bank downstream of the culvert, and exposed roots and scouring are present throughout, as well. The MAHW line is coincident with top of Bank, and the MAHW/Bank is generally coincident with OHW.</p> <p>Bank to the north of the culvert crossing is generally located within steep embankments, with exception to the western Bank between flags B-204 through B-208. Bank to the south of the culvert is situated within gently to moderately sloping embankments to the west, and steep embankments to the east. All Banks are generally vegetated and well defined, ranging from 2 to 24 inches high.</p>

**2.2-2 Bordering Vegetated Wetlands**

BVW was delineated in one location proximate to the Project limits as described in **Table 2.2-2A**. Work is proposed within the associated 100-foot Buffer Zone to BVW as well as the Ordinance’s 25-foot No Build-No Disturbance Zone and 50-foot No Build Zone. Please see **Appendix A** for more information regarding the BVW Flag Series.

**Table 2.2-2A**

Flag Series	Location	Description / Notes
WF#-1-1 to WF#1-12	Located north of Brandy Brow Road associated with the WF#B-200 bank of East Meadow River	One scrub-shrub BVW occurs within a topographic depression and fringes along the western Bank of East Meadow River north (upstream) of the culvert in proximity to the Site. Surface water was observed flowing from the upland meadow to the west into the BVW between wetland flags 1-9 and 1-10; however,

		<p>no upgradient protectable Wetland Resource Areas were observed. The depression held approximately 2 inches of standing water at the time of LEC’s site evaluation, and surface water continued flowing into the river downgradient of wetland flags 1-4/1-5 and 1-11/1-12.</p> <p>Vegetation within the scrub-shrub BVW includes individuals of mature red maple (<i>Acer rubrum</i>). The sparse shrub layer includes individuals of European buckthorn (<i>Rhamnus cathartica</i>) and silky dogwood (<i>Cornus amomum</i>). The groundcover layer includes seedlings from the overstory. Due to site observations outside the growing season, additional groundcover may be present.</p>
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**2.2-3 Land Under Water Bodies and Waterways**

LUWW was identified in one location between the delineated Bank boundaries and below the mean annual low water levels of East Meadow River. Portions of the perennial stream immediately downgradient of the beaver dam and culvert contain deeper pools, likely as a result of the high velocity discharges.

**2.2-4 Bordering Land Subject to Flooding (BLSF)**

According to the July 8, 2025 FEMA Flood Insurance Rate Map (FIRM) Map Number 25009C0083G, East Meadow River has an associated Zone A Flood Hazard Area throughout the project limits. Zone A is classified as an area subject to the 1% annual chance flood (100-year flood), where base flood elevations have not been determined. Please refer to **Figure 5** for the FEMA FIRMette. The maximum lateral extent of flood water and the limit of BLSF depicted on the plans are based on the water surface elevation (WSEL) for the 100-Year Storm event that was calculated as part of the Hydraulic Report. This WSEL was modelled using an NRCC 24-hr D 100-Year Rainfall event with a depth of 8.94”.

**2.2-5 200-foot Riverfront Area**

East Meadow River is a perennial stream with an associated 200-foot RA from the MAHW boundary. The MAHW boundaries within the project limits are generally coincident with the delineated Bank boundaries. Therefore, the limits of the RA have been measured 200 feet horizontally from the Bank flags. The limits of the 200-foot Riverfront Area are depicted on the Notice of Intent Plans.

**2.2-6 100-foot Buffer Zone**

Due to the linear nature of the project and its location adjacent to several wetland resource areas, including Bank and BVW, work within the 100-foot Buffer Zone is essentially unavoidable. The 100-foot Buffer Zone within the project limits can generally be considered previously developed or degraded by the existing transportation infrastructure and adjacent residential and commercial developments. Undisturbed portions of the 100-foot Buffer Zone will be left unaltered to the maximum extent practicable. Erosion control and sedimentation control measures and construction techniques will be employed and maintained to protect adjacent wetland resource areas. The limits of all jurisdictional wetland resource areas are depicted on the Project Plans provided in **Attachment D**.

### 2.3 Jurisdictional Wetland Resource Areas – City of Haverhill

As mentioned previously, the Ordinance generally maintains the same jurisdictional wetland resource area definitions as the Act and establishes a 25-foot No Build-No Disturbance Zone and a 50-foot No Build Zone. Due to the linear nature of the project and its location adjacent to several wetland resource areas, including Bank and BVW, work within the 25-foot No Build-No Disturbance Zone and 50-foot No Build Zone is essentially unavoidable.

### 2.4 Other Sensitive Environmental Areas

The project is located within an Outstanding Resource Water (ORW) classified as a Public Water Supply Watershed and a MassDEP Zone A Wellhead Protection Area which are associated with the Millvale Reservoir. Please see **Figure 4** for the Stormwater Critical Areas Locus Map.

The project is located within land subject to Article 97 protection associated with Neal Pond Water Supply Land. However, the Project does not propose a disposition or change in land use of Article 97 land.

A review of the current MassGIS data layer for the Massachusetts Natural Heritage Atlas (effective August 1, 2021) under the Natural Heritage and Endangered Species Program (NHESP) indicates that the project limits are located within Priority Habitat of Rare Species identified as PH 2148. MassDEP and NHESP have developed a Streamlined NOI process for projects that must be reviewed under both the Massachusetts Endangered Species Act (MESA) and the Wetland Protection Act (WPA). A copy of the NOI application and supporting documents were mailed to MassWildlife for review. On December 11, 2025, MassWildlife determined that the Project, as currently proposed, will not adversely affect the actual Resource Area Habitat of state-protected rare wildlife species and that the Project meets the state-listed species performance standards for the issuance of an Order of Conditions.

No Certified Vernal Pools under the jurisdiction of the Wetlands Protection Act Regulations (310 CMR 10.00 et seq.) or the Massachusetts Endangered Species Act (321 CMR 10.00 et seq.) occur within or adjacent to the Project limits.

East Meadow River is identified as a cold-water fishery by the Massachusetts Division of Fisheries & Wildlife according to the MassGIS data layer.

## 3.0 Proposed Conditions

The Project generally proposes the replacement of the existing culvert to meet current Massachusetts Stream Crossing standards. The majority of the work proposed for this project will occur within previously disturbed / developed areas of Bank, LUWW, BVW, and 200-foot RA associated with existing culvert and roadway infrastructure. The improvements proposed to address existing deficiencies within the project limits include the replacement of the existing culvert, roadway narrowing to a 6-foot-wide single travel lane to allow for emergency services to cross the East Meadow River, and provide access to pedestrians and bicyclists to nearby recreation areas.

### 3.1 Proposed Improvements

The improvements proposed as part of this Project include:

- Installation of erosion and sedimentation control measures, anticipated to consist of compost filter tubes and silt fencing where necessary, around the limit of work.

- Conduct clearing and grubbing of vegetation and tree removal to facilitate construction phase site access.
- Implementation of water controls including sheet piles or sandbags for dewatering and a bypass pipe to maintain stream flow during construction. The water control system will ultimately be designed by the Contractor prior to construction.
- Demolition and removal of the existing bridge deck.
- Demolition and removal of the existing reinforced concrete / stone masonry abutments and stone masonry wingwalls.
- Removal of an existing check dam within the East Meadow River channel approximately 12 feet upstream of the existing culvert.
- Excavation within and adjacent to the channel to install cast in place (CIP) concrete footings and riprap with gravel packed voids for scour protection.
- Installation of a three-sided, precast concrete box culvert supported by CIP concrete footings. The proposed three-sided culvert will have a width of 34 feet, a height of 7 feet 8 inches, and a length of 8 feet. The proposed culvert will be embedded to a depth of 6 feet 9 inches including 5 feet 9 inches of riprap with gravel packed voids and a minimum 12 inches of natural streambed material.
- Construction of CIP concrete wingwalls at the culvert inlet and outlet.
- Installation of riprap with gravel packed voids above the banks to protect against erosion and scour during high flow events. Loam and seed will be applied over riprap within upland areas to provide vegetated surface cover.
- Installation of natural streambed material and grading of a low flow channel within the stream channel and through the culvert to maintain natural water depths and velocities during a variety of flow conditions.
- Installation of timber rail fences over the culvert and along the roadway approaches for pedestrian safety.
- Full depth construction of a 6-foot Hot Mix Asphalt (HMA) shared use path over the culvert.
- Removal of portions of the existing roadway pavement to tie the shared use path into the existing conditions at the east and west ends of the culvert crossing.
- Conduct site grading to tie into existing conditions.
- Application of loam and seed to all disturbed vegetated areas.

### **3.2 Construction Staging and Sequencing**

The anticipated construction sequence for this project includes the following steps:

- Mobilize equipment, work force, and necessary materials to site.

- Install erosion and sedimentation control measures and conduct clearing and grubbing of vegetation and tree trimming / removal to facilitate site access.
- Conduct any necessary grading to facilitate access to East Meadow River.
- Structural elements to be demolished and removed.
- Install water control structure and bypass pipe.
- Demolish and remove existing bridge elements from the site.
- Conduct necessary excavation to construct cast in place concrete footings, wingwalls, and installation of rip rap.
- Install new three-sided culvert within stream channel.
- Embed three-sided culvert with riprap and natural streambed material; install additional riprap upgradient of the banks.
- Place natural streambed material over riprap within the stream channel and grade low flow channel; install loam and seed over riprap in upland areas.
- Upon stabilization of channel and completion of natural stream bed installation, remove the water control system and bypass pump and restore natural flow within the East Meadow River.
- Construct shared use path and timber rail fencing over the proposed three-sided culvert.
- Apply loam and seed to all disturbed areas of vegetation.
- Apply native wetland seed mix to temporarily impacted wetland areas.
- Remove erosion and sedimentation control measures.
- Demobilize equipment and remove any excess construction materials or waste generated from construction activities.

### **3.3 Scour Protection and Streambed Restoration**

In areas outside of the reconstructed stream channel, scour protection will consist of riprap with gravel packed voids. Loam and seed will be spread on top of the riprap and gravel to fill voids and establish a vegetative layer. It is important to note that not all stone surfaces will be covered.

In areas within the reconstructed stream channel, scour protection will consist of riprap with gravel packed voids below a 12-inch minimum natural streambed material. Excavated stones including cobbles and boulders shall be salvaged and stockpiled on site and shall be reused in the reconstructed stream channel to simulate the natural downstream reach conditions. Any excavated material that is man-made or does not match the downstream reach condition shall be removed and discarded from the project limits.

The project also proposes a low flow channel within the reconstructed stream channel as well as native or imported stone and/or boulders clustered near the thalweg. The low flow channel and stone and boulders will provide suitable habitat and cover for aquatic life during low flow.

**4.0 Wetland Resource Area Impacts**

The project proposes work along Bank to perennial stream, within LUWW, BVW, 200-foot RA, and BLSF. The project also proposes work within the 100-foot Buffer Zone and the Ordinance’s 25-foot No Build-No Disturbance Zone and the 50-foot No Build Zone associated with BVW. The majority of this work will occur within areas considered previously developed / degraded by existing impervious surface areas.

**4.1 Proposed Activities in Jurisdictional Wetland Resource Areas**

**4.1-1 Bank to Perennial Stream**

The project will result in 98 linear feet (98 linear feet permanent) of new alteration along the Bank. Permanent impacts along the Bank are associated with the replacement of the existing culvert, widening of the bankfull width to meet current Massachusetts Stream Crossing Standards, grading, and construction phase site access.

A summary of the impacts to Bank proposed by the Project is included in **Table 4.1-1**.

**Table 4.1-1**

Flag Series	Station	Permanent (lf)	Temporary (lf)	Total (lf)	Notes
WF#B-105 to WF#B-112	100+75	49	0	49	Replacement of existing culvert, stream channel widening, and construction phase site access.
WF#B-206 to WF#B-212	100+50	49	0	49	Replacement of existing culvert, stream channel widening, and construction phase site access.
<b>Total</b>		98	0	98	

A summary of the project’s compliance with the Performance Standards is provided in **8.0 Regulatory Compliance**.

**4.1-2 Land Under Water Bodies and Waterways (LUWW)**

The project will result in 1,412 square feet (1,412 square feet temporary) of new alteration within the LUWW. The project proposes to replace the failing culvert with one that will meet Massachusetts Stream Crossing Standards and enhance the streambed and bank with DER approved natural streambed material. Work proposed within LUWW includes temporary dewatering, grading, and construction phase site access. All of the temporary impacts within LUWW will be restored.

A summary of the total impacts to LUWW proposed by the Project is included in **Table 4.1-2**.

**Table 4.1-2**

	<b>Land Under Water Bodies and Waterways Impacts</b>
Permanent (sf)	0
Temporary (sf)	1,412
<b>Total (sf)</b>	<b>1,412</b>

A summary of the project’s compliance with the Performance Standards is provided in **8.0 Regulatory Compliance**.

**4.1-3 *Bordering Vegetated Wetlands***

The project will result in 30 square feet of temporary new alteration within BVW. Temporary impacts within the BVW are associated with grading, installation of erosion and sedimentation control measures, and construction phase site access. All temporarily disturbed areas within the BVW will be restored upon completion of the project through the application of native wetland seed mix.

A summary of the total impacts to BVW proposed by the Project is included in **Table 4.1-3**.

**Table 4.1-3**

	<b>Bordering Vegetated Wetland Impacts</b>
Permanent (sf)	0
Temporary (sf)	30
<b>Total (sf)</b>	<b>30</b>

These impacts are associated with the replacement of the culvert and restoration of the stream that it spans. A summary of the project’s compliance with the Performance Standards is provided in **8.0 Regulatory Compliance**.

**4.1-4 *Bordering Land Subject to Flooding***

According to the Hydraulic Report included as **Attachment C**, and the FEMA FIRMette included as **Figure 5**, the entirety of the project is located within the 100-year Floodplain.

The area of new alteration within the BLSF is coincident with the new alteration within the 200-foot RA and results in 3,870 square feet of impacts (2,434 square feet temporary / 1,436 square feet permanent). Please see the following section for a description of impacts within the 200-foot RA. A summary of the project’s compliance with BLSF Performance Standards is provided in **8.0 Regulatory Compliance**.

The compensatory flood storage calculations are included as **Figure 6**.

**4.1-5 *200-foot Riverfront Area***

The Project proposes alteration within the 200-foot RA totaling 8,138 square feet. Of the 8,138 square feet, 2,237 square feet is previously developed by the existing roadway infrastructure and 2,032 square feet is associated with temporary easements for the project that will not be altered. The project will result in 3,870 square feet (2,434 square feet temporary / 1,436 square feet permanent) of new alteration within 200-foot RA. Proposed permanent impacts within RA are a result of culvert replacement and frame unit construction, as well as scour pad construction. Temporary impacts within RA are

associated with grading, installation of erosion and sediment control measures, streambed restoration and enhancement, and construction phase site access. All temporarily disturbed areas outside of the streambed restoration area within RA will be restored upon completion of the project through the application of loam and native seed mix. The stone scour apron will receive a layer of loam and seed to fill voids and promote native plant growth within the 200-foot RA.

All of the work proposed by the Project within the 200-foot RA is located within the Inner Riparian Area. A summary of the total impacts to RA proposed by the Project is included in **Table 4.1-5**.

**Table 4.1-5**

	200-foot Riverfront Area Impacts		
	Inner Riparian	Outer Riparian	Total
Permanent (sf)	1,436	0	1,436
Temporary (sf)	2,434	0	2,434
<b>Total (sf)</b>	<b>3,870</b>	<b>0</b>	<b>3,870</b>

The entirety of the project is located within the inner riparian zone of the 200-foot RA. All impacts within the 100-foot Buffer Zone, 50-foot No Build Zone, and 25-foot No Build-No Disturbance Zone are coincident to the impacts within the inner riparian zone. The impacts within the 100-foot Buffer Zone, 50-foot No Build Zone, and 25-foot No Build-No Disturbance Zone sum the total impact to the inner riparian zone, 3,870 square feet (2,434 square feet temporary / 1,436 square feet permanent) of new alteration.

**4.1-6 100-foot Buffer Zone**

The project will result in 1,890 square feet (1,261 square feet temporary / 629 square feet permanent) of alteration within the 100-foot Buffer Zone. All of the proposed alteration within the 100-foot Buffer Zone is coincident with the 200-foot RA. Proposed permanent impacts within the 100-foot Buffer Zone are a result of the construction of the culvert frame units and construction of the stone scour apron. Temporary impacts are associated with grading, installation of erosion and sediment control measures, streambed restoration, and construction phase site access. All temporarily disturbed areas within the 100-foot Buffer Zone will be restored upon completion of the project through the application of loam and native seed mix. **Table 4.1-6** below provides a summary of the proposed 100-foot Buffer Zone impacts.

**Table 4.1-6**

	100-foot Buffer Zone Impacts
Permanent (sf)	629
Temporary (sf)	1,261
<b>Total (sf)</b>	<b>1,890</b>

**4.2 Work in Jurisdictional Wetland Resource Areas – City of Haverhill**

**4.2-1 50-foot No Build Zone**

The project will result in 1,227 square feet (750 square feet temporary / 477 square feet permanent) of alteration within the 50-foot No Build Zone. All of the proposed alteration within the 50-foot No Build Zone is coincident with the 200-foot RA. Proposed permanent

impacts within the 50-foot No Build Zone are a result of the construction of the culvert frame units and the stone scour apron. Temporary impacts are associated with grading, installation of erosion and sediment control measures, streambed restoration, and construction phase site access. All temporarily disturbed areas within the 50-foot No Build Zone will be restored upon completion of the project through the application of loam and native seed mix. **Table 4.2-1** below provides a summary of the proposed 50-foot No Build Zone impacts.

**Table 4.2-1**

	<b>50-foot No Build Zone Impacts</b>
Permanent (sf)	477
Temporary (sf)	750
<b>Total (sf)</b>	<b>1,227</b>

**4.2-2 25-foot No Build-No Disturbance Zone**

The project will result in 753 square feet (423 square feet temporary / 330 square feet permanent) of new alteration within the 25-foot No Build-No Disturbance Zone. All of the proposed alteration within the 25-foot No Build-No Disturbance Zone is coincident with the 200-foot RA. Proposed permanent impacts within the 25-foot No Build-No Disturbance Zone are a result of the construction of the proposed culvert frame units and the stone scour apron. Temporary impacts are associated with grading, installation of erosion and sediment control measures, construction of streambed restoration, and construction phase site access. All temporarily disturbed areas within the 25-foot No Build-No Disturbance Zone will be restored upon completion of the project through the application of loam and native seed mix. **Table 4.2-2** below provides a summary of the proposed 25-foot No Build-No Disturbance Zone impacts.

**Table 4.2-2**

	<b>25-foot No Build-No Disturbance Zone Impacts</b>
Permanent	330
Temporary	423
<b>Total</b>	<b>753</b>

**5.0 Avoidance, Minimization, and Mitigation Measures**

The Project was designed with an interest to avoid, minimize, and mitigate impacts to wetland resource areas to the maximum extent practicable. Mitigation measures provided for unavoidable impacts allow the project to be conditioned to comply with the General Performance Standards in the Wetland Regulations and contribute to the interests found in the Massachusetts Wetland Protection Act. Impacts to resource areas Subject to Protection under the Act have been adequately compensated. Temporarily impacted areas will be restored in place using a native seed mix.

**5.1 Avoidance**

Due to the proposed improvements along Brandy Brow Road, specifically the proposed culvert replacement, the project is unable to completely avoid impacts to jurisdictional wetland resource areas. Though it is not possible to completely avoid impacting all jurisdictional wetland resource areas, the applicant has altered the design to avoid impacts where practicable and feasible.

## 5.2 Minimization

The work areas within the upstream and downstream reaches of the East Meadow River have been minimized to the maximum extent practicable while still providing adequate space to facilitate demolition and construction activities. The limits of the scour protection have been minimized to the maximum extent practicable while also ensuring that the culvert is adequately armored for high flow events. Please see **Section 7.0 Alternatives Analysis**.

## 5.3 Mitigation

Mitigation measures provided for unavoidable impacts allow the project to be conditioned to comply with the General Performance Standards in the Wetlands Regulations and contribute to the interests found in the Massachusetts Wetland Protection Act. The Project proposes 30 square feet of temporary new alteration within BVW.

The project proposes a Wetland Seed Mix – Part Shade Mix, to restore temporarily disturbed areas of BVW. This seed mix is included under Item 755.45 of the Special Provisions for the Project. The project does not propose permanent impacts to BVW and therefore wetland replication is not anticipated. Please see the table below for the plant species included in this mix listed by botanical name, common name, and percent mix by weight.

<u>Botanical Name</u>	<u>Common Name</u>	<u>% Mix By Weight (PLS)</u>
<b>Grass</b>		
Poa palustris	Fowl Bluegrass	25.00%
Elymus riparius	Riverbank Wild Rye	19.00%
Carex lurida	Shallow Sedge	17.00%
Carex vulpinoidea	Fox Sedge	10.00%
Cinna arundinacea	Sweet Woodreed	5.00%
Sparganium eurycarpum	Giant Bur Reed Eco PA	4.00%
Carex scoparia	Broom sedge	4.00%
Carex lupulina	Hop Sedge	4.00%
Scirpus atrovirens	Green Bulrush	3.00%
Juncus effusus	Soft Rush	2.50%
Carex intumescens	Bladder Sedge	2.00%
Sparganium americanum	Burrweed	2.00%
Scirpus cyperinus	Woolgrass	1.00%
Carex crinita	Fringed Sedge	1.00%
Juncus tenuis	Path Rush	<u>0.50%</u>
		100.00%

The Project proposes a Woodland Edge Shade Mix to restore temporarily disturbed areas of RFA and BLSF. This seed mix is included under Item 765.453 of the Special Provisions for the Project. This seed mix consists of the plant species on the following page.

<u>Botanical Name</u>	<u>Common Name</u>	<u>% Mix By Weight (PLS)</u>
<b>Grass</b>		
Elymus virginicus	Virginia Wild Rye	32.0%
Elymus riparius	Riverbank Wild Rye	28.0%
Schizachyrium scoparium 'Albany Pine'	Little Bluestem 'Albany Pine'	10.0%
Panicum clandestinum 'Tioga'	Deer Tongue 'Tioga'	5.0%
Cinna arundinacea	Sweet Woodreed	2.0%
Glyceria canadensis	Manna Grass	2.0%
Carex vulpinoidea	Fox Sedge	2.0%
Agrostis perennans	Upland Bentgrass	1.6%
Juncus tenuis	Path Rush	0.8%
Carex scoparia	Broom sedge	0.5%
Juncus effusus	Soft Rush	0.5%
		<b>84.4%</b>
<b>Herb/Forb</b>		
Chamaecrista fasciculata	Partridge Pea	4.0%
Heliopsis helianthoides	Ox-Eye Sunflower	3.0%
Zizia aurea	Golden Alexanders	2.0%
Geum canadense	White Avens	1.0%
Penstemon digitalis	Beard-tongue	1.0%
Aster macrophyllus	Bigleaf Aster - PA Ecotype	0.6%
Solidago caesia	Woodland Goldenrod	0.5%
Aster divaricatus	White Wood Aster	0.5%
Anemone virginiana	Thimbleweed	0.5%
Monarda fistulosa	Wild Bergamot	0.4%
Verbena hastata	Blue Vervain	0.4%
Solidago bicolor	White Goldenrod	0.3%
Aster prenanthoides	Zig Zag Aster	0.3%
Rudbeckia hirta-VT ecotype	Black-eyed Susan-VT ecotype	0.3%
Solidago odora	Licorice Scented Goldenrod	0.3%
Eupatorium fistulosum	Joe Pye Weed	0.3%
Lobelia siphilitica	Great blue lobelia	0.2%
		<b>15.6%</b>
		<b>100.0%</b>

In areas outside of the reconstructed stream channel, scour protection will consist of riprap with gravel packed voids. Loam and seed will be spread on top of the riprap and gravel to fill voids and establish a vegetative layer. It is important to note that not all stone surfaces will be covered.

### 5.3.1 Stream Crossing Replacement

The project proposes to replace the existing culvert that conveys East Meadow River beneath Brandy Brow Road with a new precast, open box, concrete culvert that meets the Massachusetts Stream Crossing Standards and provides a significant improvement over

the existing conditions. The proposed crossing structure will provide a more open crossing that spans bankfull width, thus improving wildlife passage while also not changing the hydrology of East Meadow River during low flow or flooding events. Please refer to **8.3 Massachusetts River and Stream Crossing Standards** for a summary of the proposed structures' compliance with the Massachusetts Stream Crossing Standards.

#### **5.4 Erosion and Sedimentation Control**

Erosion and sedimentation controls will be installed and maintained where activities are proposed within 100 feet of wetland resource areas. The proposed erosion and sedimentation control measures will provide a limit of work barrier while also preventing sediments and suspended solids from migrating into or towards downgradient wetland resource areas.

Erosion controls shall consist of compost filter tubes and silt fences. No hay bales shall be used at any time on this project. The erosion and sedimentation control measures will be constructed in accordance with the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban areas, March 1997 and the USDA SCS's Erosion and Sediment control in the Site Development, Massachusetts Conservation Guide, September – 1983. Best management practices for erosion and sedimentation control will be adhered to for all phases of construction to minimize potential impacts to wetland resource areas and wildlife habitat.

The contractor will be responsible for obtaining the National Pollution Discharge Elimination System (NPDES) Construction General Permit. A Stormwater Pollution Prevention Plan (SWPPP) will be submitted prior to any land disturbance.

### **6.0 Stormwater**

The Project is subject to the Massachusetts Stormwater Standards which are incorporated into the Wetlands Protection Regulations, 310 CMR 10.05 (6)(b) and defined at 310 CMR 10.05 (6)(k) through (q). The proposed improvements along Brandy Brow Road include upgrades to the existing transportation infrastructure and therefore can be classified as a redevelopment project which is defined as the maintenance and improvement of existing roadways, including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage, and repaving. The project will result in a net reduction in impervious area by 944 square feet by narrowing the Brandy Brow Road travel way over the East Meadow River from approximately 20 feet to 6 feet.

The Project has been designed to meet the stormwater standards to the maximum extent practicable. A Stormwater Checklist and Report have been completed and submitted with this NOI, as required.

### **7.0 Alternatives Analysis**

#### **7.1 Alternative 1**

Alternative 1 consisted of: precast concrete arch units (Not Skewed), precast or cast-in-place concrete headwalls (approximately 2 feet tall), U-Shaped modular or cast-in-place concrete cantilever wingwalls, cast-in-place concrete rafted footings on micro-piles (piles added later in concept development), 29 foot 6 inch exposed clear span having a 7-foot vertical clearance to the intrados, and embankment armoring (added later in concept development).

Alternative 1 is based on an average downstream full bank width of 23.5 feet and a corresponding minimum DER channel width goal of 1.2 x full bank width = 28.2 feet. The clear span of 29 feet 6 inches is the result of selecting a widely available off-the-shelf precast arch unit that vertically fits the site. A 7-foot vertical clearance to the arch intrados was achieved which satisfies DER's minimum 6-foot height requirement. Hydraulic analysis of this arch alternative resulted in a significantly undersized opening that overtopped during a 100-year flood event. Alternative 1 was determined to be inadequate and removed from further consideration.

## **7.2 Alternative 2 (Selected)**

Alternative 2 consists of; precast concrete 3-sided rigid frame units (skewed), flared cast-in-place concrete cantilever walls, cast-in-place spread footings, a 34-foot clear span and approximate 7.66 foot vertical clearance, and riprap scour protection below natural streambed.

Alternative 2 provides a larger opening to avoid overtopping during the 100-year flood event. A 3-sided frame was selected as it provides a significantly more efficient opening relative to an arch. The clear span was increased to 34 feet, and the vertical clearance was increased to 7.66 feet which satisfies DER's minimum 6-foot height requirement and nearly achieves DER's optimum 8-foot height goal. Headwalls were omitted for this alternative as a result of increasing the vertical opening. The frame units are skewed to match the channel to better accommodate the significant flood volumes reflected in the H&H analysis. Alternative 2 was selected.

## **7.3 Off Site Alternative**

There are no feasible off-site alternatives that would be less environmentally impactful than the proposed improvements. Any new culvert construction intended to bypass Brandy Brow Road Culvert over East Meadow River would have major impacts on private property, environmentally sensitive areas, and safety concerns that would significantly outweigh any potential benefits.

## **7.4 No Build Alternative**

The No Build Alternative would result in the existing culvert remaining deficient and would provide no improvements to the existing culvert or transportation infrastructure. The No Build Alternative was not considered.

# **8.0 Regulatory Compliance**

## **8.1 General Performance Standards**

The project will meet the General Performance Standards at 310 CMR 10.54(4), 10.56(4)(a), 10.57(4)(a), and 10.58(4) for the portions of the project that do not qualify as Limited Projects.

### **8.2-1 10.54(4) General Performance Standards for Bank**

*(a) Where the presumption set forth in 310 CMR 10.54(3) is not overcome, any proposed work on a Bank shall not impair the following:*

- 1. the physical stability of the Bank;*
- 2. the water carrying capacity of the existing channel within the Bank;*
- 3. ground water and surface water quality;*
- 4. the capacity of the Bank to provide breeding habitat, escape cover and food for fisheries;*
- 5. the capacity of the Bank to provide important wildlife habitat functions. A project or projects on a single lot, for which Notice(s) of Intent is filed on or after November 1, 1987, that (cumulatively) alter(s) up to 10% or 50 feet (whichever is less) of the length of the bank found to be significant to the protection of wildlife habitat, shall not be deemed to impair its capacity to provide important wildlife habitat functions. In the case of a bank of*

*a river or an intermittent stream, the impact shall be measured on each side of the stream or river. Additional alterations beyond the above threshold may be permitted if they will have no adverse effects on wildlife habitat, as determined by procedures contained in 310 CMR 10.60.*

6. *Work on a stream crossing shall be presumed to meet the performance standard set forth in 310 CMR 10.54(4)(a) provided the work is performed in compliance with the Massachusetts Stream Crossing Standards by consisting of a span or embedded culvert in which, at a minimum, the bottom of a span structure or the upper surface of an embedded culvert is above the elevation of the top of the bank, and the structure spans the channel width by a minimum of 1.2 times the bankfull width. This presumption is rebuttable and may be overcome by the submittal of credible evidence from a competent source. Notwithstanding the requirement of 310 CMR 10.54(4)(a)5., the impact on bank caused by the installation of a stream crossing is exempt from the requirement to perform a habitat evaluation in accordance with the procedures contained in 310 CMR 10.60.*

*(b) Notwithstanding the provisions of 310 CMR 10.54(4)(a), structures may be permitted in or on a Bank when required to prevent flood damage to facilities, buildings and roads constructed prior to the effective date of 310 CMR 10.51 through 10.60 or constructed pursuant to a Notice of Intent filed prior to the effective date of 310 CMR 10.51 through 10.60 (April 1, 1983), including the renovation or reconstruction (but not substantial enlargement) of such facilities, buildings and roads, provided that the following requirements are met:*

1. *The proposed protective structure, renovation, or reconstruction is designed and constructed using best practical measures so as to minimize adverse effects on the characteristics and functions of the resource area;*
2. *The applicant demonstrates that there is no reasonable method of protecting, renovating, or rebuilding the facility in question other than the one proposed.*

*(c) Notwithstanding the provisions of 310 CMR 10.54(4)(a) or (b), no project may be permitted which will have any adverse effect on the specified habitat sites of Rare Species, as identified by procedures established under 310 CMR 10.59.*

The Project proposes the replacement of Brandy Brow Road Culvert that conveys flow from East Meadow River and meets the General Performance Standards for Bank at 310 CMR 10.54(4). In accordance with 310 CMR 10.54(4)(a), the proposed improvements will not impair:

1. the physical stability of the Bank; the construction of the proposed wingwalls and the stone scour apron will protect against erosion and scour on the slopes adjacent to the existing Banks, contributing to the stability of the Banks.
2. the water carrying capacity within the Bank; the project will not result in any fill within the existing channel and changes to the channel's width and depth are a direct result of channel widening and streambed restoration to meet the Massachusetts Stream Crossing Standards. The existing culvert is undersized and has restricted the channel width. Please see **Attachment C** for the Hydraulic Report which demonstrates a "No Rise" in elevations for the various modelled storm events.
3. the groundwater and surface water quality; the project proposes to replace the existing culvert that spans East Meadow River. There are no existing storm drains within proximity of the culvert. The proposed culvert and approaches will utilize "country drainage." The new culvert will include a 6-inch reveal at both curbs to direct runoff from draining directly to the river below.

4. the capacity of the Bank to provide breeding habitat, escape cover, and food for fisheries; the proposed East Meadow Brook culvert streambed will consist of native material approved by DER to ensure appropriate habitat for naturally occurring aquatic species. The structure will not result in any adverse effects on the Bank's ability to support fisheries and wildlife habitat functions.
5. the capacity of the Bank to provide important wildlife habitat functions; the project will temporarily alter 98 linear feet of Banks to East Meadow River and will not have any adverse effects on the Banks' ability to provide important wildlife habitat functions.
6. compliance with the Massachusetts Stream Crossing Standards; the project proposes to replace the Brandy Brow Road culvert over East Meadow River. The project is in compliance with the Massachusetts Stream Crossing Standards as demonstrated in **Section 8.3**

310 CMR 10.54(4)(b) is not applicable as none of the improvements proposed along Brandy Brow Road are related to the construction of structures intended to prevent flood damage to facilities, buildings, or roads constructed prior to the effective date.

All of the proposed work within the project limits is located within NHESP Priority Habitat (PH 2148). On December 11, 2025, MassWildlife determined that the Project, as currently proposed, will not adversely affect the actual Resource Area Habitat of state-protected rare wildlife species and that the Project meets the state-listed species performance standards for the issuance of an Order of Conditions. There are no NHESP Certified or potential vernal pools within the project limits. The project anticipates compliance with 310 CMR 10.54(4)(c).

The proposed work complies with all of the applicable performance standards for Bank at 310 CMR 10.54.

#### **8.2-2 10.55(4) General Performance Standards for Bordering Vegetated Wetlands**

*(a) Where the presumption set forth in 310 CMR 10.55(3) is not overcome, any proposed work in a Bordering Vegetated Wetland shall not destroy or otherwise impair any portion of said area.*

*(b) Notwithstanding the provisions of 310 CMR 10.55(4)(a), the issuing authority may issue an Order of Conditions permitting work which results in the loss of up to 5000 square feet of Bordering Vegetated Wetland when said area is replaced in accordance with the following general conditions and any additional, specific conditions the issuing authority deems necessary to ensure that the replacement area will function in a manner similar to the area that will be lost:*

1. *the surface of the replacement area to be created ("the replacement area") shall be equal to that of the area that will be lost ("the lost area");*
2. *the ground water and surface elevation of the replacement area shall be approximately equal to that of the lost area;*
3. *The overall horizontal configuration and location of the replacement area with respect to the bank shall be similar to that of the lost area;*
4. *the replacement area shall have an unrestricted hydraulic connection to the same water body or waterway associated with the lost area;*
5. *the replacement area shall be located within the same general area of the water body or reach of the waterway as the lost area;*
6. *at least 75% of the surface of the replacement area shall be reestablished with indigenous wetland plant species within two growing seasons, and prior to said vegetative reestablishment any exposed soil in the replacement area shall be temporarily stabilized*

*to prevent erosion in accordance with standard U.S. Soil Conservation Service methods; and*

7. *the replacement area shall be provided in a manner which is consistent with all other General Performance Standards for each resource area in Part III of 310 CMR 10.00. In the exercise of this discretion, the issuing authority shall consider the magnitude of the alteration and the significance of the project site to the interests identified in M.G.L. c. 131, § 40, the extent to which adverse impacts can be avoided, the extent to which adverse impacts are minimized, and the extent to which mitigation measures, including replication or restoration, are provided to contribute to the protection of the interests identified in M.G.L. c. 131, § 40.*

*(c) Notwithstanding the provisions of 310 CMR 10.55(4)(a), the issuing authority may issue an Order of Conditions permitting work which results in the loss of a portion of Bordering Vegetated Wetland when;*

1. *said portion has a surface area less than 500 square feet;*
2. *said portion extends in a distinct linear configuration ("finger-like") into adjacent uplands; and*
3. *in the judgment of the issuing authority it is not reasonable to scale down, redesign or otherwise change the proposed work so that it could be completed without loss of said wetland.*

*(d) Notwithstanding the provisions of 310 CMR 10.55(4)(a),(b) and (c), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.*

*(e) Any proposed work shall not destroy or otherwise impair any portion of a Bordering Vegetated Wetland that is within an Area of Critical Environmental Concern designated by the Secretary of Energy and Environmental Affairs under M.G.L. c. 21A, § 2(7) and 301 CMR 12.00: Areas of Critical Environmental Concern. 310 CMR 10.55(4)(e):*

1. *supersedes the provisions of 310 CMR 10.55(4)(b) and (c);*
2. *shall not apply if the presumption set forth at 310 CMR 10.55(3) is overcome;*
3. *shall not apply to work proposed under 310 CMR 10.53(3)(I); and*
4. *shall not apply to maintenance of stormwater detention, retention, or sedimentation ponds, or to maintenance of stormwater energy dissipating structures, that have been constructed in accordance with a valid order of conditions.*

The project results in 30 square feet of total alteration within BVW. The project does not propose permanent impacts to BVW, resulting in no "lost area." The project has been adjusted to avoid BVW alteration where practicable and feasible. In order to adequately restore the streambed and stream banks, a portion of BVW is proposed to be graded and temporarily impacted. The project proposes to adequately restore temporarily impacted areas with a native wetland seed mix.

### **8.2-3 10.56(4)(a) General Performance Standards for Land Under Water Bodies and Waterways (LUWW)**

*(a) Where the presumption set forth in 310 CMR 10.56(3) is not overcome, any proposed work within Land under Water Bodies and Waterways shall not impair the following:*

1. *The water carrying capacity within the defined channel, which is provided by said land in conjunction with the banks;*
2. *Ground and surface water quality;*

3. *The capacity of said land to provide breeding habitat, escape cover and food for fisheries; and*
4. *The capacity of said land to provide important wildlife habitat functions. A project or projects on a single lot, for which Notice(s) of intent is filed on or after November 1, 1987, that (cumulatively) alter(s) up to 10% or 5,000 square feet (whichever is less) of land in this resource area found to be significant to the protection of wildlife habitat, shall not be deemed to impair its capacity to provide important wildlife habitat functions. Additional alterations beyond the above threshold may be permitted if they will have no adverse effects on wildlife habitat, as determined by procedures established under 310 CMR 10.60.*
5. *Work on a stream crossing shall be presumed to meet the performance standard set forth in 310 CMR 10.56(4)(a) provided the work is performed in compliance with the Massachusetts Stream Crossing Standards by consisting of a span or embedded culvert in which, at a minimum, the bottom of a span structure or the upper surface of an embedded culvert is above the elevation of the top of the bank, and the structure spans the channel width by a minimum of 1.2 times the bankfull width. This presumption is rebuttable and may be overcome by the submittal of credible evidence from a competent source. Notwithstanding the requirements of 310 CMR 10.56(4)(a)4., the impact on Land under Water Bodies and Waterways caused by the installation of a stream crossing is exempt from the requirement to perform a habitat evaluation in accordance with the procedures established under 310 CMR 10.60.*

Work within LUWW will meet the performance standards at 310 CMR 10.56(4) as work will not impair the water carrying capacity within the defined channels, impair ground or surface water quality, or permanently exceed thresholds for wildlife habitat impairment at the proposed East Meadow River stream crossing replacement.

#### **8.2-4 10.57(4)(a) General Performance Standards for Bordering Land Subject to Flooding**

*(1) Compensatory Flood Storage shall be provided for all flood storage volume that will be lost as the result of a proposed project within Bordering Land Subject to Flooding, when in the judgment of the issuing authority said loss will cause an increase or will contribute incrementally to an increase in the horizontal extent and level of flood waters during peak flows. Compensatory storage shall mean a volume not previously used for flood storage and shall be incrementally equal to the theoretical volume of flood water at each elevation, up to and including the 100-year flood elevation, which would be displaced by the proposed project. Such compensatory volume shall have an unrestricted hydraulic connection to the same waterway or water body. Further, with respect to waterways, such compensatory volume shall be provided within the same reach of the river, stream, or creek.*

The Project proposes cut and fill volumes below Base Flood Elevation. The project will not result in any loss of flood storage resulting in a change in the horizontal extents or level of flood waters during peak flows and as such no compensatory flood storage is required or proposed. The compensatory flood storage calculations are included as **Figure 6**.

*(2) Work within Bordering Land Subject to Flooding, including that work required to provide the above specified compensatory storage, shall not restrict flows so as to cause an increase in flood stage or velocity.*

The proposed work within BLSF is temporary in nature or proposes the redevelopment of existing roadway infrastructure and will not result in any restriction of flow so as to cause an increase in flood storage or velocity. The project proposes to demolish the existing culvert that restricts the flow of East Meadow River and replace the culvert with one that meets the Massachusetts Stream Crossing Standards.

*(3) Work in those portions of bordering lands subject to flooding found to be significant to the protection of wildlife habitat shall not impair its capacity to provide important wildlife habitat functions. Except for work which would adversely affect vernal pool habitat, a project or projects on a single lot, for which Notice(s) of Intent is filed on or after November 1, 1987, that (cumulatively) alter(s) up to 10% or 5,000 square feet (whichever is less) of land in this resource area found to be significant to the protection of wildlife habitat, shall not be deemed to impair its capacity to provide important wildlife habitat functions. Additional alterations beyond the above threshold, or altering vernal pool habitat, may be permitted if they will have no adverse effects on wildlife habitat, as determined by procedures contained in 310 CMR 10.60.*

The BLSF within the project limits at Brandy Brow Road is previously developed / degraded by the existing roadway infrastructure. This area of BLSF is significant to the protection of wildlife habitat. The proposed improvements within BLSF will not impair, and instead enhance, the area's ability to provide wildlife habitat functions via streambed restoration by meeting the Massachusetts Stream Crossing Standards.

#### **8.2-5 10.58(4) General Performance Standards for Riverfront Area**

*(a) Protection of Other Resource Areas. The work shall meet the performance standards for all other resource areas within the riverfront area, as identified in 310 CMR 10.30 (Coastal Bank), 10.32 (Salt Marsh), 10.55 (Bordering Vegetated Wetland), and 10.57 (Land Subject to Flooding). When work in the riverfront area is also within the buffer zone to another resource area, the performance standards for the riverfront area shall contribute to the protection of the interests of M.G.L. c. 131, § 40 in lieu of any additional requirements that might otherwise be imposed on work in the buffer zone within the riverfront area.*

The project proposes work that will result in the alteration of other jurisdictional wetland resource areas, specifically LUWW, BVW, Bank, and BLSF, however, the project complies with the General Performance Standards for these resource areas and therefore complies with 10.58(4)(a).

*(b) Protection of Rare Species. No project may be permitted within the Riverfront Area which will have any adverse effect on specified habitat sites of rare wetland or upland, vertebrate or invertebrate species, as identified by the procedures established under 310 CMR 10.59 or 10.37, or which will have any adverse effect on vernal pool habitat certified prior to the filing of the Notice of Intent.*

All of the proposed work within the project limits is located within NHESP Priority Habitat (PH 2148). On December 11, 2025, MassWildlife determined that the Project, as currently proposed, will not adversely affect the actual Resource Area Habitat of state-protected rare wildlife species and that the Project meets the state-listed species performance standards for the issuance of an Order of Conditions. There are no NHESP Certified or potential vernal pools within the project limits. The project complies with 10.58(4)(b).

- (c) *Practicable and Substantially Equivalent Economic Alternatives. There must be no practicable and substantially equivalent economic alternative to the proposed project with less adverse effects on the interests identified in M.G.L. c. 131 § 40.*

There are no practicable and sustainable equivalent economic alternatives to the proposed project that would have less adverse effects on the interests identified in M.G.L. c. 131 § 40. Please refer to **Appendix C** for the Riverfront Area Alternatives Analysis.

- (d) *No Significant Adverse Effect. The work, including proposed mitigation measures, must have no significant adverse impact on the riverfront area to protect the interests identified in M.G.L. c. 131, § 40.*

The project will result in permanent alteration of undeveloped / undisturbed 200-foot Riverfront Area totaling 3,870 square feet (1,436 square feet permanent, or 17.6% of total permanent new alteration within 8,138 square feet of 200-foot RA). The project does not anticipate significant adverse effects to the 200-foot RA.

### 8.3 Massachusetts River and Stream Crossing Standards

As described in **5.3.2 Stream Crossing Replacement**, the project proposes to replace the existing culvert that conveys East Meadow River beneath Brandy Brow Road with a new precast, 3-sided open bottom, concrete culvert. The clear span was increased to 34 feet and the vertical clearance was increased to 7.66 feet which nearly achieves DER's optimum 8-foot height goal. Headwalls were omitted for this alternative as a result of increasing the vertical opening. The frame units are skewed to match the channel to better accommodate the significant flood volumes reflected in the H&H analysis. Within the culvert, the streambed will be embedded with a base of modified rock fill and gravel filled voids and topped with an additional 1-foot of DER approved pebbles and/or a native streambed material. The proposed crossing structure meets the Massachusetts Stream Crossing Standards and provides an improvement over the existing conditions. Dewatering measures and turbidity controls will be implemented during the removal of the existing culvert and installation of the new culvert to ensure there are no increases in total suspended solids or turbidity during construction. A summary of the existing and proposed structures' compliance with the Massachusetts Stream Crossing Standards is provided below.

**Standard 1 – Type of Crossing:** *Spans (bridges, 3-sided box culverts, open-bottom culverts or arches) are strongly preferred.*

**Existing Structure:** The existing culvert consists of a single span concrete deck with encased steel stringers. The culvert has an 8-foot clear span with each wall varying in width and a vertical clearance of 6.33 feet. The abutments consist of stacked field stones. The upstream ends of both abutments have been reconstructed with cast-in-place concrete. The northeast and northwest wingwalls consist of mortared cut granite blocks. The southeast and southwest wingwalls are reinforced concrete. The southwest wingwall has a mortared cut granite block retaining wall that extends 3 feet. The existing culvert does not meet Standard 1.

**Proposed Structure:** The proposed structure is an open bottom, 3-sided, concrete box culvert which will be embedded with a natural streambed material. The proposed structure provides an improvement over the existing conditions. **The proposed structure meets Standard 1.**

**Standard 2 – Embedment:** *All culverts should be embedded (sunk into stream) a minimum of 2 feet, and round pipe culverts at least 25%. If pipe culverts cannot be embedded this deep, then*

*they should not be used. When embedment materials include elements > 15 inches in diameter, embedment depths should be at least twice the  $D_{84}$  (particle width larger than 84% of particles) of particles of the embedment materials.*

**Existing Structure:** The existing culvert is embedded to a depth less than 1-foot. The existing structure does not meet Standard 2.

**Proposed Structure:** The proposed structure will be embedded to a depth of 5 feet below the existing bottom of streambed elevation; 4 feet modified rock fill with gravel filled voids, topped with a minimum 1-foot of natural streambed material. **The proposed structure meets Standard 2.**

**Standard 3 – Crossing Span:** *Spans channel width (a minimum of 1.2 times the bankfull width of the stream).*

**Existing Structure:** Within the vicinity of the existing crossing structure, East Meadow River has an average bankfull width of approximately 23.47 feet. A structure spanning the channel a minimum of 1.2 times bankfull width would have a width of 28.1 feet. The existing structure has an open span of 8 feet. The existing culvert does not span the channel 1.2 times bankfull width, therefore the existing culvert does not meet Standard 3.

**Proposed Structure:** The proposed crossing structure has an open span of 34 feet. The proposed structure spans the channel greater than 1.2 times bankfull width and provides an improvement over the existing conditions. **The proposed structure meets Standard 3.**

**Standard 4 – Openness:** *Openness ratio (cross-sectional area / crossing length) of at least 0.82 feet (0.25 meters). The crossing should be wide and high relative to its length.*

**Existing Structure:** The existing structure has a cross-sectional area of 50.64 square feet. The existing structure is 36 feet long. The existing structure has an openness ratio of 1.4 and meets Standard 4.

$$\begin{aligned} \text{Openness Ratio} &= (\text{cross-sectional area} / \text{crossing length}) \\ \text{Openness Ratio} &= (8 \times 6.33) / 36 \\ \text{Openness Ratio} &= (50.64) / 36 \\ \text{Openness Ratio} &= 1.40 \end{aligned}$$

**Proposed Structure:** The proposed structure has a cross-sectional area of 260.44 square feet and a crossing length of 8 feet. The openness ratio of the proposed structure is 32.55, well above the minimum openness ratio of 0.82. **The proposed structure meets Standard 4.**

$$\begin{aligned} \text{Openness Ratio} &= (\text{cross-sectional area} / \text{crossing length}) \\ \text{Openness Ratio} &= (34 \times 7.66) / 8 \\ \text{Openness Ratio} &= (260.44) / 8 \\ \text{Openness Ratio} &= 32.55 \end{aligned}$$

**Standard 5 – Substrate:** *Natural bottom substrate should be used within the crossing, and it should match the upstream and downstream substrates. The substrate and design should resist displacement during floods and maintain an appropriate bottom during normal flows.*

Existing Structure: The existing structure is embedded into the streambed, but it is unclear whether substrate formed over time or whether the culvert was embedded with natural streambed material intentionally. The existing structure appears to meet Standard 5.

Proposed Structure: The proposed structure will be embedded into the streambed with a minimum 1-foot of natural streambed material on top of 4 feet of modified rock fill and gravel filled voids. The project proposes to remove natural streambed materials within the project limits to regrade the stream channel and replace it during the streambed restoration process. Natural streambed material will tie into the existing upstream and downstream substrates, be constructed with appropriate bottom forms, and resist displacement during floods. **The proposed structure meets Standard 5.**

**Standard 6 – Water Depth and Velocity:** *Water depths and velocities are comparable to those found in the natural channel at a variety of flows.*

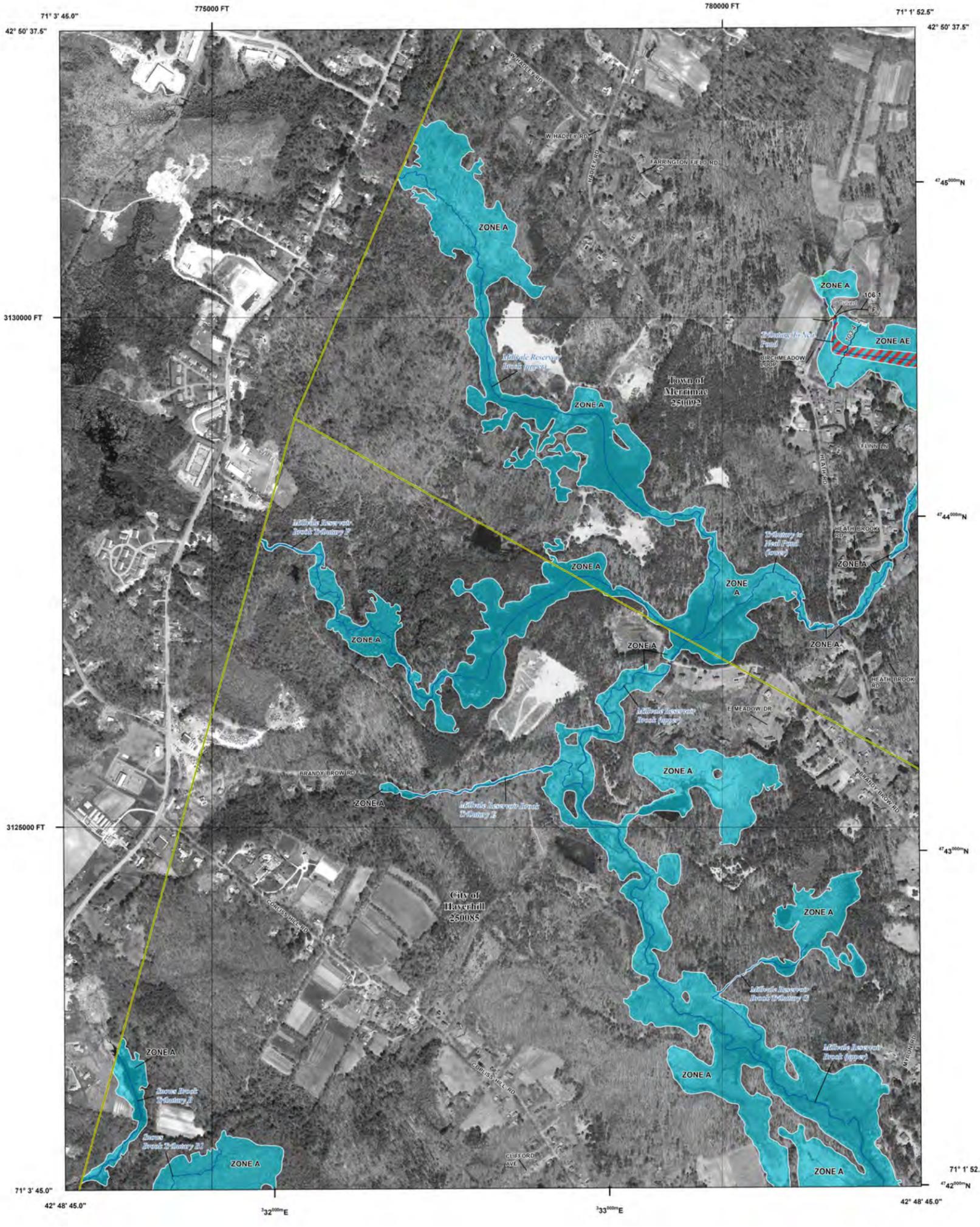
Existing Structure: In the existing condition, a well-established beaver dam exists at the outlet of Neal Pond. The upstream portion of East Meadow River between the culvert and the beaver dam is a lagoon (pool) with a significantly wider channel width compared with the downstream channel. A stone boulder check dam is located approximately 12 feet upstream of the culvert.

Proposed Structure: A hydraulic analysis has been conducted to ensure that water surface elevations, channel depths, and flow velocities will not significantly deviate from those found in the existing conditions. The beaver dam and established lagoon will not be altered as part of this project. **The proposed structure meets Standard 6.**

## 9.0 Conclusion

The proposed Brandy Brow Road Culvert Replacement Project crossing East Meadow River in Haverhill, Massachusetts has been designed to avoid work within and alteration of jurisdictional wetland resource areas where possible. Where impacts are unavoidable, they have been minimized and appropriately mitigated. The proposed mitigation measures allow the project to comply with the Performance Standards outlined in the Wetlands Protection Act. The applicant respectfully requests that the Haverhill Conservation Commission find the proposed improvements and mitigation measures described in this NOI adequately protective of the interests identified within the WPA and issue an Order of Conditions approving the work described in this NOI and shown on the accompanying plans.

**FEMA FIRM and FEMA FIRMette 25009C0083G – Dated July 8, 2025**



**FLOOD HAZARD INFORMATION**

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT  
**THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT [HTTPS://MSC.FEMA.GOV](https://msc.fema.gov)**

- SPECIAL FLOOD HAZARD AREAS**
  - Without Base Flood Elevation (BFE) Zone A, V, AE, X
  - With BFE or Depth Zone AE, AO, AH, VE, AP
  - Regulatory Floodway
  - 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
  - Future Conditions 1% Annual Chance Flood Hazard Zone X
  - Area with Reduced Flood Risk due to Levee See Notes, Zone X
  - Area with Flood Risk due to Levee Zone D
- OTHER AREAS OF FLOOD HAZARD**
  - NO SCREEN Area of Minimal Flood Hazard Zone X
  - Area of Undetermined Flood Hazard Zone D
- OTHER AREAS**
- GENERAL STRUCTURES**
  - Channel, Culvert, or Storm Sewer
  - Levee, Dike, or Floodwall
  - Cross Sections with 1% Annual Chance Water Surface Elevation
  - Coastal Transect
  - Coastal Transect Baseline
  - Profile Baseline
  - Hydrographic Feature
  - Base Flood Elevation Line (BFE)
- OTHER FEATURES**
  - Limit of Study
  - Jurisdiction Boundary

**NOTES TO USERS**

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Mapping and Insurance Assistance Center at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at <https://www.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

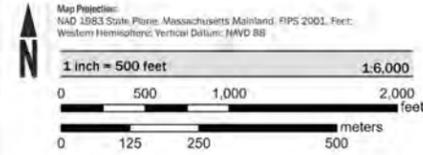
Commentators authoring text on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and localitywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on the FIRM uses imagery from 2019 provided by the U.S. Geological Survey at a resolution of 0.15 meter and 2016 transportation data provided by the U.S. Census Bureau with an unbuffered zone, and political boundaries from 2017 provided by MassGIS at a scale of 1:3,000.

**SCALE**



**PANEL LOCATOR**

ESSEX COUNTY						
			*0025	*0014		
		0081	0082	0101	0102	
0059	0078	<b>0083</b>	0084	0103	0104	
0067	0086	0087	0091	0092	0111	0112
0069	0088	0089	0093	0094	0113	0114

\* PANEL NOT PRINTED

**National Flood Insurance Program**

**NATIONAL FLOOD INSURANCE PROGRAM**  
**FLOOD INSURANCE RATE MAP**

**ESSEX COUNTY, MASSACHUSETTS**  
(All Jurisdictions)

**PANEL 0083 of 0600**

FEMA

COMMUNITY	NUMBER	PANEL	SUFFIX
HAVENHILL, CITY OF	250085	0083	G
MERRIMACK, TOWN OF	250092	0083	G

VERSION NUMBER  
**2.6.3.6**

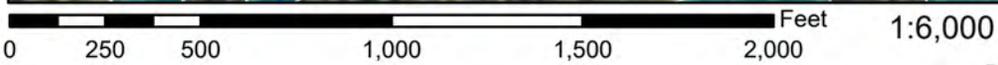
MAP NUMBER  
**25009C0083G**

MAP REVISED  
**July 8, 2025**

# National Flood Hazard Layer FIRMette



71°2'44"W 42°49'49"N



71°2'6"W 42°49'23"N

Basemap Imagery Source: USGS National Map 2023

## Legend

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

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>
		Area with Flood Risk due to Levee <i>Zone D</i>
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard <i>Zone D</i>
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation 17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
MAP PANELS		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Digital Data Available
		No Digital Data Available
		Unmapped
		The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.



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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **1/14/2026 at 5:25 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

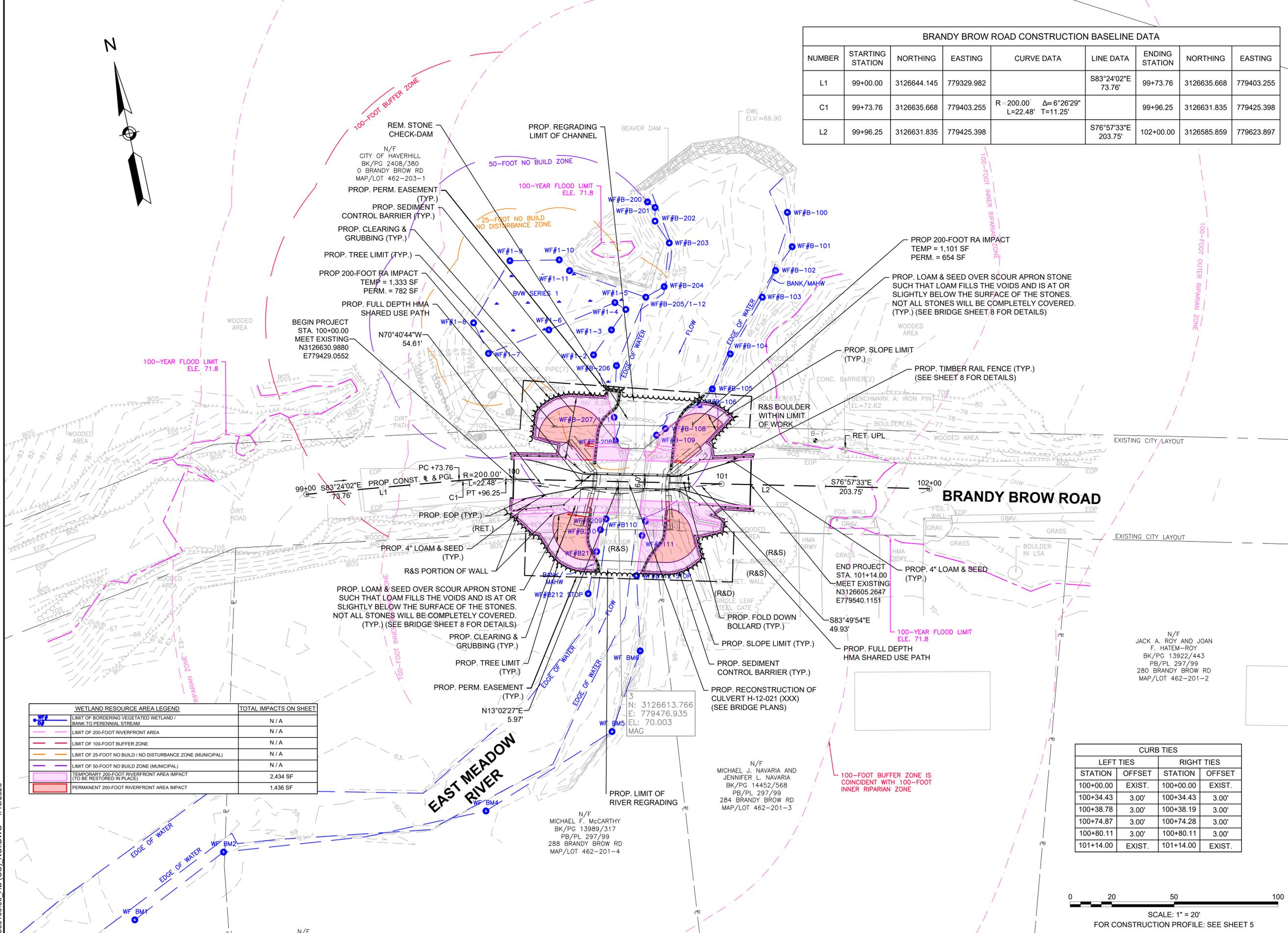
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory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

## **Supplemental RFA and BLSF Impact Construction Plan (Sheet 4)**

PREPARED FOR  
CITY OF HAVERHILL  
4 SUMMER STREET  
HAVERHILL, MA 01830

**REPLACEMENT OF BRANDY BROW ROAD  
CULVERT OVER EAST MEADOW RIVER  
BRANDY BROW ROAD  
HAVERHILL, MASSACHUSETTS**

BRANDY BROW ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	99+00.00	3126644.145	779329.982		S83°24'02"E 73.76'	99+73.76	3126635.668	779403.255
C1	99+73.76	3126635.668	779403.255	R=200.00' Δ=6°26'29" L=22.48' T=11.25'		99+96.25	3126631.835	779425.398
L2	99+96.25	3126631.835	779425.398		S76°57'33"E 203.75'	102+00.00	3126585.859	779623.897



WETLAND RESOURCE AREA LEGEND		TOTAL IMPACTS ON SHEET
	LIMIT OF BORDERING VEGETATED WETLAND / BANK TO PERENNIAL STREAM	N/A
	LIMIT OF 200-FOOT RIVERFRONT AREA	N/A
	LIMIT OF 100-FOOT BUFFER ZONE	N/A
	LIMIT OF 25-FOOT NO BUILD / NO DISTURBANCE ZONE (MUNICIPAL)	N/A
	LIMIT OF 50-FOOT NO BUILD ZONE (MUNICIPAL)	N/A
	TEMPORARY 200-FOOT RIVERFRONT AREA IMPACT (TO BE RESTORED IN PLACE)	2,434 SF
	PERMANENT 200-FOOT RIVERFRONT AREA IMPACT	1,436 SF

CURB TIES			
LEFT TIES		RIGHT TIES	
STATION	OFFSET	STATION	OFFSET
100+00.00	EXIST.	100+00.00	EXIST.
100+34.43	3.00'	100+34.43	3.00'
100+38.78	3.00'	100+38.19	3.00'
100+74.87	3.00'	100+74.28	3.00'
100+80.11	3.00'	100+80.11	3.00'
101+14.00	EXIST.	101+14.00	EXIST.

REVISIONS

NO.	REVISION	DATE

11/6/2025  
DRAWN/DESIGN BY NHG/GBP  
CHECKED BY GJH

CONSTRUCTION PLAN

SCALE: 1"=20'  
NEX-2300100.00  
4 OF 20

2300100.00.HD(CO).NOI.DWG 1/13/2026

## **Revised Notice of Intent Plan Set**

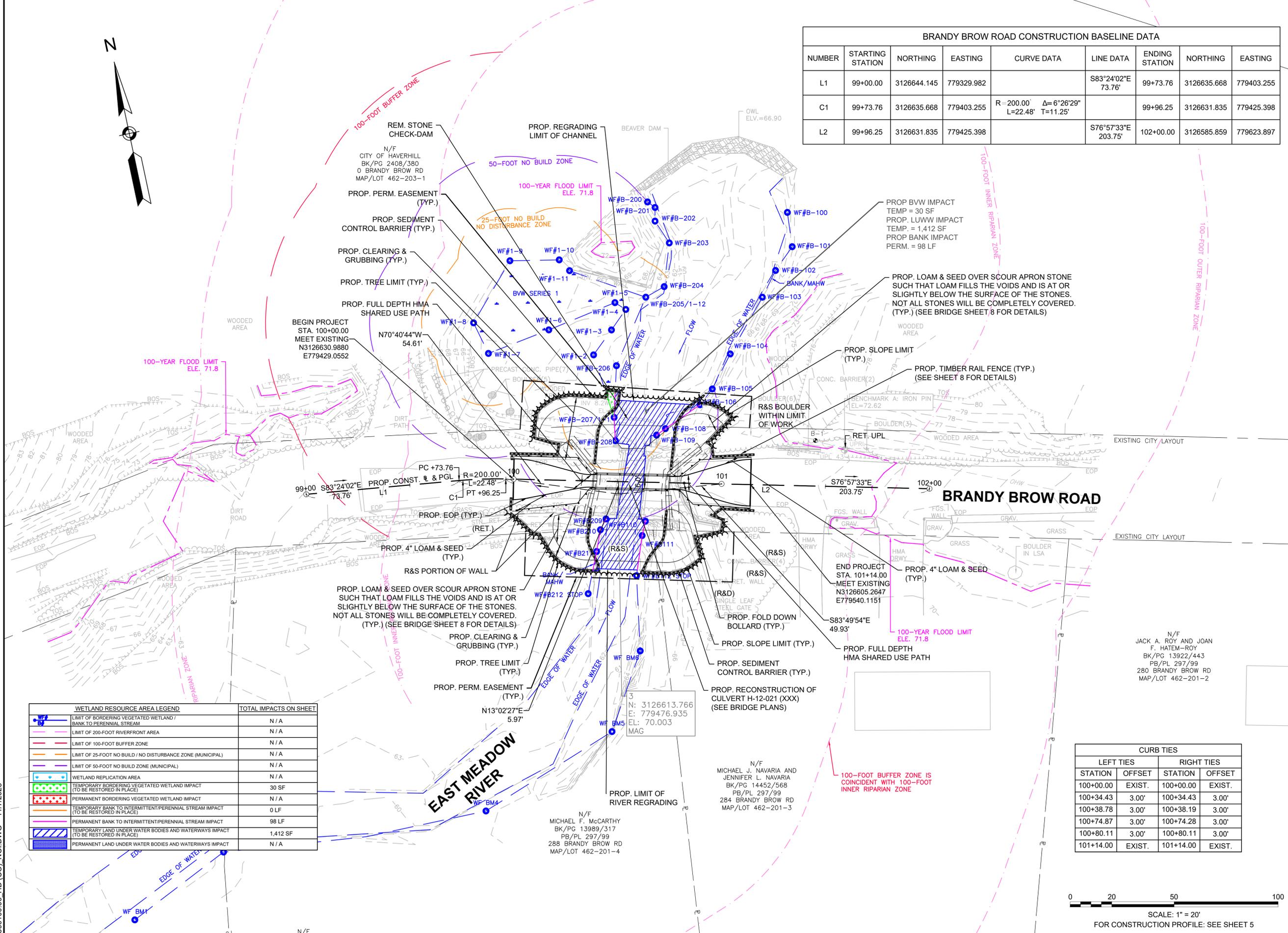






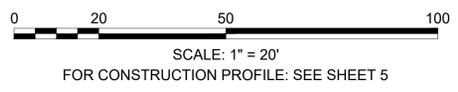
**REPLACEMENT OF BRANDY BROW ROAD  
CULVERT OVER EAST MEADOW RIVER  
BRANDY BROW ROAD  
HAVERHILL, MASSACHUSETTS**

BRANDY BROW ROAD CONSTRUCTION BASELINE DATA								
NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	99+00.00	3126644.145	779329.982		S83°24'02"E 73.76'	99+73.76	3126635.668	779403.255
C1	99+73.76	3126635.668	779403.255	R=200.00' Δ=6°26'29" L=22.48' T=11.25'		99+96.25	3126631.835	779425.398
L2	99+96.25	3126631.835	779425.398		S76°57'33"E 203.75'	102+00.00	3126585.859	779623.897



WETLAND RESOURCE AREA LEGEND		TOTAL IMPACTS ON SHEET
	LIMIT OF BORDERING VEGETATED WETLAND / BANK TO PERENNIAL STREAM	N/A
	LIMIT OF 200-FOOT RIVERFRONT AREA	N/A
	LIMIT OF 100-FOOT BUFFER ZONE	N/A
	LIMIT OF 25-FOOT NO BUILD / NO DISTURBANCE ZONE (MUNICIPAL)	N/A
	LIMIT OF 50-FOOT NO BUILD ZONE (MUNICIPAL)	N/A
	WETLAND REPLICATION AREA	N/A
	TEMPORARY BORDERING VEGETATED WETLAND IMPACT (TO BE RESTORED IN PLACE)	30 SF
	PERMANENT BORDERING VEGETATED WETLAND IMPACT	N/A
	TEMPORARY BANK TO INTERMITTENT/PERENNIAL STREAM IMPACT (TO BE RESTORED IN PLACE)	0 LF
	PERMANENT BANK TO INTERMITTENT/PERENNIAL STREAM IMPACT	98 LF
	TEMPORARY LAND UNDER WATER BODIES AND WATERWAYS IMPACT (TO BE RESTORED IN PLACE)	1,412 SF
	PERMANENT LAND UNDER WATER BODIES AND WATERWAYS IMPACT	N/A

CURB TIES			
LEFT TIES		RIGHT TIES	
STATION	OFFSET	STATION	OFFSET
100+00.00	EXIST.	100+00.00	EXIST.
100+34.43	3.00'	100+34.43	3.00'
100+38.78	3.00'	100+38.19	3.00'
100+74.87	3.00'	100+74.28	3.00'
100+80.11	3.00'	100+80.11	3.00'
101+14.00	EXIST.	101+14.00	EXIST.



REVISIONS

NO.	REVISION	DATE

11/6/2025  
DRAWN/DESIGN BY: NHG/GBP  
CHECKED BY: GJH

CONSTRUCTION PLAN

2300100.00.HD(CO).NOI.DWG 11/7/2025































