STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE: November 18, 2022

FROM: Joshua Brown
Wetlands Program Analyst

AT (OFFICE): Department of Transportation
Bureau of Environment

SUBJECT Dredge & Fill Application
Nashua-Merrimack-Bedford, 13761E

TO Karl Benedict, Public Works Permitting Officer
New Hampshire Wetlands Bureau
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

Forwarded herewith is the application package prepared by NH DOT Bureau of Highway Design for the subject major impact project. The project is located along F.E. Everett Turnpike in the Town of Merrimack, NH. The proposed NHDOT 13761E project is part of the larger Nashua-Merrimack-Bedford 13761 project that involves widening three (3) segments of the existing two-lane portions of the F.E. Everett Turnpike in Nashua, Merrimack, and Bedford, New Hampshire. The 13761E project begins approximately 0.2 miles north of Exit 12 (the Bedford Road overpass Station 1160+00.00) and continues north for 0.9 miles. Additionally, the 36" concrete culvert carrying Dumpling Brook under the Turnpike will be replaced.

This project was reviewed at the Natural Resource Agency Coordination Meeting on August 17, 2022 and September 21, 2022. A copy of the minutes has been included with this application package. A copy of this application and plans can be accessed on the Departments website via the following link: http://www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/wetland-applications.htm.

NHDOT anticipates and request that this project be reviewed and permitted by the Army Corp of Engineers through the State Programmatic General Permit process. A copy of the application has been sent to the Army Corp of Engineers.

Mitigation was determined to be required as the proposed work permanently impacts 12,251 ft^2 and includes 120-linear feet of permanent impacts to streams.

The lead people to contact for this project are Wendy Johnson, Bureau of Highway Design (271-3909 or Wendy.A.Johnson@dot.nh.gov) or Andrew O'Sullivan, Wetlands Program Manager, Bureau of Environment (271-3226 or Andrew.O'Sullivan@dot.nh.gov).

A payment voucher has been processed for this application (Voucher #72404) in the amount of $7,044.40.

If and when this application meets with the approval of the Bureau, please send the permit directly to Andrew O'Sullivan, Wetlands Program Manager, Bureau of Environment.

JRB;
cc:
BOE Original
Town of Merrimack (4 copies via certified mail)
David Trubey, NH Division of Historic Resources (Cultural Review Within)
John Magee, NH Fish & Game (via electronic notification)
Maria Tur, US Fish & Wildlife (via electronic notification)
Jeanie Brochi, US Environmental Protection Agency (via electronic notification)
Michael Hicks & Rick Kristoff, US Army Corp of Engineers (via electronic notification)
Kevin Nyhan, BOE (via electronic notification)

New Hampshire DOT

F.E. Everett Turnpike Widening Project

NH Standard Dredge & Fill Application

Prepared By:

McFarland Johnson

Nashua-Merrimack-Bedford
13761E

November 2022

NHDOT 13761E F.E. Everett Turnpike Widening Project
Nashua-Merrimack-Bedford, 13761E
NHDES Standard Dredge & Fill Permit Application
November 2022

Contents

NHDES Standard Dredge and Fill Wetlands Permit Application Form

STANDARD DREDGE AND FILL WETLANDS PERMIT APPLICATION

Water Division/Land Resources Management
Wetlands Bureau

Check the Status of your Application

RSA/Rule: RSA 482-A/Env-Wt 100-900

APPLICANT'S NAME: NH DEPARTMENT OF TRANSPORTATION **TOWN NAME:** Merrimack

Administrative Use Only	Administrative Use Only	Administrative Use Only	File No.:
			Check No.:
			Amount:
			Initials:

A person may request a waiver of the requirements in Rules Env-Wt 100-900 to accommodate situations where strict adherence to the requirements would not be in the best interest of the public or the environment but is still in compliance with RSA 482-A. A person may also request a waiver of the standards for existing dwellings over water pursuant to RSA 482-A:26, III(b). For more information, please consult the Waiver Request Form.

SECTION 1 - REQUIRED PLANNING FOR ALL PROJECTS (Env-Wt 306.05; RSA 482-A:3, I(d)(2))

Please use the Wetland Permit Planning Tool (WPPT), the Natural Heritage Bureau (NHB) DataCheck Tool, the Aquatic Restoration Mapper, or other sources to assist in identifying key features such as: priority resource areas (PRAs), protected species or habitats, coastal areas, designated rivers, or designated prime wetlands.

Has the required planning been completed?	☒ Yes ☐ No
Does the property contain a PRA? If yes, provide the following information:	☐ Yes ☒ No
• Does the project qualify for an Impact Classification Adjustment (e.g. NH Fish and Game Department (NHF&G) and NHB agreement for a classification downgrade) or a Project-Type Exception (e.g. Maintenance or Statutory Permit-by-Notification (SPN) project)? See Env-Wt 407.02 and Env-Wt 407.04.	☐ Yes ☒ No
• Protected species or habitat? ○ If yes, species or habitat name(s): See attached NHB Report ○ NHB Project ID #: NHB22-2441	☒ Yes ☐ No
• Bog?	☐ Yes ☒ No
• Floodplain wetland contiguous to a tier 3 or higher watercourse?	☐ Yes ☒ No
• Designated prime wetland or duly-established 100-foot buffer?	☐ Yes ☒ No
• Sand dune, tidal wetland, tidal water, or undeveloped tidal buffer zone?	☐ Yes ☒ No
Is the property within a Designated River corridor? If yes, provide the following information: • Name of Local River Management Advisory Committee (LAC): N/A • A copy of the application was sent to the LAC on Month: Day: Year:	☐ Yes ☒ No

For dredging projects, is the subject property contaminated? • If yes, list contaminant:	☐ Yes ☒ No
Is there potential to impact impaired waters, class A waters, or outstanding resource waters?	☐ Yes ☒ No

For stream crossing projects, provide watershed size (see WPPT or Stream Stats):
Dumpling Brook - 0.5 sq mi

SECTION 2 - PROJECT DESCRIPTION (Env-Wt 311.04(i))

Provide a **brief** description of the project and the purpose of the project, outlining the scope of work to be performed and whether impacts are temporary or permanent. DO NOT reply "See attached"; please use the space provided below.

The proposed NHDOT 13761E project is part of the larger 13761 project that involves widening three (3) segments of the existing two-lane portions of the F.E. Everett Turnpike in Nashua, Merrimack, and Bedford, New Hampshire. The 13761 project has been divided into five (5) separate construction contracts. Based on prior discussions and agreements with NHDES and the U.S. Army Corps of Engineers (Corps), each construction contract will be permitted separately, and cumulative impacts will be tracked for the entire project. The 13761E contract includes the northernmost mile of the middle segment located in the Town of Merrimack. The project begins approximatley 0.2 miles north of the Exit 12 (Bedford Road overpass) interchange and continues north for approximately 0.9 miles. The 13761E project proposes to widen the roadway from two to three lanes in each direction with the addition of a northbound and southbound travel lane. The project also includes stormwater and drainage improvements that will meet MS4 and AOT requirements to the extent practical as well as the construction of noise walls. The 36" concrete culvert carring Dumpling Brook under the Turnpike will be replaced. The project is scheduled to advertise in February 2023. The proposed project will require 12,116 SF of permanent impacts and 5,096 SF of temporary impacts to palustrine wetlands and stream channel associated with the roadway widening and required grading.

SECTION 3 - PROJECT LOCATION

Separate wetland permit applications must be submitted for each municipality within which wetland impacts occur.

ADDRESS: F.E. Everett Turnpike Right-of-Way (ROW)

TOWN/CITY: Merrimack

TAX MAP/BLOCK/LOT/UNIT: ROW

US GEOLOGICAL SURVEY (USGS) TOPO MAP WATERBODY NAME: Dumpling Brook
☐ N/A

(Optional) LATITUDE/LONGITUDE in decimal degrees (to five decimal places): 42.89524° North
-71.79037° West

SECTION 4 - APPLICANT (DESIRED PERMIT HOLDER) INFORMATION (Env-Wt 311.04(a))

If the applicant is a trust or a company, then complete with the trust or company information.

NAME: New Hampshire Department of Transportation - Attn: Wendy Johnson		
MAILING ADDRESS: 7 Hazen Drive		
TOWN/CITY: Concord	STATE: NH	ZIP CODE: 03302
EMAIL ADDRESS: Wendy.A.Johnson@dot.nh.gov		
FAX: (603) 271-7025	PHONE: (603) 271-3909	

ELECTRONIC COMMUNICATION: By initialing here: WAJ, I hereby authorize NHDES to communicate all matters relative to this application electronically.

SECTION 5 - AUTHORIZED AGENT INFORMATION (Env-Wt 311.04(c))

☐ N/A

LAST NAME, FIRST NAME, M.I.: Perron, Christine		
COMPANY NAME: McFarland-Johnson, Inc.		
MAILING ADDRESS: 53 Regional Drive		
TOWN/CITY: Concord	STATE: NH	ZIP CODE: 03301
EMAIL ADDRESS: cperron@mjinc.com		
FAX:	PHONE: 603 225 2978	

ELECTRONIC COMMUNICATION: By initialing here CJP, I hereby authorize NHDES to communicate all matters relative to this application electronically.

SECTION 6 - PROPERTY OWNER INFORMATION (IF DIFFERENT THAN APPLICANT) (Env-Wt 311.04(b))

If the owner is a trust or a company, then complete with the trust or company information.

☒ Same as applicant

NAME:		
MAILING ADDRESS:		
TOWN/CITY:	STATE:	ZIP CODE:
EMAIL ADDRESS:		
FAX:	PHONE:	

ELECTRONIC COMMUNICATION: By initialing here , I hereby authorize NHDES to communicate all matters relative to this application electronically.

SECTION 7 - RESOURCE-SPECIFIC CRITERIA ESTABLISHED IN Env-Wt 400, Env-Wt 500, Env-Wt 600, Env-Wt 700, OR Env-Wt 900 HAVE BEEN MET (Env-Wt 313.01(a)(3))

Describe how the resource-specific criteria have been met for each chapter listed above (please attach information about stream crossings, coastal resources, prime wetlands, or non-tidal wetlands and surface waters):
Env-Wt 400: Wetland boundaries and the ordinary high water and top of bank of water courses located within the project corridor were delineated in 2016-2017, and 2022. Wetlands and surface waters have been classified using the USFWS (Cowardin et al.) Wetland Classification System. No PRAs are located in the project. Based on the proposed permanent wetland and stream impacts, the proposed project is classified as a major impact project.

Env-Wt 500: The proposed project falls under Env-Wt 527 Public Highways. The proposed project has been designed in accordance with the criteria specified in Env-Wt 527.04 and is consistent with RSA 482-A:1, 483, 483-B, 485-A, and 212-A. The purpose of the proposed project is to provide improved mobility, congestion relief, and improved safety along the project corridor. The proposed project is not anticipated to impact any floodplains or substantially impact the flood storage function of wetlands. Impacts have been minimized and avoided to the maximum extent practicable.

Env-Wt 600: N/A - No coastal or tidal wetlands present.

Env-Wt 700: N/A - No designated Prime Wetlands present.

Env-Wt 900: Env-Wt 904.08 The project includes replacement of a Tier 2 stream crossing, carrying Dumpling Brook under the Everette Turnpike. The culvert replacement meets the criteria of Env-Wt 904.08.

SECTION 8 - AVOIDANCE AND MINIMIZATION

Impacts within wetland jurisdiction must be avoided to the maximum extent practicable (Env-Wt 313.03(a)).* Any project with unavoidable jurisdictional impacts must then be minimized as described in the Wetlands Best Management Practice Techniques For Avoidance and Minimization and the Wetlands Permitting: Avoidance, Minimization and Mitigation Fact Sheet. For minor or major projects, a functional assessment of all wetlands on the project site is required (Env-Wt 311.03(b)(10)).*

Please refer to the application checklist to ensure you have attached all documents related to avoidance and minimization, as well as functional assessment (where applicable). Use the Avoidance and Minimization Checklist, the Avoidance and Minimization Narrative, or your own avoidance and minimization narrative.

**See Env-Wt 311.03(b)(6) and Env-Wt 311.03(b)(10) for shoreline structure exemptions.*

SECTION 9 - MITIGATION REQUIREMENT (Env-Wt 311.02)

If unavoidable jurisdictional impacts require mitigation, a mitigation pre-application meeting must occur at least 30 days but not more than 90 days prior to submitting this Standard Dredge and Fill Permit Application.

Mitigation Pre-Application Meeting Date: Month: 08 Day: 17 Year: 2022

(☐ N/A - Mitigation is not required)

SECTION 10 - THE PROJECT MEETS COMPENSATORY MITIGATION REQUIREMENTS (Env-Wt 313.01(a)(1)c)

Confirm that you have submitted a compensatory mitigation proposal that meets the requirements of Env-Wt 800 for all permanent unavoidable impacts that will remain after avoidance and minimization techniques have been exercised to the maximum extent practicable: ☒ I confirm submittal.

(☐ N/A – Compensatory mitigation is not required)

SECTION 11 - IMPACT AREA (Env-Wt 311.04(g))

For each jurisdictional area that will be/has been impacted, provide square feet (SF) and, if applicable, linear feet (LF) of impact, and note whether the impact is after-the-fact (ATF; i.e., work was started or completed without a permit).

For intermittent and ephemeral streams, the linear footage of impact is measured along the thread of the channel. *Please note, installation of a stream crossing in an ephemeral stream may be undertaken without a permit per Rule Env-Wt 309.02(d), however other dredge or fill impacts should be included below.*

For perennial streams/rivers, the linear footage of impact is calculated by summing the lengths of disturbances to the channel and banks.

Permanent impacts are impacts that will remain after the project is complete (e.g., changes in grade or surface materials).

Temporary impacts are impacts not intended to remain (and will be restored to pre-construction conditions) after the project is completed.

JURISDICTIONAL AREA		PERMANENT			TEMPORARY		
		SF	LF	ATF	SF	LF	ATF
Wetlands	Forested Wetland	6671		☐	485		☐
	Scrub-shrub Wetland	3633		☐	688		☐
	Emergent Wetland	91		☐	95		☐
	Wet Meadow			☐			☐
	Vernal Pool			☐			☐
	Designated Prime Wetland			☐			☐
	Duly-established 100-foot Prime Wetland Buffer			☐			☐
Surface Water	Intermittent / Ephemeral Stream	206	27	☐	30	5	☐
	Perennial Stream or River	1650	93	☐	4062	165	☐
	Lake / Pond			☐			☐
	Docking - Lake / Pond			☐			☐
	Docking - River			☐			☐
Banks	Bank - Intermittent Stream			☐			☐
	Bank - Perennial Stream / River			☐			☐
	Bank / Shoreline - Lake / Pond			☐			☐
Tidal	Tidal Waters			☐			☐
	Tidal Marsh			☐			☐
	Sand Dune			☐			☐
	Undeveloped Tidal Buffer Zone (TBZ)			☐			☐
	Previously-developed TBZ			☐			☐
	Docking - Tidal Water			☐			☐
TOTAL		12,251	120		**5360**	**170**	

SECTION 12 - APPLICATION FEE (RSA 482-A:3, I)

☐ **MINIMUM IMPACT FEE**: Flat fee of $400.

☐ **NON-ENFORCEMENT RELATED, PUBLICLY-FUNDED AND SUPERVISED RESTORATION PROJECTS, REGARDLESS OF IMPACT CLASSIFICATION:** Flat fee of $400 (refer to RSA 482-A:3, 1(c) for restrictions).

☒ **MINOR OR MAJOR IMPACT FEE:** Calculate using the table below:

Permanent and temporary (non-docking):	17611 SF	× $0.40 =	$	7044.40
Seasonal docking structure:	0 SF	× $2.00 =	$	0
Permanent docking structure:	0 SF	× $4.00 =	$	0
Projects proposing shoreline structures (including docks) add $400 =			$	0
		Total =	$	7044.40

The application fee for minor or major impact is the above calculated total or $400, whichever is greater =	$ 7044.40

SECTION 13 - PROJECT CLASSIFICATION (Env-Wt 306.05)

Indicate the project classification.

☐ Minimum Impact Project	☐ Minor Project	☒ Major Project

SECTION 14 - REQUIRED CERTIFICATIONS (Env-Wt 311.11)

Initial each box below to certify:

Initials: CJP WAJ	To the best of the signer's knowledge and belief, all required notifications have been provided.
Initials: CJP WAJ	The information submitted on or with the application is true, complete, and not misleading to the best of the signer's knowledge and belief.
Initials: CJP WAJ	The signer understands that: • The submission of false, incomplete, or misleading information constitutes grounds for NHDES to: 1. Deny the application. 2. Revoke any approval that is granted based on the information. 3. If the signer is a certified wetland scientist, licensed surveyor, or professional engineer licensed to practice in New Hampshire, refer the matter to the joint board of licensure and certification established by RSA 310-A:1. • The signer is subject to the penalties specified in New Hampshire law for falsification in official matters, currently RSA 641. • The signature shall constitute authorization for the municipal conservation commission and the Department to inspect the site of the proposed project, except for minimum impact forestry SPN projects and minimum impact trail projects, where the signature shall authorize only the Department to inspect the site pursuant to RSA 482-A:6, II.
Initials: CJP WAJ	If the applicant is not the owner of the property, each property owner signature shall constitute certification by the signer that he or she is aware of the application being filed and does not object to the filing.

SECTION 15 - REQUIRED SIGNATURES (Env-Wt 311.04(d); Env-Wt 311.11)

SIGNATURE (OWNER): Wendy A. Johnson	PRINT NAME LEGIBLY: Wendy Johnson	DATE: 11/09/22
SIGNATURE (APPLICANT, IF DIFFERENT FROM OWNER):	PRINT NAME LEGIBLY:	DATE:
SIGNATURE (AGENT, IF APPLICABLE): Christine Perron	PRINT NAME LEGIBLY: Christine Perron	DATE: 11-7-22

SECTION 16 - TOWN / CITY CLERK SIGNATURE (Env-Wt 311.04(f))

As required by RSA 482-A:3, I(a)(1), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.

TOWN/CITY CLERK SIGNATURE:	PRINT NAME LEGIBLY:

	RSA 482-A:3 I(a) Exempt, State agency, 4 copies sent certified mail.
TOWN/CITY: Merrimack	DATE: N/A

DIRECTIONS FOR TOWN/CITY CLERK:
Per RSA 482-A:3, I(a)(1)

1. IMMEDIATELY sign the original application form and four copies in the signature space provided above.
2. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
3. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board.
4. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:
Submit the original permit application form bearing the signature of the Town/City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery at the address at the bottom of this page. Make check or money order payable to “Treasurer – State of NH”.

Supplemental Project Description

STANDARD DREDGE AND FILL WETLANDS PERMIT APPLICATION

F.E. EVERETT TURNPIKE WIDENING PROJECT

NHDOT – 13761E

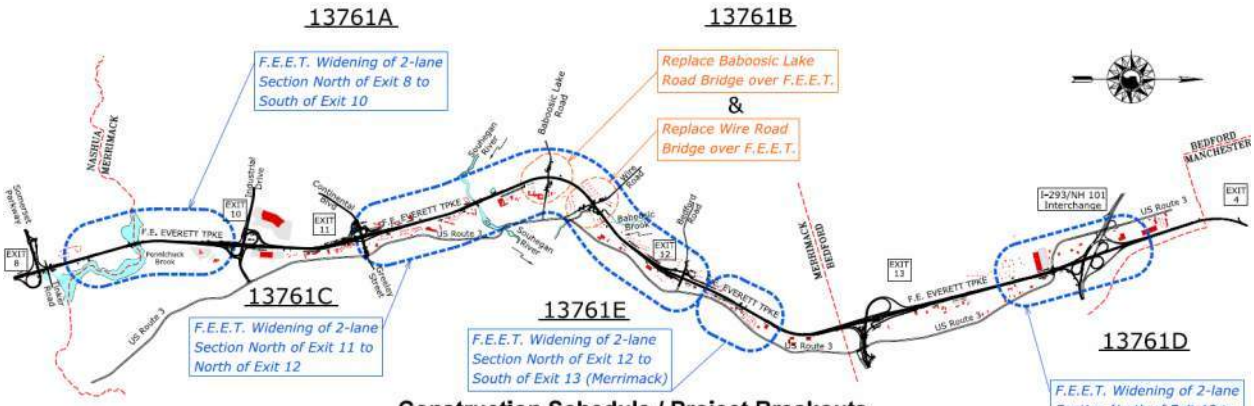
Merrimack, NH

SUPPLEMENTAL PROJECT DESCRIPTION

Contents

Introduction

The proposed NHDOT 13761E project is part of the larger Nashua-Merrimack-Bedford 13761 project that involves widening three (3) segments of the existing two-lane portions of the F.E. Everett Turnpike (F.E.E.T.) in Nashua, Merrimack, and Bedford, New Hampshire. The 13761 project has been divided into five (5) separate construction contracts. Based on prior discussions with NHDES and the Corps, each construction contract will be permitted separately, and cumulative impacts will be tracked for the entire project. This permit application is for the 13761E contract, which includes the northernmost portion of the middle segment located in the Town of Merrimack. The project begins approximately 0.2 miles north of the Exit 12 (Bedford Road overpass) and continues north for approximately 0.9 miles.



Construction Schedule / Project Breakouts

Contract	Status	Designer/ Contractor	Description	ADV. DATE	EST. Cost	CONST.
13761A	Design	VHB	F.E.E.T. Widening of 2-lane North of Exit 8 (Nashua) to south of Exit 10 (Merrimack)	01-30-2024	$33,177,000	2024
13761B	Design	MJ	Replace Wire Road and Baboosic Lake Road Bridges over the F.E.E.T (Merrimack)	10-24-2023	$12,425,000	2024
13761C	Design	MJ	F.E.E.T. Widening of 2-lane section North of Exit 11 to north of Exit 12 (Merrimack)	02-20-2024	$100,330,000	2024
13761D	Construction	CHA/AJC	F.E.E.T. Widening of 2-lane section North of Exit 13 (Merrimack) to Nouth of I-293 Diverge (Bedford)	01-18-2022	$22,068,000	2022
13761E	Design	MJ	F.E.E.T. Widening of 2-lane section North of Exit 12 to south of Exit 13 (Merrimack)	02-28-2023	$18,800,000	2023
13761	Design	Design	PE & ROW		$25,800,000	
			Total		$212,600,000	

Purpose & Need

The purpose of the F.E. Everett Turnpike Widening Project is to improve transportation efficiency and reduce safety problems associated with turnpike congestion in Nashua, Merrimack, and Bedford for all users of the turnpike while being sensitive to the needs of local communities, residents, and natural and cultural resources.

The F.E.E.T. is a principal north-south arterial highway within the State of New Hampshire and is part of the New Hampshire Turnpike System. The F.E.E.T. begins at the New Hampshire-Massachusetts State Line, where it is a continuation of US Route 3, and continues north 39.5 miles to Exit 14 in Concord, NH. It includes portions of Interstates 93 and 293 and provides a vital link for north-south travel. The F.E.E.T. carries a mix of traffic including trucks, cars, and buses, as well as commercial traffic vital to the region's economy. The F.E.E.T. corridor serves as a regional commuting route for residents of New Hampshire and Massachusetts as well as an important local route for the communities of Nashua, Merrimack, Bedford, and other surrounding municipalities. It also serves as an important link for New England-wide travel to

population centers such as Nashua, Manchester, and Concord, as well as to tourist destinations such as the New Hampshire Lakes Region, White Mountains, and ski areas. As one of the main arterials in the New Hampshire highway system, it is important to maintain the mobility of people, goods, and services through this corridor.

Existing Conditions

The northernmost part of the Middle Segment (13761E) of the F.E. Everett Turnpike Widening Project is located in Merrimack, NH. Wetlands and surface waters proximal to the proposed project were delineated by McFarland-Johnson, Inc. (MJ) in 2016-2017 and 2022. The majority of the wetlands in the vicinity of the project consist of palustrine forested wetlands and palustrine emergent wetlands. The Merrimack River is located east of the F.E. Everett Turnpike and will not be impacted by the proposed project. The project is not located within the Protected Shoreland of the Merrimack River, and this section of the Merrimack is not a NH Designated River. Surface waters located within the 13761E project area include Dumpling Brook, which is a tributary of the Merrimack River and is carried under the Turnpike via a 36" culvert that is a Tier 2 stream crossing. Dumpling Brook is mapped as a 2nd order stream and is not included on the NHDES Consolidated List of Water Bodies Subject to the Shoreland Water Quality Protection Act.

According to the NHDES Wetlands Permit Planning Tool, there is one Priority Resource Area (PRA) located within the general vicinity of the project area. The PRA is a mapped peatland that was confirmed to be non-peatland during the wetland delineation. No other PRAs were identified during the delineation.

The proposed project is located immediately west of the Merrimack River. At the northern limit of the 13761E project, the Merrimack River is located approximately 250'-300' from the Merrimack River at its closest point. The majority of the project area is located approximately 500' to over 2,000' from the Merrimack River. According to the NHDES 303(d) List (most recent available), this segment of the Merrimack River (NHRIV700060803-14-02) is impaired by mercury and E. coli. Dumpling Brook (NHRIV700060804-02), which crosses under the Turnpike within the project area, is impaired by mercury.

The project is adjacent to the Dumpling Brook Wildlife Management Area (WMA), a property owned by the State of New Hampshire and managed by NH Fish & Game. Dumpling Brook WMA is made up of thirteen tracts that were acquired between 1947 and 1953 primarily to provide a water source for the Reed's Ferry Fish Hatchery. The hatchery was closed in the mid-1950s when the expansion and realignment of the Turnpike bisected the property. Drainage pipes from the former fish hatchery are still in place today. The inlet of a 24" pipe is located in Dumpling Brook outside the existing right-of-way (ROW) and upstream from the inlet of the 36" Dumpling Brook culvert. The 24" pipe takes some flow from the brook and outlets into an artificial dammed area on the east side of the Turnpike. Stream flow was further split to supply water to the former hatchery via another pipe from the dammed area, with remaining flow going through a side channel and outletting into Dumpling Brook downstream of the 36" culvert outlet. Another old pipe system that still exists under the Turnpike consists of 8" and 12" pipes with a manhole at the ROW line, inlet outside existing ROW, and outlet adjacent to the 24" pipe. The pipe that extends west from the manhole cannot be located on the ground and appears to be completely buried. The 12" diameter pipe that extends east from the manhole is still visible but carries little to no water.

Proposed Project

The 13761E project proposes to widen the roadway from two to three lanes in each direction through the addition of a northbound and southbound travel lane. There is no proposed bridge work associated with the 13761E contract. The project includes stormwater and drainage improvements to meet MS4 and AOT requirements, as well as the construction of noise walls. The 36" culvert carrying Dumpling Brook under the Turnpike will be replaced (see below for additional details). The project is scheduled to advertise in February 2023.

Impacts

Wetlands and Surface Waters

The proposed project will require approximately 10,395 SF of permanent impacts to palustrine wetlands associated with the roadway widening. The replacement of the Dumpling Brook culvert will result in 1,650 SF/93 LF of permanent stream impacts within Dumpling Brook. The artificial side channel from the former fish hatchery drainage system was delineated as an intermittent stream. This channel will be impacted by slope work that extends out beyond a proposed sound wall at this location. Permanent impacts to the intermittent stream total 206 SF/27 LF.

Threatened, Endangered, and Species of Special Concern

The US Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) Tool Official Species List indicated that the proposed project area is within the documented range of the northern Long-eared bat. The proposed project is anticipated to require approximately 10.7 acres of tree clearing. The proposed project was evaluated in IPaC using the Northern Long-Eared Bat Consultation and 4(d) Rule Consistency Determination Key. Based on the results of this evaluation, the proposed project resulted in a may affect determination. A Verification Letter was issued on September 28, 2022 confirming that, while the project may affect northern long-eared bats, the proposed project is consistent with the activities covered under the Programmatic Biological Opinion and not prohibited under the Section 4(d) Rule. An acoustic survey for northern long-eared bat was completed Summer 2022 and did not identify this species. NHDOT will continue to consult with the USFWS to address the anticipated relisting of northern long-eared bat as endangered.

The NH Natural Heritage Bureau (NHB) reviewed the project area and identified documented records of the following species in the vicinity of the proposed project area:

Bird-foot violet
Blanding's Turtle
Eastern Hognose Snake
New England Cottontail
Wood Turtle

A survey for bird's foot violet was completed by McFarland Johnson in September 2021 and June 2022. Four populations were identified. A population approximately 6 square meters in size is located within the Contract E project area. Consultation with the NHB resulted in the recommendation of transplanting the impacted populations to new locations. A transplanting protocol will be prepared based on the NHB's recommendations and will be included in the construction contract.

The following measures will be implemented to avoid or minimize impacts to wildlife species:

- The contractor will be required to use erosion control berm, white Filtrexx Degradable Woven Silt Sock, or other "wildlife friendly" options such as woven organic material (e.g. coco or jute matting such as North American Green SC150BN or equivalent) instead of welded plastic or "biodegradable plastic" netting or thread for erosion control matting. Specific products used shall be detailed in the contractor's SWPPP.
- Contract documents will detail that all observations of Eastern hognose snake must be immediately reported to NHFG: Melissa Doperalski (603-479-1129) or Brendan Clifford (603-944-0885).
- Construction workers will be made aware of the potential to encounter protected turtles from April through November at the site. If spotted or Blanding's turtles are found laying eggs in a work area, NHFG will be contacted for further instructions (Melissa Doperalski (603-479-1129) or Josh Megyesy (cell 978-578-0802)).
- NHFG flyers/photos of snakes and turtles will be included in the contract.

Water Quality

The proposed highway improvements will result in a 3.85 acre increase in impervious surface. One stormwater treatment area (wet pond) will be constructed in the project area and will treat runoff from approximately 9.4 acres of pavement, approximately 2.5 times the area of additional pavement. The proposed project is not anticipated to cause or contribute to surface water impairments. A stormwater management report was prepared for the project and is included in this permit application.

Drainage Pipes

The drainage pipes from the former fish hatchery, described above in the Existing Conditions section, will be filled as part of this project.

The 24" pipe between Dumpling Brook and the side channel, which crosses under the Turnpike at approximately Sta 1183+75, will be abandoned by filling the pipe. Temporary impacts at the inlet will be necessary for construction access. As described above, this pipe currently separates some flow from Dumpling Brook and outlets it into an artificial side channel located just south of Dumpling Brook. The side channel is identified on the wetland impact plans as an intermittent stream (Location 5). The hydraulic analysis determined that a backwater condition exists in this side channel since the elevation of Dumpling Brook is slightly higher than that of the side channel. For this reason, the side channel is not expected to go dry when the drainage pipes are abandoned. A portion of this channel will be filled to accommodate proposed side slopes associated with a proposed soundwall (Impact Location J). The remaining side channel will continue to serve as a backwater of Dumpling Brook.

The 8" pipe between the side channel and the manhole at the ROW line, crossing under the Turnpike at approximately Sta 1182+50, will be abandoned by filling the pipe. The manhole will also be filled. As noted in the Existing Conditions section, there is no evidence of the pipe that extends west from the manhole and there is no flow coming from this pipe into the manhole. The outlet of the pipe into the side channel also has no flow. Therefore, no impacts to wetlands or Dumpling Brook are anticipated from filling the manhole and pipe.

Dumpling Brook

Dumpling Brook is the only stream crossing in this contract. This is a Tier 2 crossing based on watershed size. The existing pipe is 36" diameter and about 450' in length. Bankfull width is approximately 25 feet. A summary of geomorphic characteristics of Dumpling Brook is included elsewhere in this application.

The existing pipe will be replaced with a 42" diameter culvert. In order to avoid impacts outside the existing ROW, the new pipe will be skewed to match the existing channel geometry and to allow the longer pipe to fit entirely within the ROW. The proposed pipe will be approximately 600' in length. The slope of the pipe and stream channel is less than 1%. A backwater condition exists up to the outlet of the existing 36" Dumpling Brook culvert but does not extend through the pipe.

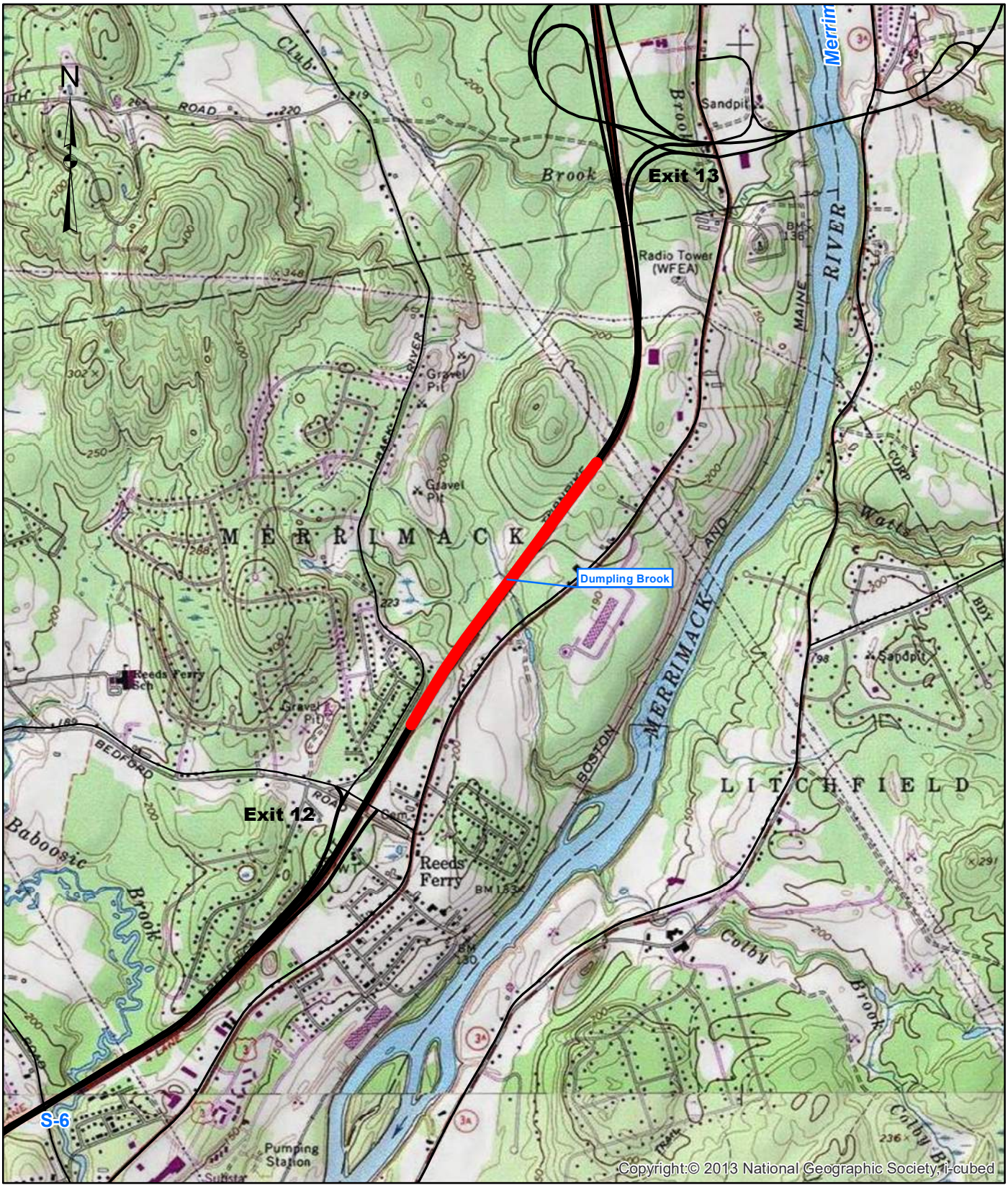
The proposed culvert replacement meets the criteria of Env-Wt 904.08, In-Kind Replacement of Tier 1 or Tier 2 Existing Legal Crossings. A summary of how the proposed culvert replacement meets the stream crossing rules is included elsewhere in this application.

According to NH Fish & Game, a population of native brook trout (species of concern) is known to occur in Dumpling Brook. With a slope of less than 1%, fish passage through the pipe is possible despite its length. Removing the 24" drainage pipe and directing all flow through a single, upsized culvert will provide an overall benefit to the stream system and aquatic organism passage. A time of year restriction will be required to further minimize impacts to brook trout. No in-water work will occur in Dumpling Brook between October 1st and March 31st.

Easements

The majority of the proposed project will be located within the existing state-owned right-of-way (ROW). All necessary easements will be obtained by the NHDOT Bureau of Right-of-Way prior to the start of construction. Easements will be required within the Dumpling Brook WMA. Coordination with NH Fish & Game is ongoing and no concerns with securing the necessary easements are anticipated.

Location Map



FEET 13761E Contract Limits

0 2,000 4,000
Feet

NHDOT 13761 F.E. EVERETT TURNPIKE CONTRACTS
NASHUA-MERRIMACK-BEDFORD, NEW HAMPSHIRE

13761E LOCATION MAP

SCALE :	DATE :	FIGURE :
AS SHOWN	SEPTEMBER 2022	1

McFarland Johnson

M:\18589.00 NHDOT Southern FEET Design\Draw\GIS\13761E\13761E FEET USGS Map.mxd

Attachment A: Minor and Major Projects

STANDARD DREDGE AND FILL WETLANDS PERMIT APPLICATION ATTACHMENT A: MINOR AND MAJOR PROJECTS

Water Division/Land Resources Management

Wetlands Bureau

Check the Status of your Application

RSA/ Rule: RSA 482-A/ Env-Wt 311.10; Env-Wt 313.01(a)(1); Env-Wt 313.03

APPLICANT'S NAME: **NH Department of Transportation** **TOWN NAME:** MERRIMACK

Attachment A is required for *all minor and major projects*, and must be completed *in addition* to the Avoidance and Minimization Narrative or Checklist that is required by Env-Wt 307.11.

For projects involving construction or modification of non-tidal shoreline structures over areas of surface waters having an absence of wetland vegetation, only Sections I.X through I.XV are required to be completed.

PART I: AVOIDANCE AND MINIMIZATION

In accordance with Env-Wt 313.03(a), the Department shall not approve any alteration of any jurisdictional area unless the applicant demonstrates that the potential impacts to jurisdictional areas have been avoided to the maximum extent practicable and that any unavoidable impacts have been minimized, as described in the Wetlands Best Management Practice Techniques For Avoidance and Minimization.

SECTION I.I - ALTERNATIVES (Env-Wt 313.03(b)(1))

Describe how there is no practicable alternative that would have a less adverse impact on the area and environments under the Department's jurisdiction.

THE F.E. EVERETT TURNPIKE WAS ORIGINALLY CONSTRUCTED IN THE 1950S AND 1960S AND HAS BEEN LOCATED ON THE EXISTING ALIGNMENT SINCE THAT TIME. THE PROPOSED PROJECT IS NEEDED TO ADDRESS SAFETY CONCERNS RELATED TO INCREASED TRAFFIC CONGESTION. DUE TO THE LOCATION OF THE EXISTING HIGHWAY AND ASSOCIATED INFRASTRUCTURE, THERE ARE LIMITED ALTERNATIVES FOR THE PROPOSED HIGHWAY WIDENING. IMPACTS TO JURISDICTIONAL RESOURCE AREAS INCLUDING WETLANDS, STREAMS, AND BANKS HAVE BEEN AVOIDED AND MINIMIZED TO THE MAXIMUM EXTENT PRACTICABLE THROUGH STEEPENING ROADWAY SLOPES.

SECTION I.II - MARSHES (Env-Wt 313.03(b)(2))

Describe how the project avoids and minimizes impacts to tidal marshes and non-tidal marshes where documented to provide sources of nutrients for finfish, crustacean, shellfish, and wildlife of significant value.

There are no tidal marshes located within the project.

One non-tidal marsh will be impacted by the proposed project. This PEM wetland is located at approximately Sta 1198 (Left). The proposed slope work in this location was minimized in order to minimize impacts to the wetland, with impacts limited to the roadside edge of the wetland. The remaining wetland, which extends well beyond the existing ROW, will remain intact.

SECTION I.III - HYDROLOGIC CONNECTION (Env-Wt 313.03(b)(3))

Describe how the project maintains hydrologic connections between adjacent wetland or stream systems.

Hydrologic connections between adjacent wetland or stream systems will be maintained with the exception of an artificial connection at Dumpling Brook. The pipe between Dumpling Brook and an artificial side channel, which crosses under the Turnpike at approximately Sta 1183+75, will be abandoned by filling the pipe. Temporary impacts at the inlet will be necessary for construction access. As described in the Supplemental Narrative, this pipe currently separates some flow from Dumpling Brook and outlets it into an artificial side channel located just south of Dumpling Brook. The side channel is identified on the wetland impact plans as an intermittent stream (Location 5). The hydraulic analysis determined that a backwater condition exists in this side channel since the elevation of Dumpling Brook is slightly higher than that of the side channel. For this reason, the side channel is not expected to go dry when the drainage pipes are abandoned. A portion of this channel will be filled to accommodate proposed side slopes associated with a proposed soundwall (Impact Location J). The remaining side channel will continue to serve as a backwater of Dumpling Brook.

SECTION I.IV - JURISDICTIONAL IMPACTS (Env-Wt 313.03(b)(4))

Describe how the project avoids and minimizes impacts to wetlands and other areas of jurisdiction under RSA 482-A, especially those in which there are exemplary natural communities, vernal pools, protected species and habitat, documented fisheries, and habitat and reproduction areas for species of concern, or any combination thereof.

Wetland impacts have been avoided and minimized to the maximum extent practicable. The proposed project is not anticipated to impact any exemplary natural communities, vernal pools, protected species and habitat, documented fisheries, and/or habitat and reproduction areas for species of special concern. Coordination with the NH Natural Heritage Bureau, NH Fish and Game, and the US Fish and Wildlife Service has occurred. Measures will be implemented to avoid or minimize impacts to species of concern. These measures are described in the Supplemental Narrative.

A vernal pool survey was completed in the Spring of 2017 and no vernal pools were identified in the vicinity of this project segment. Appropriate sediment and erosion controls will be implemented throughout construction to avoid detrimental water quality impacts. Avoidance and minimization measures include refining and steepening roadway slopes to specifically avoid and minimize wetland and stream impacts. Stormwater treatment BMPs have also been incorporated into the design in order to treat runoff from additional pavement surfaces, thereby ensuring water quality of surface waters in the vicinity is maintained.

SECTION I.V - PUBLIC COMMERCE, NAVIGATION, OR RECREATION (Env-Wt 313.03(b)(5))

Describe how the project avoids and minimizes impacts that eliminate, depreciate or obstruct public commerce, navigation, or recreation.

The proposed project is not anticipated to eliminate, depreciate, or obstruct public commerce, navigation, or recreation. Impacts to wetland resource areas are in close proximity to the existing roadway and are primarily located within the existing right-of-way. The proposed highway widening will reduce traffic congestion and increase safety, improving public commerce and navigation.

SECTION I.VI - FLOODPLAIN WETLANDS (Env-Wt 313.03(b)(6))

Describe how the project avoids and minimizes impacts to floodplain wetlands that provide flood storage.

There are no floodplain wetlands in the project.

SECTION I.VII - RIVERINE FORESTED WETLAND SYSTEMS AND SCRUB-SHRUB – MARSH COMPLEXES (Env-Wt 313.03(b)(7))

Describe how the project avoids and minimizes impacts to natural riverine forested wetland systems and scrub-shrub – marsh complexes of high ecological integrity.

The project will result in impacts to forested wetlands and scrub-shrub wetlands. The project has avoided or minimized impacts to these wetland systems by steepening side slopes to the extent practicable, limiting impacts to the roadside edge of wetland systems that extend beyond the ROW. Impacts to wetlands adjacent to Dumpling Brook have been avoided.

SECTION I.VIII - DRINKING WATER SUPPLY AND GROUNDWATER AQUIFER LEVELS (Env-Wt 313.03(b)(8))

Describe how the project avoids and minimizes impacts to wetlands that would be detrimental to adjacent drinking water supply and groundwater aquifer levels.

Best management practices for soil erosion and sediment control will be implemented throughout the duration of the project in order to protect water quality, and the Contractor will prepare and implement a Stormwater Pollution Prevention Plan. The proposed project is not anticipated to have a detrimental impact on adjacent drinking water supply and groundwater aquifer levels or the wetlands that provide these functions. Wetland impacts are limited to the edges of existing wetlands. Large wetland areas that provide groundwater recharge/discharge will remain largely intact. The proposed project also includes a wet pond for stormwater treatment that will outlet to Dumpling Brook. The wet pond will treat approximately 9.4 acres of pavement.

SECTION I.IX - STREAM CHANNELS (Env-Wt 313.03(b)(9))

Describe how the project avoids and minimizes adverse impacts to stream channels and the ability of such channels to handle runoff of waters.

Dumpling Brook is the only stream crossing in this contract. This is a Tier 2 crossing based on watershed size. The existing pipe is 36" diameter and about 450' in length. Bankfull width is approximately 25 feet. A summary of geomorphic characteristics of Dumpling Brook is included elsewhere in this application.

The existing pipe will be replaced with a 42" diameter culvert. In order to avoid impacts outside the existing ROW, the new pipe will be skewed to allow the longer pipe to fit entirely within the ROW. The proposed pipe will be approximately 600' in length. The slope of the pipe and stream channel is less than 1%. A backwater condition exists up to the outlet of the existing 36" Dumpling Brook culvert but does not extend through the pipe.

The proposed culvert replacement meets the criteria of Env-Wt 904.08, In-Kind Replacement of Tier 1 or Tier 2 Existing Legal Crossings. A summary of how the proposed culvert replacement meets the stream crossing rules is included elsewhere in this application.

According to NH Fish & Game, a population of native brook trout (species of concern) is known to occur in Dumpling Brook. With a slope of less than 1%, fish passage through the pipe is possible despite its length. Removing the 24" drainage pipe and directing all flow through a single, upsized culvert will provide an overall benefit to the stream system and aquatic organism passage. A time of year restriction will be required to further minimize impacts to brook trout. No in-water work will occur in Dumpling Brook between October 1st and March 31st.

A wet pond will be constructed as part of the project and the outlet of the pond will discharge into Dumpling Brook. With the pond in place, the post-developed flow for the 10-year and 50-year storms will be less than the pre-developed flow.

SECTION I.X - SHORELINE STRUCTURES - CONSTRUCTION SURFACE AREA (Env-Wt 313.03(c)(1))

Describe how the project has been designed to use the minimum construction surface area over surface waters necessary to meet the stated purpose of the structures.

N/A - The proposed project does not involve any shoreline structures.

SECTION I.XI - SHORELINE STRUCTURES - LEAST INTRUSIVE UPON PUBLIC TRUST (Env-Wt 313.03(c)(2))

Describe how the type of construction proposed is the least intrusive upon the public trust that will ensure safe docking on the frontage.

N/A - The proposed project does not involve any shoreline structures.

SECTION I.XII - SHORELINE STRUCTURES – ABUTTING PROPERTIES (Env-Wt 313.03(c)(3))

Describe how the structures have been designed to avoid and minimize impacts on ability of abutting owners to use and enjoy their properties.

N/A - The proposed project does not involve any shoreline structures.

SECTION I.XIII - SHORELINE STRUCTURES – COMMERCE AND RECREATION (Env-Wt 313.03(c)(4))

Describe how the structures have been designed to avoid and minimize impacts to the public's right to navigation, passage, and use of the resource for commerce and recreation.

N/A - The proposed project does not involve any shoreline structures.

SECTION I.XIV - SHORELINE STRUCTURES – WATER QUALITY, AQUATIC VEGETATION, WILDLIFE AND FINFISH HABITAT (Env-Wt 313.03(c)(5))

Describe how the structures have been designed, located, and configured to avoid impacts to water quality, aquatic vegetation, and wildlife and finfish habitat.

N/A - The proposed project does not involve any shoreline structures.

SECTION I.XV - SHORELINE STRUCTURES – VEGETATION REMOVAL, ACCESS POINTS, AND SHORELINE STABILITY (Env-Wt 313.03(c)(6))

Describe how the structures have been designed to avoid and minimize the removal of vegetation, the number of access points through wetlands or over the bank, and activities that may have an adverse effect on shoreline stability.

N/A - The proposed project does not involve any shoreline structures.

PART II: FUNCTIONAL ASSESSMENT
REQUIREMENTS Ensure that project meets the requirements of Env-Wt 311.10 regarding functional assessment (Env-Wt 311.04(j); Env-Wt 311.10).
FUNCTIONAL ASSESSMENT METHOD USED: US Army Corps of Engineers New England District Highway Methodology Workbook Supplement, 1999 Edition
NAME OF CERTIFIED WETLAND SCIENTIST (FOR NON-TIDAL PROJECTS) OR QUALIFIED COASTAL PROFESSIONAL (FOR TIDAL PROJECTS) WHO COMPLETED THE ASSESSMENT: CHRISTINE PERRON, CWS
DATE OF ASSESSMENT: SUMMER 2022
Check this box to confirm that the application includes a NARRATIVE ON FUNCTIONAL ASSESSMENT: ☒
For minor or major projects requiring a standard permit without mitigation, the applicant shall submit a wetland evaluation report that includes completed checklists and information demonstrating the RELATIVE FUNCTIONS AND VALUES OF EACH WETLAND EVALUATED. Check this box to confirm that the application includes this information, if applicable: ☒ Note: The Wetlands Functional Assessment worksheet can be used to compile the information needed to meet functional assessment requirements.

NHDES Avoidance and Minimization Checklist

AVOIDANCE AND MINIMIZATION CHECKLIST

Water Division/Land Resources Management
Wetlands Bureau

Check the Status of your Application

RSA/Rule: RSA 482-A/ Env-Wt 311.07(c)

This checklist can be used in lieu of the written narrative required by Env-Wt 311.07(a) to demonstrate compliance with requirements for Avoidance and Minimization (A/M), pursuant to RSA 482-A:1 and Env-Wt 311.07(c).

For the construction or modification of non-tidal shoreline structures over areas of surface waters without wetland vegetation, complete only Sections 1, 2, and 4 (or the applicable sections in Attachment A: Minor and Major Projects (NHDES-W-06-013).

The following definitions and abbreviations apply to this worksheet:

- "A/M BMPs" stands for Wetlands Best Management Practice Techniques for Avoidance and Minimization dated 2019, published by the New England Interstate Water Pollution Control Commission (Env-Wt 102.18).
- "Practicable" means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes (Env-Wt 103.62).

SECTION 1 - CONTACT/LOCATION INFORMATION	
APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation	
PROJECT STREET ADDRESS: F.E. EVERETT TURNPIKE	PROJECT TOWN: MERRIMACK
TAX MAP/LOT NUMBER: ROW	

SECTION 2 - PRIMARY PURPOSE OF THE PROJECT		
Env-Wt 311.07(b)(1)	Indicate whether the primary purpose of the project is to construct a water-access structure or requires access through wetlands to reach a buildable lot or the buildable portion thereof.	☐ Yes ☒ No

If you answered "no" to this question, describe the purpose of the "non-access" project type you have proposed:

The purpose of the proposed F.E. Everett Turnpike widening project is to improve transportation safety and efficiency by reducing traffic congestion.

SECTION 3 - A/M PROJECT DESIGN TECHNIQUES Check the appropriate boxes below in order to demonstrate that these items have been considered in the planning of the project. Use N/A (not applicable) for each technique that is not applicable to your project.		
Env-Wt 311.07(b)(2)	For any project that proposes new permanent impacts of more than one acre or that proposes new permanent impacts to a Priority Resource Area (PRA), or both, whether any other properties reasonably available to the applicant, whether already owned or controlled by the applicant or not, could be used to achieve the project's purpose without altering the functions and values of any jurisdictional area, in particular wetlands, streams, and PRAs.	☐ Check ☒ N/A
Env-Wt 311.07(b)(3)	Whether alternative designs or techniques, such as different layouts, construction sequencing, or alternative technologies could be used to avoid impacts to jurisdictional areas or their functions and values.	☒ Check ☐ N/A
Env-Wt 311.07(b)(4) Env-Wt 311.10(c)(1) Env-Wt 311.10(c)(2)	The results of the functional assessment required by Env-Wt 311.03(b)(10) were used to select the location and design for the proposed project that has the least impact to wetland functions.	☒ Check ☐ N/A
Env-Wt 311.07(b)(4) Env-Wt 311.10(c)(3)	Where impacts to wetland functions are unavoidable, the proposed impacts are limited to the wetlands with the least valuable functions on the site while avoiding and minimizing impacts to the wetlands with the highest and most valuable functions.	☒ Check ☐ N/A
Env-Wt 313.01(c)(1) Env-Wt 313.01(c)(2) Env-Wt 313.03(b)(1)	No practicable alternative would reduce adverse impact on the area and environments under the department's jurisdiction and the project will not cause random or unnecessary destruction of wetlands.	☒ Check ☐ N/A
Env-Wt 313.01(c)(3)	The project would not cause or contribute to the significant degradation of waters of the state or the loss of any PRAs.	☒ Check ☐ N/A
Env-Wt 313.03(b)(3) Env-Wt 904.07(c)(8)	The project maintains hydrologic connectivity between adjacent wetlands or stream systems.	☒ Check ☐ N/A
Env-Wt 311.10 A/M BMPs	Buildings and/or access are positioned away from high function wetlands or surface waters to avoid impact.	☐ Check ☒ N/A
Env-Wt 311.10 A/M BMPs	The project clusters structures to avoid wetland impacts.	☐ Check ☒ N/A
Env-Wt 311.10 A/M BMPs	The placement of roads and utility corridors avoids wetlands and their associated streams.	☒ Check ☐ N/A
A/M BMPs	The width of access roads or driveways is reduced to avoid and minimize impacts. Pullouts are incorporated in the design as needed.	☐ Check ☒ N/A
A/M BMPs	The project proposes bridges or spans instead of roads/driveways/trails with culverts.	☐ Check ☒ N/A

A/M BMPs	The project is designed to minimize the number and size of crossings, and crossings cross wetlands and/or streams at the narrowest point.	☒ Check ☐ N/A
Env-Wt 500 Env-Wt 600 Env-Wt 900	Wetland and stream crossings include features that accommodate aquatic organism and wildlife passage.	☒ Check ☐ N/A
Env-Wt 900	Stream crossings are sized to address hydraulic capacity and geomorphic compatibility.	☒ Check ☐ N/A
A/M BMPs	Disturbed areas are used for crossings wherever practicable, including existing roadways, paths, or trails upgraded with new culverts or bridges.	☐ Check ☒ N/A
SECTION 4 - NON-TIDAL SHORELINE STRUCTURES		
Env-Wt 313.03(c)(1)	The non-tidal shoreline structure has been designed to use the minimum construction surface area over surfaces waters necessary to meet the stated purpose of the structure.	☐ Check ☒ N/A
Env-Wt 313.03(c)(2)	The type of construction proposed for the non-tidal shoreline structure is the least intrusive upon the public trust that will ensure safe navigation and docking on the frontage.	☐ Check ☒ N/A
Env-Wt 313.03(c)(3)	The non-tidal shoreline structure has been designed to avoid and minimize impacts on the ability of abutting owners to use and enjoy their properties.	☐ Check ☒ N/A
Env-Wt 313.03(c)(4)	The non-tidal shoreline structure has been designed to avoid and minimize impacts to the public's right to navigation, passage, and use of the resource for commerce and recreation.	☐ Check ☒ N/A
Env-Wt 313.03(c)(5)	The non-tidal shoreline structure has been designed, located, and configured to avoid impacts to water quality, aquatic vegetation, and wildlife and finfish habitat.	☐ Check ☒ N/A
Env-Wt 313.03(c)(6)	The non-tidal shoreline structure has been designed to avoid and minimize the removal of vegetation, the number of access points through wetlands or over the bank, and activities that may have an adverse effect on shoreline stability.	☐ Check ☒ N/A

NHDES Avoidance and Minimization Narrative

AVOIDANCE AND MINIMIZATION WRITTEN NARRATIVE

Water Division/Land Resources Management

Wetlands Bureau

Check the Status of your Application

RSA/ Rule: RSA 482-A/ Env-Wt 311.04(j); Env-Wt 311.07; Env-Wt 313.01(a)(1)b; Env-Wt 313.01(c)

APPLICANT'S NAME: **NH Department of Transportation** **TOWN NAME:** **MERRIMACK**

An applicant for a standard permit shall submit with the permit application a written narrative that explains how all impacts to functions and values of all jurisdictional areas have been avoided and minimized to the maximum extent practicable. This attachment can be used to guide the narrative (attach additional pages if needed). Alternatively, the applicant may attach a completed Avoidance and Minimization Checklist (NHDES-W-06-050) to the permit application.

SECTION 1 - WATER ACCESS STRUCTURES (Env-Wt 311.07(b)(1))

Is the primary purpose of the proposed project to construct a water access structure?

NO

SECTION 2 - BUILDABLE LOT (Env-Wt 311.07(b)(1))

Does the proposed project require access through wetlands to reach a buildable lot or portion thereof?

NO

SECTION 3 - AVAILABLE PROPERTY (Env-Wt 311.07(b)(2))*

For any project that proposes permanent impacts of more than one acre, or that proposes permanent impacts to a PRA, or both, are any other properties reasonably available to the applicant, whether already owned or controlled by the applicant or not, that could be used to achieve the project's purpose without altering the functions and values of any jurisdictional area, in particular wetlands, streams, and PRAs?

**Except as provided in any project-specific criteria and except for NH Department of Transportation projects that qualify for a categorical exclusion under the National Environmental Policy Act.*

N/A

SECTION 4 - ALTERNATIVES (Env-Wt 311.07(b)(3))

Could alternative designs or techniques, such as different layouts, different construction sequencing, or alternative technologies be used to avoid impacts to jurisdictional areas or their functions and values as described in the Wetlands Best Management Practice Techniques For Avoidance and Minimization?

Wetland impacts have been avoided and minimized to the maximum extent practicable. The proposed project is not anticipated to impact any exemplary natural communities, vernal pools, protected species and habitat, documented fisheries, and/or habitat and reproduction areas for species of special concern. Coordination with the NH Natural Heritage Bureau, NH Fish and Game, and the US Fish and Wildlife Service has occurred. Measures will be implemented to avoid or minimize impacts to species of concern. These measures are described in the Supplemental Narrative. Appropriate sediment and erosion controls will be implemented throughout construction to avoid detrimental water quality impacts. Avoidance and minimization measures include refining and steepening roadway slopes to specifically avoid and minimize wetland and stream impacts. Stormwater treatment BMPs have also been incorporated into the design in order to treat runoff from additional pavement surfaces, thereby ensuring water quality of surface waters in the vicinity is maintained.

SECTION 5 - CONFORMANCE WITH Env-Wt 311.10(c) (Env-Wt 311.07(b)(4))**

How does the project conform to Env-Wt 311.10(c)?

***Except for projects solely limited to construction or modification of non-tidal shoreline structures only need to complete relevant sections of Attachment A*.

The existing F.E. Everett Turnpike was originally constructed in the 1950s and 1960s and was sited on its current location at that time. Based on the existing location of the Turnpike infrastructure, opportunities for relocating the proposed widening project are limited. However, as mentioned above, avoidance and minimization efforts have substantially reduced the amount of impacts. A functional assessment was completed and used to help minimize and avoid impacts to higher quality wetlands. Wetland impacts are located along the edges of existing wetlands, and the proposed project is not anticipated to result in a substantial loss of wetland functions and values.

Natural Resource Agency Coordination Meeting Minutes

BUREAU OF ENVIRONMENT
CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: August 17, 2022
LOCATION OF CONFERENCE: Virtual meeting held via Zoom

ATTENDED BY:

NHDOT
Matt Urban
Andrew O'Sullivan
Jon Evans
Joshua Brown
Mark Hemmerlein
Dan Prehemo

ACOE
Mike Hicks

EPA
Jean Brochi

NHDES
Karl Benedict
Lori Sommer

NHB
Jessica Bouchard

NH Fish & Game
John Magee
Mike Dionne

Federal Highway
Absent

The Nature Conservancy
Absent

Consultants/ Public Participants
Mark Neuroth
Robert H. Durfee, P.E.
Christine Perron
Mike Long
Megan Ooms

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH: *(minutes on subsequent pages)*

Table of Contents:

to protect the ruins during construction. A Phase 1A/1B Archaeological Study, prepared by Monadnock Archaeological Consulting, LLC, was submitted to NH DHR. Upon review of the 1A/1B Archaeological Study, no further study is recommended by NH DHR.
M. Neuroth presented the current status and schedule of the proposed project. The project is currently in the engineering design and permitting phase. Advertising and bidding is proposed to occur January

Nashua-Merrimack-Bedford, 13761E (Non-Fed):

Christine Perron introduced the project, which proposes widening and associated improvements along the F.E. Everett Turnpike. The overall 13761 project includes widening three segments of the existing 2-lane portions of the F.E. Everett Turnpike in Nashua, Merrimack, and Bedford, totaling 8.1 miles. The overall project consists of adding an additional travel lane in both the northbound and southbound directions to provide congestion relief and improved safety, as well as the rehabilitation or replacement of five bridges. There are currently 5 construction contracts planned to complete the project, with the possibility of additional contracts if there is a need to split the larger Contract C. As was previously discussed at this meeting, each contract will have a separate permit application, but impacts will be considered cumulatively. Contract D was the first to receive a permit and is now under construction. Today's meeting will discuss Contract E, which is scheduled to advertise in February 2023. The permit application will be submitted to NHDES in October 2022.

Contract E, located in Merrimack between Exits 12 and 13, is the northernmost end of the middle segment of the 13761 project. The E contract is 0.9 miles in length, beginning approximately 0.2 miles north of the Bedford Road overpass (Station 1160+00), and continuing north. Work in Contract E will consist of widening to add a northbound and southbound travel lane, widening for traffic control, construction of a noise wall, addressing the Dumpling Brook culvert, and drainage improvements.

The wetland delineation was completed by McFarland Johnson in 2016-2017 and wetland boundaries were confirmed in 2021-2022. Contract E includes small areas of palustrine wetlands and one stream (Dumpling Brook). There are no Priority Resource Areas and the project is outside the Merrimack River designated river corridor. The Dumpling Brook Wildlife Management Area is adjacent to the project area and the project will require either an easement or acquisition to accommodate the proposed stormwater treatment pond. Coordination with NH Fish & Game has been initiated.

Jurisdictional impacts are still being finalized as avoidance and minimization measures are refined. At this time, wetland impacts are expected to be approximately 15,000 sq ft, with four wetlands impacted. Impacts are higher than anticipated in preliminary design due to changes in slope work necessary for traffic control and guardrail.

Dumpling Brook is the only stream crossing in Contract E and is a Tier 2 crossing based on watershed size. The existing pipe is 36" diameter and about 450' in length. Bankfull width is approximately 25 feet. The original intent was to leave the existing pipe in place, extending it 50' to accommodate the widening and realigning the outlet for a total impact of 170 linear feet. The realigned channel would be riprap covered with natural streambed material. MJ is still in the

process of evaluating if the pipe has sufficient capacity based on the current StreamStats flow rate. If it's determined that the pipe is hydraulically undersized, the entire pipe will be replaced with a slightly larger diameter (42 or 48") and the new pipe would be 600' in length and skewed to eliminate the need for realigning the channel.

The proposed wetland and stream impacts will require mitigation. Based on the preliminary impacts of 15,000 sq ft of wetland and 170 linear feet of stream, the in-lieu fee would be $139,800. No mitigation input has been received and NHDOT's preference is to pay the in-lieu fee. The D contract (13761D), Permit 2021-02109, resulted in 10,785 sq ft of wetland impact that was mitigated via an in-lieu fee ($61,052).

There are no existing surface water impairments in the vicinity of the project. Within the limits of Contract E, total existing impervious surface area is 9.25 acres. The project will add approximately 3.8 acres of pavement. A proposed wet pond will treat runoff from approximately 9.4 acres of pavement, which equates to approximately 2.5 times the area of additional pavement.

The federally listed northern long-eared bat has the potential to occur in the project area. The project was anticipated to be covered under the 4(d) Rule; however, informal consultation with the USFWS has been initiated in anticipation of the relisting of northern long-eared bat to endangered by the end of this year. An acoustic presence/absence survey was completed in July 2022 and results have not yet been analyzed.

State listed species that occur in or near the project area consist of bird-foot violet, New England cottontail, and wood turtle. McFarland Johnson completed a survey for bird-foot violet in 2021 and 2022. One population was identified in Contract E. Impacts to this population cannot be avoided and coordination with the Natural Heritage Bureau has been initiated.

Karl Benedict noted that avoidance and minimization measures should be described in the application package, along with the coordination carried out with the Natural Heritage Bureau and NH Fish & Game.

Lori Sommer asked if the impact to the Wildlife Management Area would require an amendment to the conservation deed. C. Perron noted that coordination is just getting underway and information on how the property is protected is still unknown. L. Sommer cautioned that impacts would likely require working with the Department of Justice and the process takes time to get through.

John Magee commented that he would follow up at Fish & Game regarding the Wildlife Management Area. He also noted that wild brook trout do occur in Dumpling Brook. The stream is a groundwater fed, cold water stream. Ideally, aquatic organism passage could be accommodated through the stream crossing. He acknowledged that the length of the pipe makes that challenging, although a slope of 1% or less would pass fish despite the length. Mike Long commented that there is 15 feet of cover over the pipe and that, if replaced, trench construction would likely be carried out. The culvert was considered to be in fair condition in 2014; however, NHDOT Turnpikes has asked the project team to take another look at the pipe to assess its current condition. The slope of the pipe is 1% or less.

Mike Hicks asked if there would be any floodplain impacts. C. Perron replied that there are no mapped floodplains within the project area.

Jean Brochi had no comments or questions.

Jessica Bouchard noted that she needed to finish her review of the plant survey summary that was provided by MJ and schedule a meeting to discuss next steps. She expected that the best solution would be to transplant the impacted population.

BUREAU OF ENVIRONMENT
CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: September 21, 2022
LOCATION OF CONFERENCE: Virtual meeting held via Zoom

ATTENDED BY:

NHDOT
Matt Urban
Andrew O'Sullivan
Jon Evans
Emily Kulig
Kerry Ryan
Arin Mills
Wendy Johnson
Dan Prehemo
Wayne Brooks

ACOE
Absent

EPA
Jean Brochi

NHDES
Karl Benedict
Lori Sommer

NHB
Sabrina Stanwood
Madeline Severance

NH Fish & Game
John Magee
Mike Dionne
Kevin Newton

Federal Highway
Absent

The Nature Conservancy
Absent

Consultants/ Public Participants
Christine Perron
Brian Patinskas
Linda Greer
Lee Carboneau
Kristen Clarke
Ben Lundsted

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH: *(minutes on subsequent pages)*

Table of Contents:

Manchester Conservation Commission for potential wetland restoration projects in the Merrimack watershed, possibly in floodplain areas, to address wetland mitigation and offered to provide input as needed.

John Magee (NHFG) - no questions or comments, but he is also interested in mitigation.

Mike Dionne (NHFG)– Noted the plan calls for 90% treatment, and asked how much is treated now? Linda responded that aside from treatment associated with individual developments, like Market Basket and the Riverwalk, not much treatment takes place. Most drainage passes through the gravelly abandoned rail corridor.

Jean Brochi (USEPA)– would like to be included in the mitigation planning and looks forward to a future presentation.

Madeline Severance (NHNHB)– has no concerns as there are no NHB records.

Nashua-Merrimack-Bedford, 13761E (Non-Fed):

Christine Perron introduced the project, which proposes widening and associated improvements along the F.E. Everett Turnpike. As previously discussed at the August meeting, Contract E is located in Merrimack, just south of the Merrimack-Bedford town line between Exits 12 and 13. The project limits are just under one mile. An overview of the entire project was provided at the August meeting. The purpose of discussing the project this month was to review new information about Dumpling Brook.

Dumpling Brook is the only stream crossing in this contract. This is a Tier 2 crossing based on watershed size. The existing pipe is 36" diameter and about 450' in length. Bankfull width is approximately 25 feet. At the previous meeting, it was noted that the design team was still analyzing whether to extend the existing pipe or replace it. A decision has now been made to replace the pipe with a 42" culvert.

Since the August meeting, it was determined that some drainage pipes from the days of the former NH Fish & Game fish hatchery are still in place today but were not picked up by survey. A 1950s plan from the construction of the Turnpike was shown to describe the locations of these pipes. The inlet of a 24" pipe is located in Dumpling Brook outside the existing right-of-way (ROW) and upstream from the inlet of the 36" Dumpling Brook culvert. The 24" pipe takes some flow from the brook and outlets into an artificial dammed area on the east side of the Turnpike. Stream flow was further split to supply water to the former hatchery via another pipe from the dammed area, with remaining flow going through a side channel and outletting into Dumpling Brook. Another pipe system that still exists under the Turnpike consists of 8" and 12" pipes with a manhole at the ROW line, inlet outside existing ROW, and outlet adjacent to the 24" pipe. These structures were also part of the hatchery system. The survey crew recently located these drainage pipes and they are now shown on project plans. When the wetland delineation was completed, the side channel at the outlet of the drainage pipe system was delineated as a stream. There is a delineated forested wetland in the vicinity of the 12" pipe but the delineation did not extend as far as the pipe inlet.

As part of the proposed project, the old drainage pipes will be abandoned by filling them. There is no benefit in keeping the pipes in place or replacing them. They are more than 70 years old and doing nothing would eventually create safety concerns as they deteriorate. Removing the pipes would benefit Dumpling Brook by keeping all flow in a single, upsized pipe.

Photos of the side channel were reviewed. There is typically only a trickle of water coming from the 24" pipe. There is a defined channel, although it still retains characteristics of an excavated channel. The channel also still has the concrete weir structures constructed for the hatchery.

The drainage pipes were added to the hydraulic analysis for the proposed project and it was determined that a backwater condition exists in the side channel since the elevation of Dumpling Brook is slightly higher than that of the side channel. For this reason, the side channel is not expected to go dry when the drainage pipes are abandoned.

The replacement of the 36" Dumpling Brook culvert with a 42" culvert on new alignment will result in approximately 170 LF of permanent channel impact at the inlet and outlet, as discussed last month. Because of the backwater condition at the side channel, this channel is expected to continue to retain water. It is also not a natural stream channel. For these reasons, no permanent impacts will be shown in this side channel on the wetland impact plans.

Karl Benedict noted that the backwater condition in the side channel should be described in the permit application. He also asked that the application address 1) whether or not there would be impacts to the wetland at the inlet of the 8"/12" pipe system when the pipes are abandoned, and 2) if a backwater condition exists at the inlet side of Dumpling Brook and, if so, if impacts to hydrology would be anticipated from the proposed fill in the stream channel.

K. Benedict asked if there is floodplain at Dumpling Brook. C. Perron replied that there is no mapped floodplain in this area. Karl also asked if the downstream dam type structure was classified as a dam. C. Perron clarified that the structure is a concrete weir and not a dam.

Lori Sommer asked if the 170 linear feet of stream impact included the banks and channel, and if impacts would be mitigated via an in-lieu fee. C. Perron replied that Dumpling Brook has no defined banks and the 170 linear feet of impact was measured along the thread of the channel. Mitigation would be via an in-lieu fee.

John Magee commented that he thought filling the drainage pipes was a good idea. He also asked about the wetland at the inlet of the 8"/12" pipe system. C. Perron noted that potential impacts to this wetland would be analyzed but there likely would be no impact given how little water this pipe carries and how large the wetland is.

J. Magee asked if the downstream weir could be removed for mitigation. C. Perron replied that the project team could look into removing it; however, it would not be removed for mitigation purposes.

J. Magee asked if the new Dumpling Brook culvert would be installed via directional boring. C. Perron replied that the pipe would be installed with open trench construction. J. Magee asked that a larger pipe be considered to improve aquatic organism passage (AOP) if the cost is not

much greater than the 42" pipe that's proposed. C. Perron responded that the pipe size would be addressed in the permit application. Comments received at the August meeting indicated that the 42" pipe, despite its length, would provide some improvement to AOP since the slope is less than 1%.

Mike Hicks and Jean Brochi had no comments or questions.

Maddie from the Natural Heritage Bureau asked about the status of the rare plant coordination. C. Perron noted that Jessica had provided recommendations to incorporate into a transplanting plan, which will be completed prior to the project's advertising date in February.

Mitigation Narrative

Mitigation Narrative

The project requires compensatory mitigation for unavoidable permanent impacts to wetlands associated with the widening of a 0.9-mile segment of the F.E. Everett Turnpike.

The following information is provided to satisfy requirements for permittee responsible mitigation, as outlined in Chapter Env-Wt 800.

Project Overview

The project will result in 10,395 SF of permanent impacts to wetlands and 120 LF of permanent impact to stream channel. This project is part of a larger project that will be permitted and constructed under multiple contracts. Therefore, each construction contract will include mitigation for its associated impacts and total mitigation for the cumulative impacts associated with the entire project will be reconciled with the last 13761 contract.

Wetlands were classified according to Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979). The Wetland Functional Assessment was prepared in accordance with the U.S. ACE New England District highway methodology.

The delineation, wetland classification, and functional assessment were overseen by Christine Perron, CWS. Proposed impacts are located in palustrine forested, scrub-shrub, and emergent wetlands, as well perennial and intermittent streams. Detailed impacts are provided on the enclosed wetland impact plans and application form.

The project begins approximately 0.2 miles north of the Exit 12 (Bedford Road overpass) and continues north for approximately 0.9 miles. The project is located in Merrimack, just south of the Merrimack-Bedford town line between Exits 12 and 13. The Merrimack River is located immediately east. The majority of the area has been disturbed by the construction of the FE Everett Turnpike, state and local roadways, and commercial and residential development. The Dumpling Brook Wildlife Management Area is located along the west side of the project near its northern limit.

Mitigation for Unavoidable Impacts

Impacts to jurisdictional areas have been avoided and minimized to the extent practicable while still accomplishing the purpose and need of the project.

There have been numerous meetings with the public and local officials throughout the development of the FE Everett Turnpike Widening Project, including three meetings in the Town of Merrimack with the Town Council (11/17/2016), Public Works Department (1/9/2018), and the public (5/1/2018). No potential mitigation projects have been brought forward for consideration.

No suitable restoration or enhancement opportunities exist in the project area that are in line with the proposed scope of work. Wetland creation opportunities were not considered practicable due to the costs associated with long-term monitoring and maintenance. Suitable areas for the preservation of an aquatic buffer have not been identified in the vicinity of the project.

For these reasons, payment to the Aquatic Resource Mitigation (ARM) Fund is proposed. Based on the NHDES ARM Fund 2022 Wetland Payment Calculator, the ARM Fund payment for proposed impacts will be $103,449.60.

There are currently 5 construction contracts planned to complete the overall widening project. Each contract will have a separate permit application, with impacts considered cumulatively for purposes of mitigation. To date, only one construction contract, Contract D, has received a permit. Impacts and mitigation will continue to be tracked and summarized in subsequent permit applications.

Nashua-Merrimack-Bedford 13761
Summary of wetland permit applications and mitigation by contract

Contract	***Permit Number***	***Wetland Impacts***	***Stream Impacts***	***Mitigation***
13761D	2021-02109	10,785 sq ft	0	$61,052 in-lieu fee
13761E	tbd	10,395 sq ft	120 linear ft	$103,449.60 proposed in-lieu fee

2022 VALUES

TOWN	LAND VALUE
Acworth	2015
Albany	1166
Alexandria	3283
Allenstown	11545
Alstead	3107
Alton	28465
Amherst	33150
Andover	5187
Antrim	5186
Ashland	17888
Atkinson	53267
Auburn	25811
Barnstead	10183
Barrington	14071
Bartlett	10785
Bath	2148
Bean's Grant	494
Bean's Purchase	494
Bedford	53267
Belmont	16815
Bennington	5777
Benton	494
Berlin	2091
Bethlehem	1170
Boscawen	8475
Bow	22793
Bradford	5543
Brentwood	25013
Bridgewater	21888
Bristol	19371
Brookfield	3208
Brookline	24118
Cambridge	494
Campton	6327
Canaan	5832
Candia	13335
Canterbury	4856
Carroll	4102
Center Harbor	43396
Chandler's Purchase	494
Charlestown	3287

NHDES AQUATIC RESOURCE MITIGATION FUND
WETLAND PAYMENT CALCULATION
*****INSERT AMOUNTS IN YELLOW CELLS*****

	1	**Convert square feet of impact to acres:**	
INSERT SQ FT OF IMPACT	Square feet of impact =	10395.00	
		43560.00	
	Acres of impact =	0.2386	
	2	**Determine acreage of wetland construction:**	
	Forested wetlands:	0.3580	
	Tidal wetlands:	0.7159	
	All other areas:	0.3580	
	3	**Wetland construction cost:**	
	Forested wetlands:	$36,674.03	
	Tidal Wetlands:	$73,348.07	
	All other areas:	$36,674.03	
	4	**Land acquisition cost (See land value table):**	
INSERT LAND VALUE FROM TABLE WHICH APPEARS TO THE LEFT. (Insert the amount do not copy and paste.)	Town land value:	53267	
	Forested wetlands:	$19,067.16	
	Tidal wetlands:	$38,134.33	
	All other areas:	$19,067.16	
	5	**Construction + land costs:**	
	Forested wetland:	$55,741.20	
	Tidal wetlands:	$111,482.39	
	All other areas:	$55,741.20	
	6	**NHDES Administrative cost:**	
	Forested wetlands:	$11,148.24	
	Tidal wetlands:	$22,296.48	
	All other areas:	$11,148.24	
	**********	**TOTAL ARM PAYMENT**********	
	Forested wetlands:	$66,889.44	
	Tidal wetlands:	$133,778.87	
	All other areas:	$66,889.44	

NHDES AQUATIC RESOURCE MITIGATION FUND
STREAM PAYMENT CALCULATION

INSERT LINEAR FEET OF IMPACT on BOTH BANKS AND CHANNEL	**Right Bank**	
	Left Bank	
	Channel	120.0000
	TOTAL IMPACT	120.0000
	Stream Impact Cost:	$30,466.80
	NHDES Administrative cost:	
		$6,093.36
	********* **TOTAL ARM FUND STREAM PAYMENT**********	
		$36,560.16

Wetland Functions & Values

Wetland Function-Value Evaluation Form

Total area of wetland 0.5 acres Human made? no Is wetland part of a wildlife corridor? no or a "habitat island"? no

Adjacent land use highway and residential Distance to nearest roadway or other development 25 ft

Dominant wetland systems present PSS1E Contiguous undeveloped buffer zone present no

Is the wetland a separate hydraulic system? yes If not, where does the wetland lie in the drainage basin?

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 1

Latitude 42.887421 Longitude -71.477790

Prepared by: JT Date

Wetland Impact:
Type Area

Evaluation based on:
Office Field X

Corps manual wetland delineation completed? Y x N

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	N	15		
Floodflow Alteration	Y	1, 3, 4, 5, 6, 7, 8, 9	X	large wetland surrounded by impervious surface capable of retaining ponded water. Observed ponding during rainy conditions
Fish and Shellfish Habitat	N			
Sediment/Toxicant Retention	Y	1, 2, 4, 5, 7, 9	x	large wetland surrounded by impervious surface, which is treated with sand/salt in winter
Nutrient Removal	Y	1, 3, 7, 9		
Production Export	N	2		
Sediment/Shoreline Stabilization	N			
Wildlife Habitat	N	19		
Recreation	N			
Educational/Scientific Value	N			
Uniqueness/Heritage	N	1, 27		
Visual Quality/Aesthetics	N			
ES Endangered Species Habitat				
Other				

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland ~ 0.3 ac Human made? partial Is wetland part of a wildlife corridor? no or a "habitat island"? no

Adjacent land use highway and commercial Distance to nearest roadway or other development 70 ft

Dominant wetland systems present PFO1E Contiguous undeveloped buffer zone present no

Is the wetland a separate hydraulic system? yes If not, where does the wetland lie in the drainage basin?

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 2

Latitude 42.892393 Longitude -71.472804

Prepared by: JT Date

Wetland Impact:
Type Area

Evaluation based on:
Office Field X

Corps manual wetland delineation completed? Y x N

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	N			
Floodflow Alteration	Y	3, 4, 5, 8, 9		wetland located in basin, surrounded by impervious surface
Fish and Shellfish Habitat	N	1		
Sediment/Toxicant Retention	Y	1, 2, 4		
Nutrient Removal	Y	3, 5, 7		
Production Export	N			
Sediment/Shoreline Stabilization	N			
Wildlife Habitat	N	19		
Recreation	N			
Educational/Scientific Value	N			
Uniqueness/Heritage	N	1, 27		
Visual Quality/Aesthetics	N			
ES Endangered Species Habitat				
Other				

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 9,065 SF Human made? no Is wetland part of a wildlife corridor? no or a "habitat island"? no

Adjacent land use highway and undeveloped Distance to nearest roadway or other development 25 ft

Dominant wetland systems present PFO1E Contiguous undeveloped buffer zone present partial

Is the wetland a separate hydraulic system? yes If not, where does the wetland lie in the drainage basin?

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 3

Latitude 42.893393 Longitude -71.472800

Prepared by: JT Date 7/27/22

Wetland Impact:
Type Area

Evaluation based on:
Office Field X

Corps manual wetland delineation completed? Y x N

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	N	15		
Floodflow Alteration	Y	5, 6, 7, 8, 9		
Fish and Shellfish Habitat	N	1		
Sediment/Toxicant Retention	Y	1, 2, 4, 5, 7, 9	x	wetland receives water from surroundings, histic epipedon soils, evidence of water retention
Nutrient Removal	Y	3, 5, 7		
Production Export	N	2		
Sediment/Shoreline Stabilization	N			
Wildlife Habitat	Y	4, 5, 7, 19		wetland adjacent to Dumpling Brook wildlife management area
Recreation	N			
Educational/Scientific Value	N			
Uniqueness/Heritage	N	27		
Visual Quality/Aesthetics	N			
ES Endangered Species Habitat				
Other				

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland_____ Human made? no Is wetland part of a wildlife corridor? no or a "habitat island"? no

Adjacent land use highway and undeveloped Distance to nearest roadway or other development 50 ft

Dominant wetland systems present PFO1E Contiguous undeveloped buffer zone present partial

Is the wetland a separate hydraulic system? yes If not, where does the wetland lie in the drainage basin?_____

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 4

Latitude 42.894818 Longitude -71.471356

Prepared by: JT Date_____

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office_____ Field X

Corps manual wetland delineation completed? Y x N_____

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	N	4, 15		
Floodflow Alteration	Y	5, 6, 7, 8		
Fish and Shellfish Habitat	N	1		
Sediment/Toxicant Retention	Y	1, 2, 3, 5, 7, 9	x	large wetland area that receives overland flow and exibits signs of long duration water retention
Nutrient Removal	Y	2, 3, 5, 7		
Production Export	N	2		
Sediment/Shoreline Stabilization	N			
Wildlife Habitat	Y	4, 5, 7, 19, 21		adjacent to dumpling brook WMA
Recreation	N	5		
Educational/Scientific Value	N	5		
Uniqueness/Heritage	N	27		
Visual Quality/Aesthetics	N	8		
ES Endangered Species Habitat				
Other				

Notes: wetland extends beyond project area

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 890 SF Human made? no Is wetland part of a wildlife corridor? no or a "habitat island"? no

Adjacent land use highway and residential Distance to nearest roadway or other development 110 ft

Dominant wetland systems present PFO1E Contiguous undeveloped buffer zone present no

Is the wetland a separate hydraulic system? no If not, where does the wetland lie in the drainage basin?

How many tributaries contribute to the wetland? Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 5

Latitude 42.894734 Longitude -71.470183

Prepared by: JT Date 7/27/22

Wetland Impact:
Type Area

Evaluation based on:
Office Field X

Corps manual wetland delineation completed? Y x N

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	N	4, 7		
Floodflow Alteration	Y	3, 4, 9, 10, 13		wetland adjacent to dumpling brook, little to no flood storage upstream
Fish and Shellfish Habitat	N	8, 14, 17		
Sediment/Toxicant Retention	Y	1, 2, 3, 4, 10, 16	x	adjacent to dumpling brook, slow moving water present, saturation
Nutrient Removal	Y	3, 5, 7, 8, 9		
Production Export	N			
Sediment/Shoreline Stabilization	Y	3, 4, 5, 9, 12, 15	x	adjacent to dumpling brook, slow moving water present, saturation
Wildlife Habitat	N	13, 19		
Recreation	N			
Educational/Scientific Value	N	11		
Uniqueness/Heritage	Y	1, 11, 27		
Visual Quality/Aesthetics	N			
ES Endangered Species Habitat				
Other				

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland_____ Human made? no Is wetland part of a wildlife corridor? no or a "habitat island"? no

Adjacent land use highway and undeveloped Distance to nearest roadway or other development 125ft

Dominant wetland systems present PFO1E Contiguous undeveloped buffer zone present yes

Is the wetland a separate hydraulic system? no If not, where does the wetland lie in the drainage basin? adjacent to stream

How many tributaries contribute to the wetland?_____Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 6

Latitude 42.895866 Longitude -71.470860

Prepared by: JT Date 7/27/22

Wetland Impact:
Type_____Area_____

Evaluation based on:
Office_____ Field X

Corps manual wetland delineation completed? Y X N_____

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	N	4		
Floodflow Alteration	Y	3, 6, 8, 9, 10		
Fish and Shellfish Habitat	Y	1, 4, 8, 9, 14, 17		
Sediment/Toxicant Retention	Y	1, 2, 3, 9, 10, 12, 13, 15, 16	X	floodplain to dumpling brook, slow moving water present, water impoundment
Nutrient Removal	Y	3, 5, 8, 9,10, 12, 13, 14	X	floodplain to dumpling brook, slow moving water present, water impoundment
Production Export	Y	7, 10, 14		
Sediment/Shoreline Stabilization	Y	3, 4, 6, 7, 9, 12, 13, 15		
Wildlife Habitat	Y	3, 4, 5, 7, 8, 19, 20, 21	X	wetland associated with dumpling brook and within wildlife management area
Recreation	N	5		
Educational/Scientific Value	N	5, 11		
Uniqueness/Heritage	Y	7, 11, 27		
Visual Quality/Aesthetics	N	2, 9		
ES Endangered Species Habitat				
Other				

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland * Human made? no Is wetland part of a wildlife corridor? no or a "habitat island"? no

Adjacent land use undeveloped and highway (200ft away) Distance to nearest roadway or other development 195 ft

Dominant wetland systems present PFO1E Contiguous undeveloped buffer zone present yes

Is the wetland a separate hydraulic system? yes If not, where does the wetland lie in the drainage basin?

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 7

Latitude 42.896468 Longitude -71.470466

Prepared by: JT Date 07/27/2022

Wetland Impact:
Type Area

Evaluation based on:
Office Field X

Corps manual wetland delineation completed? Y x N

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	N	4		
Floodflow Alteration	N	3, 6		
Fish and Shellfish Habitat	N	1		
Sediment/Toxicant Retention	N	9		
Nutrient Removal	N			
Production Export	N			
Sediment/Shoreline Stabilization	N			
Wildlife Habitat	Y	1, 3, 4, 5, 7, 19	x	wetland within dumpling brook wma and surrounded by undeveloped area
Recreation	N	5		
Educational/Scientific Value	N	5		
Uniqueness/Heritage	N			
Visual Quality/Aesthetics	Y	5, 7, 8		
ES Endangered Species Habitat				
Other				

Notes: * wetland extends beyond study area/delineated portion

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland* _____ Human made? partial Is wetland part of a wildlife corridor? no or a "habitat island"? no

Adjacent land use highway and undeveloped Distance to nearest roadway or other development 20 ft

Dominant wetland systems present PEM1E Contiguous undeveloped buffer zone present yes

Is the wetland a separate hydraulic system? yes If not, where does the wetland lie in the drainage basin? _____

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 8

Latitude 42.898481 Longitude -71.467585

Prepared by: JT Date 7/27/22

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office _____ Field X

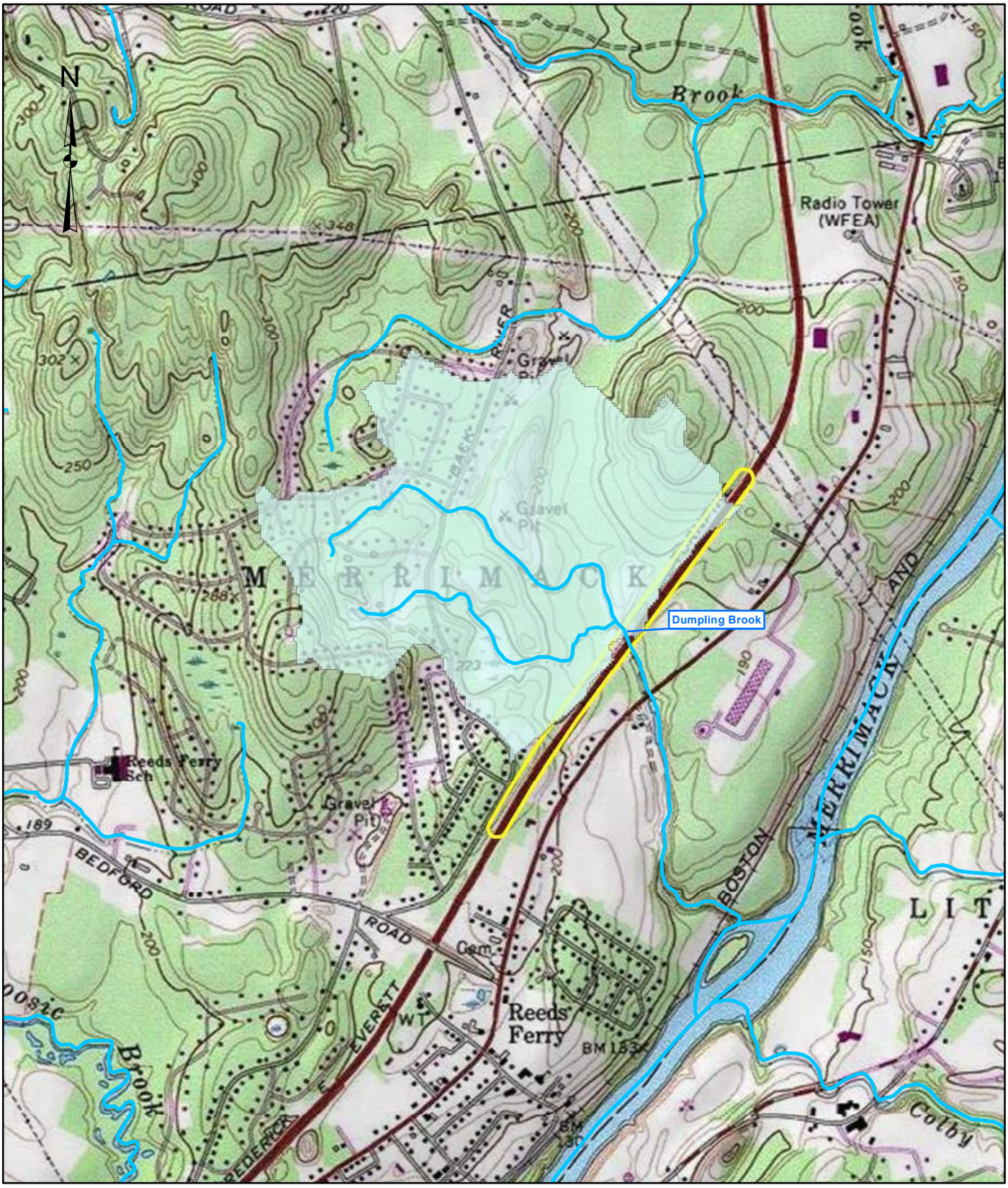
Corps manual wetland delineation completed? Y X N _____

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	N	4		
Floodflow Alteration	N	3, 9		
Fish and Shellfish Habitat	N			
Sediment/Toxicant Retention	Y	1, 2, 7		
Nutrient Removal	Y	3, 8, 9		
Production Export	N	7		
Sediment/Shoreline Stabilization	N			
Wildlife Habitat	Y	4, 5, 7, 8, 9, 13, 19	X	surrounded by undeveloped area and partially within dumpling brook wma
Recreation	N	5		
Educational/Scientific Value	N	5		
Uniqueness/Heritage	N	27		
Visual Quality/Aesthetics	N			
ES Endangered Species Habitat				
Other				

Notes: *wetland extends beyond study area

* Refer to backup list of numbered considerations.

Watershed Map



NHDOT 13761 F.E. EVERETT TURNPIKE CONTRACTS

NASHUA-MERRIMACK-BEDFORD, NEW HAMPSHIRE

DUMPLING BROOK WATERSHED

SCALE :	DATE :	FIGURE :
AS SHOWN	OCTOBER 2022	2

McFarland Johnson

M:\18589.00 NHDOT Southern FEET Design\Draw\GIS\10_Dumpling Brook Watershed Map Figure 2.mxd

Env-Wt 904.08 Stream Crossing Rules

NH Department of Transportation
Bureau of Environment
Nashua-Merrimack-Bedford, 13761E

Env-Wt 904.08 In-Kind Replacement of Tier 1 or Tier 2 Existing Legal Crossings

Dumpling Brook is a Tier 2 crossing based on its watershed size of 0.5 square miles. There are no Priority Resource Areas that elevate the crossing to Tier 3.

(b) A project to repair, rehabilitate, or replace a tier 1 or tier 2 crossing shall qualify under this section only if a professional engineer certifies that:

(1) The existing stream crossing does not have a history of causing or contributing to flooding that damages the crossing, other human infrastructure, or protected species or habitat, or any combination thereof;

Dumpling Brook is carried under the Turnpike via a 36" culvert. In addition, a 24" pipe runs roughly parallel to the Dumpling Brook culvert, carrying some flow from Dumpling Brook and outletting it into an artificial side channel. The existing condition does not have a history of causing or contributing to flooding. This is documented in the enclosed drainage report prepared by professional engineers at McFarland Johnson.

(2) The proposed stream crossing will:

a. Meet or exceed the general criteria specified in Env-Wt 904.01;

Not be a barrier to sediment transport;

The proposed work will increase the size of the culvert that carries Dumpling Brook and will eliminate the 24" pipe that diverts flow from the brook. The proposed condition will not result in a barrier to sediment transport and is anticipated to improve the overall stream system.

Prevent the restriction of high flows and maintain existing low flows;

Eliminating the 24" pipe that diverts flow from Dumpling Brook will result in improved maintenance of low flows. Replacing the existing 36" culvert with a 42" culvert will prevent the restriction of high flows. The proposed condition passes the 50-year storm event.

Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;

Eliminating the 24" pipe that diverts flow from Dumpling Brook and upsizing the 36" culvert to a 42" culvert is anticipated to result in improved aquatic organism passage. The slope of the pipe and stream channel is less than 1% and the water velocity during normal flows is less than 1 foot per second. These conditions are expected to allow passage of fish and other aquatic organisms.

Not cause an increase in the frequency of flooding or overtopping of banks;

The proposed crossing will pass a 50-year storm event and will not cause an increase in the frequency of flooding or overtopping of banks.

Preserve watercourse connectivity where it currently exists;

Connectivity of Dumpling Brook will be preserved through the proposed 42" culvert.

Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;

Eliminating the 24" pipe that diverts flow from Dumpling Brook will result in improved watercourse connectivity.

Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

The proposed condition will improve the hydraulic capacity of the crossing and is not anticipated to cause erosion, aggradation, or scouring.

Not cause water quality degradation.

The proposed crossing will not cause water quality degradation.

b. Maintain or enhance the hydraulic capacity of the crossing;

The existing and proposed crossing pass the 50-year storm event. Hydraulic functioning will be improved with the elimination of the 24" culvert.

c. Maintain or enhance the capacity of the crossing to accommodate aquatic organism passage, or both;

Eliminating the 24" pipe that diverts flow from Dumpling Brook and upsizing the 36" culvert to a 42" culvert is anticipated to result in improved aquatic organism passage. The slope of the pipe and stream channel is less than 1% and the water velocity during normal flows is less than 1 foot per second. These conditions are expected to allow passage of fish and other aquatic organisms.

d. Maintain or enhance the connectivity of the stream reaches upstream or downstream of the crossing, or both; and

Eliminating the 24" pipe that diverts flow from Dumpling Brook will result in improved watercourse connectivity.

e. Not cause an increase in the frequency of flooding or overtopping of banks upstream or downstream of the crossing, or both.

The proposed crossing will pass a 50-year storm event and will not cause an increase in the frequency of flooding or overtopping of banks.

Prepared By:

McFarland Johnson

Stream Crossing Assessment

NH STREAM CROSSING ASSESSMENT FORM

Project Name/Number	Nashua-Merrimack-Beford 13761E	**Town**	Merrimack	**County**	Hillsborough	**Street Name**	FE Everett Turnpike
Waterbody Name	Dumpling Brook	**NHDOT Structure ID**	n/a - culvert	**Lat/Long**	42.895128, -71.470196	**Stream Order**	2
Watershed Size https://streamstats.usgs.gov/ss/ ≤ 200 ac = Tier 1 > 200 ac and < 640 ac = Tier 2 ≥ 640 ac = Tier 3	320 ac / 0.5 sq mi	**Within Designated River Corridor?**	YES (NO)	**Within 100-Year Floodplain?**	YES (NO)	**Protected Species or Habitat? (NHB Record)**	YES (NO)
In a Prime Wetland or 100' Buffer?	YES (NO)	**Tidal Watercourse**	YES (NO)	**NHDES Stream Crossing Tier Env-Wt-900**	1 (2) 3 4		
Estimated Bankfull Width	*NH 2005 Regional Hydraulic Geometry Curves* *Wbf= (watershed in sq miles^0.4892)(12.469)* 8.9				Comments: No PRAs present		

FIELD REVIEW TASKS

Investigators	Jordan Tate	**Date**	6/6/2022	**Regime**	(PER) INT EPHM

Existing Structure

Type	Bridge	Arch	Open Box	Closed Box	Open Bottom Arch	Pipe Arch/Squash Pipe	(Circular)	Other	**Size**	36" diameter
Material	Concrete round pipe with stone wing walls, bottom has accumulated sediment						**Perched Outlet**	YES (NO)	Distance from invert to the water surface: n/a	
Water Depth	At Inlet: 0.5'		At Outlet: 0.4'		In Structure: not measured		**Continuous Substrate Through Structure**	Yes	**Type**	silt/muck
Flow	No Flow		Isolated Pools		(Continuous Flow)					
Tailwater Control	No	Location (distance from outlet): _____			Materials:		**Pool Configuration**	Width:____ Length:____ Max Depth:_____		
Angle of Stream Flow Approaching Structure	Sharp Bend (45-90)	(Mild Bend (5-45))	Naturally Straight	Channelized Straight			**Photos**	Outlet Structure ____	Inlet Structure ____	

Notes [weather conditions, recent precipitation, habitat features (rifle, run, pool, step, glide, woody debris, undercut banks, shading, vegetation, etc.), aquatic life observed]: continuous but low flow

Dominant Channel Substrate (Visual Assessment)

	Silt	Sand	Gravel	Cobble	Boulder	Bedrock	
Upstream	_____%	_____%	_____%	_____%	_____%	_____%	**Notes: 100% silt/sand**
Downstream	_____%	_____%	_____%	_____%	_____%	_____%	**Notes: 100% silt/sand**
In Structure	_____%	_____%	_____%	_____%	_____%	_____%	**Notes: unknown**

Riparian Zone

Riparian Zone Present	(YES) NO	**Dominant Vegetation**	
Width of Riparian Zone	_____		
Vegetation Density	Absent Low (Medium) High		

Additional Requirements for Tier 2, 3, & 4 Crossings

UPSTREAM CROSS-SECTIONS (MINIMUM OF 3)

		Loc 1	Loc 2	Loc 3	Loc 4	Loc 5	Average
UPSTREAM	Approximate Distance From Structure	64'	61'	____	____	____	62.50
	Bankfull Width (Wbf)	25'	30'	____	____	____	27.50
	Avg Bankfull Depth (Avg Dbf)	1.95	1.49	____	____	____	1.72
	Max Bankfull Depth (Max Dbf)	2.4	2.25	____	____	____	2.33
	Flood-Prone Width (2x Max Dbf)	208	180	____	____	____	194.00
	Method of Flood-Prone Width Measurement (field measurement (tape, rangefinder, surveyor's level), field estimate, GIS estimate, etc.)	field measurement	field measurement				

Notes: Third reference reach not completed - channel became more dispersed

BANKFULL DEPTH MEASUREMENTS

Instructions: Determine the average and maximum bankfull depth (Dbf) at each cross-section location. Dbf is measured from the channel bed to the estimated water surface elevation at bankfull flow. To determine the average Dbf, measure Dbf in approximately 1-foot intervals spaced evenly across the entire bankfull width (Wbf) of the channel.

UPSTREAM	Loc 1	1.2, 1.5, 1.6, 1.7, 1.8, 2.0, 2.1, 2.4, 2.5, 2.6, 2.4, 2.2, 2.2, 2.0, 2.0, 2.2, 2.45, 2.3, 2.4, 2.1, 2.0, 1.8, 0.85, 0.6	**Max Dbf = 2.4**	**Avg Dbf = 1.95**
	Loc 2	1.4, 1.5, 1.5, 1.5, 1.2,. 1.25, 1.2, 1.45, 1.6, 1.85, 1.9, 1.95, 2.25, 1.9, 1.95, 1.8, 1.45, 1.3, 1.3, 1.0, 1.4, 1.9, 1.6, 1.0, 0.85, 0.8	**Max Dbf = 2.25**	**Avg Dbf = 1.49**
	Loc 3	____ ____	**Max Dbf = ____**	**Avg Dbf = ____**
	Loc 4	____ ____	**Max Dbf = ____**	**Avg Dbf = ____**
	Loc 5	____ ____	**Max Dbf = ____**	**Avg Dbf = ____**

CHANNEL GEOMETRY UPSTREAM FROM CROSSING

		Loc 1	Loc 2	Loc 3	Loc 4	Loc 5	Average
UPSTREAM	Entrenchment Ratio: (Wfpa/Wbf)	8.32	6	____	____	____	7.16
	Width/Depth Ratio: (Wbf/Dbf)	12.82	20.13	____	____	____	16.48
	Sinuosity: (stream length/valley length) (from aerial)	1.03	1.03	____	____	____	1.03
	Channel Slope	____	____	____	____	____	____
	Channel Material	sand/silt	silt/sand	____	____	____	____
	Rosgen Classification	C5	C5	____	____	____	____

Additional Requirements for Tier 2, 3, & 4 Crossings

DOWNSTREAM CROSS-SECTIONS (MINIMUM OF 3)

		Loc 1	Loc 2	Loc 3	Loc 4	Loc 5	Average
DOWNSTREAM	Approximate Distance From Structure	13'	48'	96'	_____	_____	52.33
	Bankfull Width (Wbf)	22'	28'	17.6	_____	_____	22.53
	Avg Bankfull Depth (Avg Dbf)	1.01	1.92	1.04	_____	_____	1.32
	Max Bankfull Depth (Max Dbf)	1.6'	2.4'	1.75	_____	_____	1.92
	Flood-Prone Width (2x Max Dbf)	25.75	65.8	130'	_____	_____	73.85
	Method of Flood-Prone Width Measurement (field measurement (tape, rangefinder, surveyor's level), field estimate, GIS estimate, etc.)	field measurement	field measurement	field measurement			

Notes: some type of partial dam at downstream crossing 3, concrete extending partially into the channel

BANKFULL DEPTH MEASUREMENTS

Instructions: Determine the average and maximum bankfull depth (Dbf) at each cross-section location. Dbf is measured from the channel bed to the estimated water surface elevation at bankfull flow. To determine the average Dbf, measure Dbf in approximately 1-foot intervals spaced evenly across the entire bankfull width (Wbf) of the channel.

DOWNSTREAM	Loc 1	1.3, 1.6, 1.4, 1.4, 1.25, 1.1, 0.8, 0.8, 0.8, 0.7, 1.2, 1, 1.05, 1.0, 0.8, 0.6, 0.4	**Max Dbf = 1.6**	**Avg Dbf = 1.01**
	Loc 2	1.3, 1.6, 1.7, 2, 2.2, 2.2, 2.2, 2.1, 2.4, 2.3, 2.2, 2.1, 2.2, 2.0, 1.7, 1.7, 1.8, 1.8, 1.8, 2.0, 2.4, 2.8, 2.3, 1.2, 1.2, 0.8	**Max Dbf = 2.4**	**Avg Dbf = 1.92**
	Loc 3	0.6, 1.2, 0.9, 1.0, 0.9, 0.9, 1.4, 1.75, 1.4, 1.1, 1.2, 1.1, 1.2, 1.3, 0.7, 0	**Max Dbf = 1.75**	**Avg Dbf = 1.04**
	Loc 4	_____	**Max Dbf =** _____	**Avg Dbf =** _____
	Loc 5	_____	**Max Dbf =** _____	**Avg Dbf =** _____

CHANNEL GEOMETRY DOWNSTREAM FROM CROSSING

		Loc 1	Loc 2	Loc 3	Loc 4	Loc 5	Average
DOWNSTREAM	Entrenchment Ratio: (Wfpa/Wbf)	1.17	2.35	7.39	_____	_____	3.64
	Width/Depth Ratio: (Wbf/Dbf)	21.78	14.58	16.91	_____	_____	17.76
	Sinuosity: (stream length/valley length) (from aerial)	1.17	1.17	1.17	_____	_____	1.17
	Channel Slope	_____	_____	_____	_____	_____	_____
	Channel Material	silt/sand	silt/sand	silt/sand	_____	_____	_____
	Rosgen Classification	B5	C5	C5	_____	_____	_____

Additional Requirements for Tier 2, 3, & 4 Crossings

CHANNEL GEOMETRY & ROSGEN CLASSIFICATION

REF REACH	
Average Bankfull Width (Wbf)	
Average Bankfull Depth (Dbf)	
Average Floodprone Width (Wfpa)	
Entrenchment Ratio: (Wfpa/Wbf)	
Width/Depth Ratio: (Wbf/Dbf)	
Sinuosity: (stream length/valley length) (from aerial; from GIS)	
Channel Slope	
Channel Material	
Rosgen Classification	

UPSTREAM	
Average Bankfull Width (Wbf)	27.50'
Average Bankfull Depth (Dbf)	1.72'
Average Floodprone Width (Wfpa)	194.00'
Entrenchment Ratio: (Wfpa/Wbf)	7.16
Width/Depth Ratio: (Wbf/Dbf)	16.48
Sinuosity: (stream length/valley length) (from aerial; from GIS)	1.03
Channel Slope	<1%
Channel Material	silt/sand
Rosgen Classification	C

DOWNSTREAM	
Average Bankfull Width (Wbf)	22.53'
Average Bankfull Depth (Dbf)	1.32'
Average Floodprone Width (Wfpa)	73.85'
Entrenchment Ratio: (Wfpa/Wbf)	3.64
Width/Depth Ratio: (Wbf/Dbf)	17.76
Sinuosity: (stream length/valley length) (from aerial; from GIS)	1.17
Channel Slope	<1%
Channel Material	silt/sand
Rosgen Classification	C

Design Bankfull Width	25.01'	Average of upstream and downstream bankfull width
Design Entrenchment Ratio	5.40	Average of upstream and downstream entrenchment ratio

Existing Span Length	36" diameter pipe	Notes:

RECOMMENDED SPAN LENGTH

Bankfull Width (Wbf) x Entrenchment Ratio (Field Measurement)	Wbf 25'	X	Entrenchment Ratio (Field Measurement) 5.40	Full Geomorphic Compatibility (Based on Field Measurements) Span Length (feet) =	135
Bankfull Width (Wbf) x Entrenchment Ratio (Rosgen Stream Type)	Wbf 25'	X	Entrenchment Ratio (Rosgen Stream Type: C) 2.2	Geomorphic Compatibility (Based on Rosgen Stream Classification Entrenchment Ratio) Span Length (feet) =	55
1.2 x Bankfull Width (Wbf) + 2'	(1.2	X	Wbf 25') + 2'	Geomorphic Compatibility (Based on Bankfull Width) Span Length (feet) =	32

Drainage Report

Prepared For:

New Hampshire DOT
Department of Transportation

Nashua – Merrimack – Bedford

F.E. Everett Turnpike Widening Project

Stormwater Management Report

State Project No. 13761E

McFarland Johnson
53 Regional Drive • Concord, NH 03301

September 2022

TABLE OF CONTENTS

1 INTRODUCTION

1.1 PROJECT DESCRIPTION

This document consists of drainage design information associated with State Project No. 13761E, which will construct the widening of the F.E. Everett Turnpike (F.E.E.T.) from STA 1160+00 to STA 1206+50.

The 13761E contract is one of five proposed construction contracts for the project.

1.2 EXECUTIVE SUMMARY

The Stormwater Management Report for the 13761E Contract evaluates the peak stormwater flows for the pre-developed verses post-developed conditions, water quality requirements, and current MS4 regulations. The drainage systems' Best Management Practices (BMP), water quality design and analysis have been advanced to the slope and drain level based on the NHDOT and NHDES engineering practices.

2 RECEIVING WATERS

- **Dumpling Brook** – Dumpling Brook crosses the FEET at station 1185+50. The watershed area calculated in Stream Stats is 0.5 square miles delineated downstream of the FEET crossing. Dumpling Brook also collects closed drainage systems and overland flow from within the project area. The south side area includes a closed drainage system and sheet flow along the FEET from Sta 1163+02 to 1183+91. The north side area includes a closed drainage system and sheet flow along the FEET from Sta 1183+91 to 1206+18.

3 ANALYSIS METHODOLOGY

Criteria

The proposed stormwater management system is designed so that the hydrologic characteristics of post-development run-off from the site will mimic pre-development patterns and intensities for the 2-year, 10-year, and 50-year, 24-hour storm events.

Rainfall Intensities

The hydrologic analysis to determine peak stormwater discharge rates was performed using the HydroCAD stormwater modeling system computer program developed by HydroCAD Software Solutions, LLC. Hydrographs for each watershed were developed using the SCS Synthetic Unit Hydrograph Method TR-20 with a Type III rainfall distribution from NOAA Atlas 14, Volume 10, Version 3 for Merrimack, NH. Rainfall intensities used for the calculation of peak flow rates are listed in **Table 1**. Extreme precipitation rainfall data obtained from Northeast Regional Climate Center was used for rainfall intensities because the data for 24-hour storms were more conservative than NOAA. Pre-Development and Post-Development HydroCAD calculations output can be found in **Appendix E**.

Table 1 – Rainfall Rate Summary from Extreme Precipitation Estimates

24-hour Rainfall Precipitation

Storm Event Frequency	Inches / 24-hour
2-year	2.91
10-year	4.37
50-year	6.58
100-year	7.85

Time of Concentration

The time of concentration (Tc) is the travel time is takes stormwater to travel from the most remote point in the watershed to the point of interest (also known as the design point). Stormwater runoff travels through the watershed as sheet flow, shallow concentrated flow, and open channel flow depending on the site topography. The time of concentration was calculated in HydroCAD based on flow path length, slope, and condition. The site was modeled using a Manning's number based on surface description, land slope and a maximum length of 100 feet for sheet flow. The shallow concentrated flow was modeled using a velocity factor based on surface description, land slope and flow length. The minimum time of concentration is 5 minutes. See **Appendix E** for calculations.

Runoff Curve Number

Rainfall is converted to runoff by using a runoff curve number (CN). The curve numbers were determined based on land cover and hydrologic conditions using values per the Natural Resource Conservation Service (NRCS) and TR-55.

Analysis

The stormwater management system is designed so that the hydrologic characteristics of post-development run-off from the site will mimic pre-development patterns and intensities for the 2-year, 10-year, and 50-year, 24-hour storm events.

A hydrology study was completed for the proposed development area to quantify the change in peak rates of stormwater runoff versus existing conditions.

4 EXISTING CONDITIONS

Below are sub-drainage areas that reflect the Hydrocad Model.

Existing Dumpling Brook Design Point at FEET Mainline (DP-11):

- Sub-Drainage Area 84-1: The sub-drainage area totals 4.56 acres and collects sheet flow on FEET mainline Sta 1163+00 to 1198+50. The sheet flow area outlets on the east side of FEET mainline and collects at Dumpling Brook at 1185+00.

- Sub-Drainage Area 84-2: The sub-drainage area totals 3.51 acres and collects sheet flow on FEET mainline Sta 1171+50 to 1209+00. The sheet flow area outlets on the west side of FEET mainline and collects at Culvert 1185 at 1185+50.

- Sub-Drainage Area 84-3: The sub-drainage area totals 3.51 acres and collects overland stormwater on FEET mainline Sta 1191+00 to 1206+00. The existing stormwater runoff outlets on the west side of FEET mainline and collects at Culvert 1185 at 1185+50.

- Sub-Drainage Area 84-5: The sub-drainage area totals 4.88 acres and collects overland stormwater FEET mainline Sta 1163+00 to 1191+00. The existing stormwater runoff outlets on the west side of FEET mainline and collects at Culvert 1185 at 1185+50.

Existing Design Point 12 at FEET Mainline: This drainage area does not reach Dumpling Brook.

- Sub-Drainage Area 84-4: The sub-drainage area totals 0.71 acres and collects sheet flow on FEET mainline Sta 1208+00 to 1209+00. The sheet flow area outlets on both sides of FEET mainline and collects at existing culvert at 1213+00 and flows to the east side of FEET mainline.

Existing Design Point at Southern Limit of Contract E: This drainage area does not reach Dumpling Brook.

- Southern Sub-Drainage Area: The sub-drainage area includes area from FEET mainline Sta 1154+00 to 1163+00. The closed system is within the project limits but flows south to an existing system that outlets on the east side of FEET mainline.

5 PROPOSED CONDITIONS

5.1 PROPOSED CONDITIONS AND PEAK FLOW RATES

Below is a description of the proposed conditions and a comparison to the existing conditions at each design point.

Proposed Dumpling Brook Design Point at FEET Mainline (DP-11):

- Sub-Drainage Area P84-1: The sub-drainage area totals 1.17 acres and is collected in a proposed closed drainage system on FEET Mainline Sta 1169+00 to 1181+00 RT. The proposed impervious is untreated and outlets east on FEET Mainline where it will flow to Dumpling Brook. This untreated area is flowing into a wetland, but the proposed area flowing to the wetland is less than the existing.

- Sub-Drainage Area P84-2: The sub-drainage area totals 0.08 acres and collects sheet flow from FEET Mainline Sta 1174+00 to 1176+50 LT. The sheet flow area outlets on the west side of FEET mainline and collects in Culvert 1185. This untreated area is flowing into a wetland, but the proposed area flowing to the wetland is less than the existing.

- Sub-Drainage Area P84-6: The sub-drainage area totals 0.11 acres and collects sheet flow from FEET Mainline Sta 1185+00 to 1186+50 LT. The sheet flow area outlets on the west side of FEET mainline and collects in Culvert 1185. This untreated area is flowing into a wetland, but the proposed area flowing to the wetland is less than the existing.

- Sub-Drainage Area P84-8: The sub-drainage area totals 0.12 acres and collects sheet flow from FEET Mainline Sta 1181+00 to 1182+50 LT. The sheet flow area outlets on the west side of FEET mainline and collects in Culvert 1185. This untreated area is flowing into a wetland, but the proposed area flowing to the wetland is less than the existing.

- Sub-Drainage Area P84-9: The sub-drainage area totals 0.10 acres and collects sheet flow from FEET Mainline Sta 1197+50 to 1199+00 LT. The sheet flow area outlets on the west side of FEET mainline and collects in Culvert 1185. This untreated area is flowing into a wetland, but the proposed area flowing to the wetland is less than the existing.

The following three drainage sub-areas discharge to 1188 Wet Pond which outlets into culvert 1185. 1188 Wet Pond is sized to limit post-development flows to Design Point 11 to be less than the pre-development condition.

- Sub-Drainage Area P84-3: The sub-drainage area totals 9.82 acres and collects proposed and existing closed drainage systems on FEET Mainline Sta 1163+00 to 1206+00. The proposed impervious is treated in 1188 Wet Pond located at FEET mainline 1191+00 west. The BMP outlets south to Culvert 1185.

- Sub-Drainage Area P84-4: The sub-drainage area totals 2.83 acres and collects overland stormwater on FEET mainline Sta 1191+00 to 1206+00. The proposed impervious is treated in 1188 Wet Pond located at FEET mainline 1191+00 west. The BMP outlets south to Culvert 1185.

- Sub-Drainage Area P84-7: The sub-drainage area totals 3.78 acres and collects overland stormwater on FEET mainline Sta 1163+00 to 1191+00. The proposed impervious is treated in 1188 Wet Pond located at FEET mainline 1191+00 west. The BMP outlets south to Culvert 1185.

Below is a comparison summary of the pre-development and post-development flow rates at Design Point 11.

Estimated Changes in Peak Flow Rates to Design Point 11

	Estimated Peak Flow (CFS)		
Design Storm	**Existing**	**Proposed**	**Net Change**
2-year/24-hr rainfall	13.7	4.7	-9.0
10-year/24-hr rainfall	33.2	26.8	-6.4
50-year/24-hr rainfall	89.4	79.5	-9.9

Proposed Design Point 12 at FEET Mainline: This drainage area does not reach Dumpling Brook.

- Sub-Drainage Area P84-5: The sub-drainage area totals 0.79 acres and collects sheet flow on FEET mainline Sta 1206+00 to 1209+00. The sheet flow area outlets on both sides of FEET mainline and collects at existing culvert at 1213+00 and flows to the east side of FEET mainline.

Estimated Changes in Peak Flow Rates to Design Point 12

	Estimated Peak Flow (CFS)		
Design Storm	**Existing**	**Proposed**	**Net Change**
2-year/24-hr rainfall	2.0	2.2	0.2
10-year/24-hr rainfall	3.0	3.4	0.4
50-year/24-hr rainfall	4.6	5.1	0.5

There is a negligible increase to Design Point 12 due to the proposed profile high point being shifted slightly.

Proposed Design Point at Southern Limit of Contract E: This drainage area does not reach Dumpling Brook.

- Southern Sub-Drainage Area: The sub-drainage area includes area from FEET mainline Sta 1154+00 to 1163+00. The closed system is within the project limits but will be treated and detained in BMP 1145 in a proposed contract within this project.

1185 Culvert

The existing culvert that is located at 1185+00 has a diameter of 36". There is also a 24" culvert that runs parallel. The existing pipes will be replaced with a 42" pipe that is better aligned with Dumpling Brook. The post-developed flow for the 10-year and 50-year storms is less than the pre-developed. The post-developed flow for the 2-year storm is 0.55 cfs more than the pre-developed flow which is due to the detaining of the proposed runoff in the Wet Pond offsetting the hydrograph. The slight increase is counterbalanced at **Discharge Point 11** with a 9.0 cfs decrease in the post-developed flow.

Basin Summary

BMP 1188 This wet extended detention pond is located on the SB side of FEET mainline at 1188+00.	Lined Basin – Perimeter Underdrain – Roadway Underdrain Tributary – Ground Water Elevation = Top of Berm = Permanent Pool Elevation= Bottom of Basin=	**No** **No** **No** **172.60** **180.20** **175.00** **172.00**

6 WATER QUALITY TREATMENT (ALTERATION OF TERRAIN)

The proposed highway improvements along FEET Mainline 1154+00 to 1209+00 will result in a total of 14.21 acres of impervious area where currently the existing roadway has 10.36 acres of impervious within the 13761E project limits. Therefore, the total new additional impervious is 3.85 acres.

This contract proposes one detention basin that will receive drainage areas from FEET mainline. The total pavement area collected to the stormwater quality treatment practices is 9.81 acres.

The Alteration of Terrain (AoT) treatment goal for this project is to treat more than double the amount of new additional pavement area that is created by the project. Looking solely at the additional impervious pavement created within the 13761E project limits of 3.85 acres, treating 9.81 acres of pavement exceeds the AOT treatment goal of 7.70 acres, which is double the amount of new impervious surfaces created along FEET mainline.

The proposed stormwater management includes Best Management Practices (BMP) to comply with the National Pollutant Discharge Elimination System (NPDES) 2017 New Hampshire (NH) Small Municipal Separate Storm Sewer System (MS4) General Permit including the 2020 modifications.

Stormwater quality control will be achieved through a program of Best Management Practices (BMPs). The proposed treatment for the 13761E project will include one wet pond. The proposed development is designed to capture and treat the runoff from the 90th percentile of all rainfall in accordance with the NHDES Stormwater Management Standards.

Below is the AoT Worksheet for the 13761E project.

Treated Roadway Areas Related Contract E Roadway Improvements									
Subcatchment ID	BMP ID	Road Description	Road Stationing	Receiving Waterbody/ Ultimate Receiving Waterbody	Proposed Sub-Catchment Area Sq ft	Existing Pavement Sq ft	Total Proposed Pavement Sq ft	Newly Generated Pavement Sq ft	Existing Treated Pavement Sq Ft
P84-3	1184	FEET Mainline	1163+00 to 1206+00	Dumpling Brook	431,768	152,939	431,768	278,829	0
P84-4	1184	FEET Mainline	1191+00 TO 1206+00	Dumpling Brook	123,275	0	0	0	0
P84-7	1184	FEET Mainline	1163+00 TO 1191+00	Dumpling Brook	164,657	0	0	0	0
				Total for Area Draining to Dumpling Brook	**719,700**	**152,939**	**431,768**	**278,829**	**0**
Untreated Roadway Areas related to Contract E Improvements									
Subcatchment ID	BMP ID	Road Description	Road Stationing	Receiving Waterbody/ Ultimate Receiving Waterbody	Proposed Sub-Catchment Area Sq ft	Existing Pavement Sq ft	Total Proposed Pavement Sq ft	Newly Generated Pavement Sq ft	Existing Treated Pavement Sq Ft
P84-1	None	FEET Mainline	1169+00 to 1181+00	Dumpling Brook	50,835	198,895	50,835	-148,060	0
P84-2	None	FEET Mainline	1174+00 to 1176+50	Dumpling Brook	3,528	0	3,528	3,528	0
P84-5	None	FEET Mainline	1206+00 to 1209+00	Design Point 12	34,412	30,797	34,412	3,615	0
P84-6	None	FEET Mainline	1185+00 to 1186+50	Dumpling Brook	4,792	0	4,792	4,792	0
P84-8	None	FEET Mainline	1181+00 to 1182+50	Dumpling Brook	5,227	0	5,227	5,227	0
P84-9	None	FEET Mainline	1197+50 to 1199+00	Dumpling Brook	4,138	0	4,138	4,138	0
Southern Sub-Drainage Area	None	FEET Mainline	1154+00 to 1163+50	Design Point 14	84,071	68,825	84,071	15,246	
				Untreated Totals	**187,003**	**298,517**	**187,003**	**-111,514**	**0**
Subcatchment ID's with PS = Point Source Discharge and NPS = Nonpoint Source Discharges									
				Totals	**906,703**	**451,456**	**618,771**	**167,315**	**0**
					20.81504301	10.364	14.20503	3.8410302	
				Total Newly Generated Pavement Area			167,315		
				Treated Existing Pavement			0		
				2x Newly Generated Pavement Area plus Existing Treated Area			334,631		
				Treated Total Proposed			431,768		
				Percent of proposed			**129%**		
				AOT Goal			100%		
							TRUE		

The total existing and proposed pavement areas shown above can be found in the appendix A.

7 MS4 GENERAL PERMIT REGULATIONS

The proposed 13761E Contract is within a MS4 area and must comply with the general permit regulations. The proposed project contains one discharge point. This discharge point qualifies as a redevelopment area under the MS4 regulations. Below is a description of the discharge point.

FEET MAINLINE

Outlet from 1188 Wet Pond – The total drainage area to this outlet location is greater than 1 acre and falls under the jurisdiction of MS4 regulations. The proposed wet pond will provide the required amount of treatment. The information presented below includes the entire drainage area to 1188 Wet Pond.

MS4 Point Source Discharges to Proposed BMP on FEET Mainline at 1188+00

Subcatchment ID	BMP ID	Road Description	Road Stationing	Receiving Waterbody / Design Point	Proposed Sub-Catchment Area (Sq. ft)	Existing Pavement (Sq. ft)	Total Proposed Pavement (Sq. ft)	Newly generated Pavement (Sq. ft)
				Treated Pont Discharge Total	431,768		431,768	**132,056**
P84-3	188	FEET	1163+00 to 1206+00	Souhegan River	431,768	299,712	431,768	132,056
				Untreated Pont Discharge Total	**0**	**299,712**	**0**	**0**
				Pont Discharge Totals	**431,768**	**299,712**	**431,768**	**132,056**

Sub catchment area > 1 acre	TRUE			
Percent Existing	69%	Since >40%, use re development standards		
		Percent Treated	0.0%	100.0%
		Required Treatment for Existing and New Pavement Areas	30%	50%
		Treatment Goal Achieved?	**FALSE**	**TRUE**

NHB DataCheck Results Letter

Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

Please note: portions of this document are confidential.
Maps and NHB record pages are confidential and should be redacted from public documents.

To: Jordan Tate, McFarland Johnson
5 Depot Street
Suite 25
Freeport, ME 04032

From: NHB Review, NH Natural Heritage Bureau
Date: 8/3/2022 (valid until 08/03/2023)
Re: Review by NH Natural Heritage Bureau
Permits: NHDES - Wetland Standard Dredge & Fill - Major, USACE - General Permit, USEPA - Stormwater Pollution Prevention

NHB ID: **NHB22-2441** Town: Merrimack Location: FE Everett Turnpike
Description: Contract E, located in Merrimack, is the northernmost mile of the middle segment of the 13761 project. The contract is 0.9 miles in length, beginning approximately 0.2 miles north of the Bedford Road overpass (Station 1160+00), and continuing north. The purpose of the 13761 project is to add one northbound and one southbound travel lane to improve traffic operations and safety. Associated work will include stormwater and drainage upgrades/improvements and construction of noise walls. The 36" metal culvert that carries Dumpling Brook under the Turnpike will be extended on the upstream side. A separate permit application will be prepared for each of the 13761 contracts. The purpose of this DataCheck review is to update NHB21-1748 for permitting purposes.

cc: NHFG Review

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments **NHB: Please continue to coordinate with NHB to avoid/minimize rare plant impacts.**
F&G: Please continue cordination with New Hampshire Fish and Game.

Plant species	**State[1]**	**Federal**	**Notes**
bird-foot violet (*Viola pedata var. pedata*)	T	--	

Vertebrate species	**State[1]**	**Federal**	**Notes**
Blanding's Turtle (*Emydoidea blandingii*)	E	--	Contact the NH Fish & Game Dept (see below).
Eastern Hognose Snake (*Heterodon platirhinos*)	E	--	Contact the NH Fish & Game Dept (see below).

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

Please note: portions of this document are confidential.
Maps and NHB record pages are confidential and should be redacted from public documents.

New England Cottontail (*Sylvilagus transitionalis*)	E	--	Contact the NH Fish & Game Dept (see below).
Wood Turtle (*Glyptemys insculpta*)	SC	--	Contact the NH Fish & Game Dept (see below).

[1]Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

For all animal reviews, refer to 'IMPORTANT: NHFG Consultation' section below.

Disclaimer: A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

IMPORTANT: NHFG Consultation

If this NHB Datacheck letter DOES NOT include ANY wildlife species records, then, based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

If this NHB Datacheck letter includes a record for a threatened (T) or endangered (E) wildlife species, consultation with the New Hampshire Fish and Game Department under Fis 1004 may be required. To review the Fis 1000 rules (effective February 3, 2022), please go to https://wildlife.state.nh.us/wildlife/environmental-review.html. All requests for consultation and submittals should be sent via email to NHFGreview@wildlife.nh.gov or can be sent by mail, and **must include the NHB Datacheck results letter number and "Fis 1004 consultation request" in the subject line.**

If the NHB DataCheck response letter does not include a threatened or endangered wildlife species but includes other wildlife species (e.g., Species of Special Concern), consultation under Fis 1004 is not required; however, some species are protected under other state laws or rules, so coordination with NH Fish & Game is highly recommended or may be required for certain permits. While some permitting processes are exempt from required consultation under Fis 1004 (e.g., *statutory permit by notification, permit by rule, permit by notification, routine roadway registration, docking structure registration, or conditional authorization by rule)*, coordination with NH Fish & Game may still be required under the rules governing those specific permitting processes, and it is recommended you contact the applicable permitting agency. For projects not requiring consultation under Fis 1004, but where additional coordination with NH Fish and Game is requested, please email: Kim Tuttle *kim.tuttle@wildlife.nh.gov* with a copy to NHFGreview@wildlife.nh.gov, and include the NHB Datacheck results letter number and "review request" in the email subject line.

Contact NH Fish & Game at (603) 271-0467 with questions.

Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

NHB Coordination

53 Regional Drive
Concord, NH 03313

Tel: (603) 225-2978
Fax: (603) 225-0095

McFARLAND JOHNSON
Established 1946

MEETING NOTES

PROJECT: Nashua-Merrimack-Bedford, 13761E
(MJ Project No: 18589.00)

DATE OF MEETING: August 19, 2022

LOCATION: Teams Meeting

SUBJECT: Rare plant discussion

PROJECT REPRESENTATIVES:

NHDOT: Rebecca Martin, Jon Evans, Dan Prehemo

NHB: Jessica Bouchard

MJ: Christine Perron

NOTES ON MEETING:

MJ completed a survey in 2021 and 2022 for bird foot violet for the FE Everett Turnpike widening project. The survey identified 4 populations of the plant within the project area. Two of the populations (#3 and #4) are located within proposed slope lines and impacts to the plants cannot be avoided. Impacts to populations #1 and #2 appear less likely but cannot yet be ruled out since design is not yet final. A summary of the populations is below:

Population Number	Approximate Station	Project Contract	Size of population polygon (square meters)	Number of stems	Impacts	History
1	798+50 LT	A	196	585	Impacts can likely be avoided	Part of documented population
2	804+50 RT	A	18	32	Impacts can likely be avoided	Part of documented population
3	806+00 RT	A	32	71	Population will be impacted	Population not previously document
4	1166+50 RT	E	6	9	Population will be impacted	Population transplanted in 1991

Contract E is scheduled to advertise in February 2023. Contract A is currently scheduled to advertise in January 2024. The Natural Heritage Bureau (NHB) recommends transplanting impacted populations to new locations. Transplanting would be best to do by contract rather than all at once. This would allow an opportunity to refine the transplanting protocols for Contract A based on experience gained from Contract E. With a February 2023 advertising date, construction of Contract E would begin by early June.

Jessica gave an overview of NHB's recommendations for transplanting, which she will finalize and provide to the group:

- The plant has rhizomes and is not deeply rooted; when a clump is moved, an area of about 1' diameter and 2' deep should be moved.
- New location should be pre-prepared to avoid delays in getting the plants into the ground.
- Once transplanted, plants need to be watered frequently.
- Time of year for transplanting was discussed. Transplanting should take place 6 to 8 weeks before the first hard frost, or in the summer after flowering. Given the details that still need to be worked out, transplanting this year is likely not feasible since it's already late August. Transplanting in summer 2023 would work with the construction schedule.
- Vegetation management (mowing) at the new location will be critical. There needs to be a commitment from DOT to mow at least once a year, ideally after July 1. If mowing before July 1, blade height should be at least 6".
- The new location must be owned by DOT with a low chance of future development/construction.
- Location should have some sort of visual cue at the site if possible.
- The new location needs to be sunny (open), sandy habitat with other low growing vegetation.
- There needs to be an effort to increase awareness by DOT staff and buy-in on long-term management.

<u>Suitable Location</u>

- Dan suggested that plants could be transplanted back onto a constructed slope in Contract E. It should be possible to identify a suitable back slope that wouldn't require additional clearing. The slope could be graded appropriately for mowing.
- Plants would be less likely to be disturbed on a back slope.
- Keeping the plants within the limits of the widening project would reduce the likelihood of future projects impacting the plants and would also be in line with DOT's objective to keep PFAS-impacted soils as close to their origin as possible.
- Placing on a constructed slope during construction of the project would also provide an opportunity to move more of the native soil onto the new slope.
- Orange construction fencing or other barrier should be placed around the transplanted population while active construction is underway.

<u>Contract considerations</u>

- It was agreed that it would make sense to include the physical moving of the plants in the construction contract, with stipulations that the work must be monitored by MJ and/or the NHB.
- The contractor will also be responsible for watering after transplanting.
- Contract language will need to specify that the existing location of the rare plants cannot be disturbed until transplanting takes place.
- Turnpikes staff should review draft contract language, proposed location, and long-term mowing protocols.
- Contract documents need to be prepared at least a month prior to advertising.

Longer term considerations

- Rebecca suggested that it may be possible to install small signs at the location similar to what is used for pollinator planting sites.
- Should meet with turnpikes staff on site to increase awareness.
- Annual monitoring will be required for three years.

Next steps

- Jessica will finalize NHB's recommendations, including the appropriate time of year for transplanting. Once finalized, the recommendations should be used to prepare a transplanting protocol.
- Christine will prepare a draft scope of work for MJ's role in the transplant effort (preparing transplant protocol, coordinating with DOT and NHB on proposed location, preparing language for contract documents, construction monitoring, and long-term monitoring). The scope should be completed early next week in case Wendy wants to include it in the amendment that is currently being prepared for the project.

Submitted by:

Christine Perron
McFarland Johnson, Inc.

CC:
Wendy Johnson, NHDOT
Mike Long, MJ
Brian Colburn, MJ
Benjamin Martin, VHB

Nashua Merrimack Bedford 13761E, F.E. Everett Turnpike Project, Contract E Merrimack, NH

Brief summary of previous Bird-foot violet (*Viola pedata* var. *pedata*) transplants along the Everett Turnpike and pre and post-transplant recommendations for Bird-foot violet located within the Contract E work plan.

Proposed project:

Nine **bird-foot violet (**BFV) individuals are located in an area slated for construction to widen the Everett Turnpike north of exit 12 to south of exit 13. The permit application is expected to be submitted in October 2022, and advertisement of the work is expected to occur in February 2023, with construction commencing approximately two months after the advertisement date (Spring 2023). This occurrence is located within proposed slope lines and cannot be avoided.

Brief history of Bird's foot violet along the Everett Turnpike:

In 1991, BFV located north of exit 11 along the northbound lane were transplanted to five various areas along the Everett Turnpike. The proposed work included removal of the toll booths at exit 11 and subsequent construction of a new northbound entrance ramp. Site 1, 1A, and 2 were surveyed in 1993. Site 3 was never revisited, and Site 4 was visited in 2016. Of these five original transplant sites, only one BFV occurrence (transplant Site 3) was located during surveys performed for the Everett Turnpike expansion project in 2021 and 2022.

Management comments from NHB's 1993 records indicate that the survival and management of the transplants were questionable. In 1993 it was found that Site 1 was degraded by asphalt dumping and road crews indicated that they had not been informed about the relocated plants. Site 2 contained two sub-populations, and by 1993 the northernmost one had fewer plants than were originally transplanted and the southern sub-population could not be found. There were concerns that the southern sub-population was planted in a location that was in danger of being shaded out by other plants.

Overall, given the low success rate of the previous BFV transplants, NHB will consider the proposed transplanting of these 9 individuals to be experimental. It is possible that adequate monitoring, management, and awareness of the proposed transplants will ensure a greater opportunity for long-term establishment. Additionally, as it is likely that additional occurrences of BFV will need to be transplanted for upcoming work slated along the Everett Turnpike, it is our hope that the transplanting and monitoring of this occurrence can be used to inform best practices for future transplants. **NHB requests that the consultant/NHDOT develop the draft transplant protocol and submit it to NHB for review, editing as needed, and approval.**

NHB recommendations for long-term establishment of transplants:

1. **Transplant location**:
    a. Suitable habitat: open, sandy areas, full sunlight preferred. Existing BFV populations have established on older NHDOT fill soils, so it is expected that the plants would be able to tolerate proposed NHDOT fill soils, if they are of similar composition. In addition, native (old NHDOT fill) soil surrounding the population will be extracted with the plants and placed at the relocation site.

b. BFV can tolerate some competition from other plants, but too much shading is expected to diminish the bloom and eventually eliminate the plants. Recommend siting transplant location at least 10 feet from shade created by treeline overhang.
c. In an area that can be mowed at least annually to prevent shading out by other species.
d. In an area that is not expected to be developed in the future.
e. Plants must be protected from maintenance road crew foot and tire traffic.

2. **Transplant timing**:
    a. Following spring bloom but prior to seed dispersal is preferrable. Blooms mid to late May (expect annual variability). Seed is expected to disperse by the end of June.
    b. This timing is suggested with the aim of allowing the seeds to develop on the plants but not disperse until they are relocated, to preserve the seed bank.
    c. Relocation timeframe should be around approximately mid-June.
    d. Preferably on a cloudy day, early morning, or evening. Avoid transplanting in the hottest part of the day.

Post-transplant recommendations:

1. **Protection during construction**:
    a. Surround with orange construction fencing to protect during construction.

2. **Monitoring**:
    a. Short-term monitoring immediately following transplanting to prevent drying out and aid establishment. This should consist of daily monitoring for at least 1-2 weeks.
    b. Long-term monitoring of transplants should occur annually for three years, during spring bloom/seed development timeframe.

3. **Vegetation management**:
    a. BFV blooms in the spring and seeds will likely have dispersed by the end of June. The species is low growing, around six inches or less including the seed pods. Mowing should occur at least annually to keep other species from shading out BFV. Mowing should be delayed until at least July 1st to allow seeds to fully disperse, and the blade should be at least 4 inches or slightly higher. If mowing is performed prior to July 1st, the blade should be at least six inches high so that fruiting plants are not cut before the seeds mature and disperse.

4. **Awareness**:
    a. NHDOT road crews working on the Everett Turnpike should be made aware of the new transplant location to prevent injury from routine roadway maintenance work, tires, and foot traffic. Please consider the best way to educate road crews or provide visibility for road crews when they are in the vicinity of the transplant location. Mowing should be allowed to occur without disruption, so perhaps a permanent sign next to the occurrence would be most suitable.

NH Fish & Game Correspondence

Christine J. Perron

From: Johnson, Wendy <Wendy.A.Johnson@dot.nh.gov>
Sent: Tuesday, September 20, 2022 11:26 AM
To: McNaughten, Elizabeth (Betsey); Sullivan, Cynthia
Cc: Christine J. Perron; Mike D. Long; Brian R. Colburn; Brian E. Patinskas; Brooks, Wayne; Prehemo, Dan; Evans, Jonathan; Rae, Dena
Subject: RE: Dumpling Brook WMA - DOT proposal for culvert under Everett Turnpike

Hi Betsey,

For this land transaction you will be working with the NHDOT ROW team, Cindy Sullivan, copied above. Please coordinate with her on this action moving forward. If you have any questions, please let us know.

Thank you,

Wendy Johnson, P.E.
Project Manager
New Hampshire Department of Transportation
7 Hazen Drive, PO Box 483
Concord, NH 03302-0483

From: McNaughten, Elizabeth (Betsey) <Elizabeth.McNaughten@wildlife.nh.gov>
Sent: Thursday, September 15, 2022 11:19 AM
To: Christine J. Perron <CPerron@mjinc.com>
Cc: Mike D. Long <mlong@mjinc.com>; Brian R. Colburn <bcolburn@mjinc.com>; Brian E. Patinskas <BPatinskas@mjinc.com>; wendy.a.johnson@dot.nh.gov; Prehemo, Dan <Daniel.L.Prehemo@dot.nh.gov>; Evans, Jonathan <Jonathan.A.Evans@dot.nh.gov>; Magee, John <john.a.magee@wildlife.nh.gov>; Dionne, Michael <Michael.A.Dionne@wildlife.nh.gov>
Subject: RE: Dumpling Brook WMA - DOT proposal for culvert under Everett Turnpike

Hi Christine – I wish I had the ability to take your document below and add the information and boundary lines from the attached. I don't, but it would be helpful if you can create it.

The attached shows the survey for the easement area which impacts two parcels purchased between 1947 and 1953. The west side of the turnpike is all NHFG owned. That triangle piece bisected by the turnpike is right where the impacts are. The eastern side in not in State ownership anymore.

We would need to know how much of NHFG lands are being impacting. These lands were originally purchased with fishing license fees, therefore NHFG need to compensated for the impacts. We can work with DOT ROW on this, and how they will appraise it. The important thing is that these lands were not purchased with a federal grant, they are too old.

Let me know who the DOT ROW contact is, and hopefully we can move forward on the internal state approvals for the easement.

Betsey McNaughten, Land Agent
NH Fish and Game Department

11 Hazen Drive, Concord, NH 03301
(603) 271-6640 ~ Fax (603) 271-6938

Did you know? New Hampshire Fish and Game trains teachers and provides science-based educational materials for thousands of school children each year, fostering an understanding and appreciation of wildlife and conservation issues

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From: Christine J. Perron <CPerron@mjinc.com>
Sent: Tuesday, September 13, 2022 4:35 PM
To: McNaughten, Elizabeth (Betsey) <Elizabeth.McNaughten@wildlife.nh.gov>
Cc: Mike D. Long <mlong@mjinc.com>; Brian R. Colburn <bcolburn@mjinc.com>; Brian E. Patinskas <BPatinskas@mjinc.com>; Johnson, Wendy <wendy.a.johnson@dot.nh.gov>; Prehemo, Dan <Daniel.L.Prehemo@dot.nh.gov>; Evans, Jonathan <Jonathan.A.Evans@dot.nh.gov>; Magee, John <john.a.magee@wildlife.nh.gov>; Dionne, Michael <Michael.A.Dionne@wildlife.nh.gov>
Subject: RE: Dumpling Brook WMA - DOT proposal for culvert under Everett Turnpike
Importance: High

Hi Betsey,

We are looking for an update on what you have been able to find out about the deed/funding restrictions on the parcel with proposed impacts associated with the FE Everett Turnpike project. As I mentioned, the project is scheduled to be advertised on February 28, 2023. The project requires a drainage easement for a proposed stormwater treatment basin; the easement area would be approximately 56,050 sq ft.

Please provide an update at your earliest convenience. I'd be happy to set up a meeting if that would be helpful.
Thanks,
Christine

McFarland Johnson
Christine J. Perron, CWS | Regional Environmental Manager
603-225-2978

From: Christine J. Perron
Sent: Wednesday, August 31, 2022 6:42 AM
To: 'McNaughten, Elizabeth (Betsey)' <Elizabeth.McNaughten@wildlife.nh.gov>

USFWS Official Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To:
Project Code: 2022-0064462
Project Name: FEET 13761 E Contract

September 28, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Federal and non-Federal project proponents have responsibilities under the Act to consider effects on listed species.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested by returning to an existing project's page in IPaC.

Endangered Species Act Project Review

Please visit the "**New England Field Office Endangered Species Project Review and Consultation**" website for step-by-step instructions on how to consider effects on listed

species and prepare and submit a project review package if necessary:

https://www.fws.gov/office/new-england-ecological-services/endangered-species-project-review

NOTE Please do not use the **Consultation Package Builder** tool in IPaC except in specific situations following coordination with our office. Please follow the project review guidance on our website instead and reference your **Project Code** in all correspondence.

Northern Long-eared Bat Update - Additionally, please note that on March 23, 2022, the Service published a proposal to reclassify the northern long-eared bat (NLEB) as endangered under the Endangered Species Act. The U.S. District Court for the District of Columbia has ordered the Service to complete a new final listing determination for the NLEB by November 2022 (Case 1:15-cv-00477, March 1, 2021). The bat, currently listed as threatened, faces extinction due to the range-wide impacts of white-nose syndrome (WNS), a deadly fungal disease affecting cave-dwelling bats across the continent. The proposed reclassification, if finalized, would remove the current 4(d) rule for the NLEB, as these rules may be applied only to threatened species. Depending on the type of effects a project has on NLEB, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective (anticipated to occur by December 30, 2022). If your project may result in incidental take of NLEB after the new listing goes into effect this will first need to be addressed in an updated consultation that includes an Incidental Take Statement. If your project may require re-initiation of consultation, please contact our office for additional guidance.

Additional Info About Section 7 of the Act
Under section 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether projects may affect threatened and endangered species and/or designated critical habitat. If a Federal agency, or its non-Federal representative, determines that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Federal agency also may need to consider proposed species and proposed critical habitat in the consultation. 50 CFR 402.14(c)(1) specifies the information required for consultation under the Act regardless of the format of the evaluation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/service/section-7-consultations

In addition to consultation requirements under Section 7(a)(2) of the ESA, please note that under sections 7(a)(1) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Please contact NEFO if you would like more information.

Candidate species that appear on the enclosed species list have no current protections under the

ESA. The species' occurrence on an official species list does not convey a requirement to consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see:

https://www.fws.gov/program/migratory-bird-permit

https://www.fws.gov/library/collections/bald-and-golden-eagle-management

Please feel free to contact us at **newengland@fws.gov** with your **Project Code** in the subject line if you need more information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat.

Attachment(s): Official Species List

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Project Code: 2022-0064462
Project Name: FEET 13761 E Contract
Project Type: Road/Hwy - Maintenance/Modification
Project Description: Contract E, located in Merrimack, is the northernmost end of the middle segment of the 13761 F.E. Everett Turnpike widening project. The E contract is 0.9 miles in length, beginning approximately 0.2 miles north of the Bedford Road overpass (Station 1160+00), and continuing north. The purpose of the overall 13761 project is to add one northbound and one southbound travel lane to improve traffic operations, and safety. Associated work will include stormwater treatment, drainage upgrades, and construction of noise walls. The 36" metal culvert that carries Dumpling Brook under the Turnpike will be addressed. An acoustic survey was completed in 2022 and concluded that northern long-eared bat is likely absent from the project area.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.89484845,-71.47089395664864,14z

Counties: Hillsborough County, New Hampshire

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: New Hampshire Department of Transportation
Name: Christine Perron
Address: 53 Regional Drive
City: Concord
State: NH
Zip: 03301
Email cperron@mjinc.com
Phone: 6032252978

USFWS 4(d) Rule Consistency Verification Letter

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104

In Reply Refer To:
Project code: 2022-0064462
Project Name: FEET 13761 E Contract

September 28, 2022

Subject: Consistency letter for the 'FEET 13761 E Contract' project indicating that any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Dear Christine Perron:

The U.S. Fish and Wildlife Service (Service) received on September 28, 2022 your effects determination for the 'FEET 13761 E Contract' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. You indicated that no Federal agencies are involved in funding or authorizing this Action. This IPaC key assists users in determining whether a non-Federal action may cause "take"[1] of the northern long-eared bat that is prohibited under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat.

Please report to our office any changes to the information about the Action that you entered into IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation.

If your Action proceeds as described and no additional information about the Action's effects on species protected under the ESA becomes available, no further coordination with the Service is required with respect to the northern long-eared bat.

The IPaC-assisted determination for the northern long-eared bat **does not** apply to the following ESA-protected species that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Candidate

You may coordinate with our Office to determine whether the Action may cause prohibited take of the animal species listed above.

---

[1]Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct [ESA Section 3(19)].

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

FEET 13761 E Contract

2. Description

The following description was provided for the project 'FEET 13761 E Contract':

> Contract E, located in Merrimack, is the northernmost end of the middle segment of the 13761 F.E. Everett Turnpike widening project. The E contract is 0.9 miles in length, beginning approximately 0.2 miles north of the Bedford Road overpass (Station 1160+00), and continuing north. The purpose of the overall 13761 project is to add one northbound and one southbound travel lane to improve traffic operations, and safety. Associated work will include stormwater treatment, drainage upgrades, and construction of noise walls. The 36" metal culvert that carries Dumpling Brook under the Turnpike will be addressed. An acoustic survey was completed in 2022 and concluded that northern long-eared bat is likely absent from the project area.

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.89484845,-71.47089395664864,14z

Determination Key Result

This non-Federal Action may affect the northern long-eared bat; however, any take of this species that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o).

Determination Key Description: Northern Long-eared Bat 4(d) Rule
This key was last updated in IPaC on **May 15, 2017**. Keys are subject to periodic revision.

This key is intended for actions that may affect the threatened northern long-eared bat.

The purpose of the key for non-Federal actions is to assist determinations as to whether proposed actions are excepted from take prohibitions under the northern long-eared bat 4(d) rule.

If a non-Federal action may cause prohibited take of northern long-eared bats or other ESA-listed animal species, we recommend that you coordinate with the Service.

Determination Key Result

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Qualification Interview

1. Is the action authorized, funded, or being carried out by a Federal agency?

   No

2. Will your activity purposefully **Take** northern long-eared bats?

   No

3. [Semantic] Is the project action area located wholly outside the White-nose Syndrome Zone?

   Automatically answered
   No

4. Have you contacted the appropriate agency to determine if your project is near a known hibernaculum or maternity roost tree?

   Location information for northern long-eared bat hibernacula is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases and other sources of information on the locations of northern long-eared bat roost trees and hibernacula is available at www.fws.gov/media/nleb-roost-tree-and-hibernacula-state-specific-data-links-0.

   Yes

5. Will the action affect a cave or mine where northern long-eared bats are known to hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

   No

6. Will the action involve Tree Removal?

   Yes

7. Will the action only remove hazardous trees for the protection of human life or property?

   No

8. Will the action remove trees within 0.25 miles of a known northern long-eared bat hibernaculum at any time of year?

   No

9. Will the action remove a known occupied northern long-eared bat maternity roost tree or any trees within 150 feet of a known occupied maternity roost tree from June 1 through July 31?

   No

Project Questionnaire

If the project includes forest conversion, report the appropriate acreages below. Otherwise, type '0' in questions 1-3.

1. Estimated total acres of forest conversion:

10.7

2. If known, estimated acres of forest conversion from April 1 to October 31

10.7

3. If known, estimated acres of forest conversion from June 1 to July 31

0

If the project includes timber harvest, report the appropriate acreages below. Otherwise, type '0' in questions 4-6.

4. Estimated total acres of timber harvest

0

5. If known, estimated acres of timber harvest from April 1 to October 31

0

6. If known, estimated acres of timber harvest from June 1 to July 31

0

If the project includes prescribed fire, report the appropriate acreages below. Otherwise, type '0' in questions 7-9.

7. Estimated total acres of prescribed fire

0

8. If known, estimated acres of prescribed fire from April 1 to October 31

0

9. If known, estimated acres of prescribed fire from June 1 to July 31

0

If the project includes new wind turbines, report the megawatts of wind capacity below. Otherwise, type '0' in question 10.

10. What is the estimated wind capacity (in megawatts) of the new turbine(s)?

0

IPaC User Contact Information

Agency: New Hampshire Department of Transportation
Name: Christine Perron
Address: 53 Regional Drive
City: Concord
State: NH
Zip: 03301
Email cperron@mjinc.com
Phone: 6032252978

Section 106 Effect Memo

New Hampshire DOT
Department of Transportation

Victoria F. Sheehan
Commissioner

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

William Cass, P.E.
Assistant Commissioner

NASHUA-MERRIMACK-BEDFORD
13761
RPR 8452

No Adverse Effect Memo

Pursuant to meetings and discussions on March 9, 2017, April 12, 2018, and November 7, 2018, and for the purpose of compliance with regulations of the National Historic Preservation Act, the Advisory Council on Historic Preservation's *Procedures for the Protection of Historic Properties* (36 CFR 800), the US Army Corps of Engineers' *Appendix C and NH RSA 227C:9 regarding the Preservation of State Historic Resources*; the NH Division of Historical Resources, NH Department of Transportation and the US Army Corps of Engineers (ACOE) have coordinated the identification and evaluation of cultural resources with plans to widen three segments of the F.E. Everett Turnpike (FEET) in the towns of Nashua, Merrimack and Bedford, New Hampshire.

Project Description

This project involves widening three segments of the FEET, totaling approximately 8 miles in length, from two lanes to three in each direction. The Area of Potential Effect extends approximately 300 feet from the centerline of the turnpike. The three segments include approximately 1.5 miles of the southern segment, beginning approximately 2,000 feet north of Exit 8 in Nashua, ending approximately 1,000 feet south of the Exit 10 overpass bridge in Merrimack. The middle segment runs for approximately 5.5 miles in Merrimack, starting approximately 3,500 south the Exit 11 overpass, includes the interchange at Exit 12 and ends approximately one mile south of the Bedford Toll Plaza. The northern segment begins approximately 0.6 miles south of the US Route 3 overpass bridge, running northerly for approximately 1.3 miles, ending at the northern limit of the I-293/NH Route 101 interchange in Bedford.

Although the Federal Highway Administration (FHWA) took interest in the undertaking due to its relation to the I-293 interchange, FHWA has since determined that they will not participate as a federal agency for this undertaking and as such the ACOE is the lead for their permitted areas.

Analysis

The FEET was reviewed in 2010 and was determined not eligible for the National Register of Historic Places. The Pennichuck Water Works (PWW) in Nashua was determined eligible for the National Register in 1993 and confirmed in 2003. Portions of the PWW are located within the Southern Segment, as it spans both sides of the FEET. There are three stormwater treatment areas proposed adjacent to and within the PWW property, in what is currently cleared ROW or undeveloped land.

An RPR addendum was submitted in March 2018 to NHDHR, and identified all of the structures located with the APE built prior to 1968. Comparing those properties to the proposed impacts, it has been determined that

all tree clearing and grading will occur within the turnpike right-of-way (ROW). All impacts are outlined in Table A1 of the RPR Addendum.

There are seven proposed noise barriers, ranging in height from 15-17 feet, proposed along the project. Of the properties that contain structures built prior to 1968, and are directly adjacent to the FEET, there are three individual properties (3 Gull Lane, 6 Camp Sargent Road, and 9 Smith Road) and one historic district (Bigwood Historic District) that would have noise barriers built adjacent to the properties. Tree clearing will be necessary for the installation of the noise barriers; however vegetation buffers will remain at these four noise barrier locations.

For the properties older than 50 years that abut the FEET where no noise barriers are proposed, tree cover will remain along Hoyt Street, Hillcrest Drive, Chamberlain Road, Wire Road, DW Highway, Harris Avenue, South River Road, Brookfield Drive, and Back River Road. The noise analysis was completed and the impacts were reviewed with SHPO in relation to the Area of Potential Effect at the November 7, 2018 meeting. The attached memo details that review.

There are a limited number of properties that abut the FEET that have limited vegetation buffers currently. There will be limited visual change at these locations, and noise analysis has shown that any noise decibel increases will likely not be noticeable. Properties include 15 Harris Avenue that currently abuts the northbound Exit 12 off ramp, 11 Sunset Avenue, 8 and 7 Priscilla Lane and 232 and 258 South River Road.

Other impacts that are adjacent to or need easements for properties along the FEET include tree clearing, stormwater treatment areas, and slope and grading work. All of the tree clearing, slope work and grading will take place within the ROW. There is one proposed stormwater treatment area that is adjacent to/and possibly within the parcel at 20 Wire Road. Tree cover will remain between the house and the proposed stormwater treatment location.

A Phase IA/IB Archaeological Investigation was completed along the project corridor and Phase II Determinations of Eligibility were completed at various location. It was determined that the Naticook Brook I Site is eligible for the National Register of Historic Places and is located within the APE. Should the site need to be impacted, NH Division of Historical Resources will be consulted and all necessary phases of archaeology will be completed.

Public Consultation

Town official meetings were held in each of the municipalities in 2016. Public meetings were held March 29, 2018 in Bedford, April 3, 2018 in Nashua, and May 1, 2018 in Merrimack. Initial contact letters were sent to Land and Community Heritage Investment Program (LCHIP), Land and Water Conservation Fund (LWCF), Conservation Land Stewardship (CLS) programs. Continued consultation with the Pennichuck Water Works will continue throughout the planning process.

Determination of Effect

Applying the criteria of effect at 36 CFR 800.5, we mutually agreed that the proposed actions will not have an adverse effect on historic properties. The limited impacts to the Pennichuck Water Works Historic District will not impact any of the contributing features of the district. The stormwater treatment areas will further advance the role that the Pennichuck Water Works plays in the watershed treatment area. The noise barrier that will be added adjacent to the Bigwood Historic District will not impact the character defining features of the district,

and a tree line will remain between the district and the noise barrier. The other remaining properties that are adjacent to the APE will retain their tree lines, and all slopework to be done will be within the ROW. No additional above ground survey is required and all necessary phases of archaeology will be completed.

The ACOE has reviewed the proposed plans in relation to their permit area and determined the project would not adversely affect historic resources.

In accordance with the Advisory Council's regulations, we will continue to consult, as appropriate, as this project proceeds.

Jill Edelmann 12/10/2018
Jill Edelmann Date
Cultural Resources Manager

Concurred with by the NH State Historic Preservation Officer:

Jodi Miller, DSHPO for 12/13/18
Elizabeth H. Muzzey Date
State Historic Preservation Officer
NH Division of Historical Resources

c.c. Mike Hicks, ACOE
Jon Evans, NHDOT
Wendy Johnson, NHDOT
Chris St. Louis, NHDHR

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NH GP Appendix B – Corps Secondary Impacts Checklist and Supplemental Narrative

US Army Corps of Engineers®
New England District

Appendix B
New Hampshire General Permits
Required Information and USACE Section 404Checklist

USACE Section 404 Checklist

1. Attach any explanations to this checklist. Lack of information could delay a USACE permit determination.
2. All references to "work" include all work associated with the project construction and operation. Work includes filling, clearing, flooding, draining, excavation, dozing, stumping, etc.
3. See GC 3 for information on single and complete projects.
4. Contact USACE at (978) 318-8832 with any questions.
5. The information requested below is generally required in the NHDES Wetland Application. See page 61 for NHDES references and Admin Rules as they relate to the information below.

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See the following to determine if there is an impaired water in the vicinity of your work area. * https://nhdes-surface-water-quality-assessment-site-nhdes.hub.arcgis.com/ https://www.des.nh.gov/water/rivers-and-lakes/water-quality-assessment https://www4.des.state.nh.us/onestopdatamapper/onestopmapper.aspx	x	
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	x	
2.2 Are there proposed impacts to tidal SAS, prime wetlands, or priority resource areas? Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) DataCheck Tool for information about resources located on the property at https://www4.des.state.nh.us/NHB-DataCheck/.		x
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	x	
2.4 Would the project remove part or all of a riparian buffer? (Riparian buffers are lands adjacent to streams where vegetation is strongly influenced by the presence of water. They are often thin lines of vegetation containing native grasses, flowers, shrubs and/or trees that line the stream banks. They are also called vegetated buffer zones.)		x
2.5 The overall project site is more than 40 acres?	x	
2.6 What is the area of the previously filled wetlands?	unknown	
2.7 What is the area of the proposed fill in wetlands?	12,251 SF	
2.8 What % of the overall project sire will be previously and proposed filled wetlands?	unknown	
3. Wildlife	Yes	No
3.1 Has the NHB & USFWS determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project? (All projects require an NHB ID number & a USFWS IPAC determination.) NHB DataCheck Tool: https://www4.des.state.nh.us/NHB-DataCheck/. USFWS IPAC website: https://ipac.ecosphere.fws.gov/	x	

3.2 Would work occur in any area identified as either "Highest Ranked Habitat in N.H." or "Highest Ranked Habitat in Ecological Region"? (These areas are colored magenta and green, respectively, on NH Fish and Game's map, "2010 Highest Ranked Wildlife Habitat by Ecological Condition.") Map information can be found at: • PDF: https://wildlife.state.nh.us/wildlife/wap-high-rank.html. • Data Mapper: www.granit.unh.edu. • GIS: www.granit.unh.edu/data/downloadfreedata/category/databycategory.html.	x	
3.3 Would the project impact more than 20 acres of an undeveloped land block (upland, wetland/waterway) on the entire project site and/or on an adjoining property(s)?		x
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		x
3.5 Are stream crossings designed in accordance with the GC 31?	x	
4. Flooding/Floodplain Values	Yes	No
4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?		x
4.2 If 4.1 is yes, will compensatory flood storage be provided if the project results in a loss of flood storage?	N/A	
5. Historic/Archaeological Resources		
For a minimum, minor or major impact project - a copy of the RPR Form (www.nh.gov/nhdhr/review) with your DES file number shall be sent to the NH Division of Historical Resources as required on Page 37 GC 14(d) of the GP document**	x	
6. Minimal Impact Determination (for projects that exceed 1 acre of permanent impact)	Yes	No
Projects with greater than 1 acre of permanent impact must include the following: • Functional assessment for aquatic resources in the project area. • On and off-site alternative analysis. • Provide additional information and description for how the below criteria are met.		
6.1 Will there be complete loss of aquatic resources on site?		x
6.2 Have the impacts to the aquatic resources been avoided and minimized to the greatest extent practicable?	x	
6.3 Will all aquatic resource function be lost?		x
6.4 Does the aquatic resource (s) have regional significance (watershed or ecoregion)?		x
6.5 Is there an on-site alternative with less impact?		x
6.6 Is there an off-site alternative with less impact?		x
6.7 Will there be a loss to a resource dependent species?		x
6.8 Are indirect impacts greater than 1 acre within and adjacent to the project area?		x
6.9 Does the proposed mitigation replace aquatic resource function for direct, indirect, and cumulative impacts?	x	

*Although this checklist utilizes state information, its submittal to USACE is a federal requirement.

** If your project is not within Federal jurisdiction, coordination with NH DHR is not required under Federal law.

1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water?

The proposed project is located immediately west of the Merrimack River. At the northern limits of the 13761E project the Merrimack River is located approximately 250'-300' from the Merrimack River at its closest point. The majority of the project area is located approximately 500' to over 2,000' from the Merrimack River. According to the NHDES 303(d) List (most recent available), this segment of the Merrimack River (NHRIV700060803-14-02) is impaired by mercury and E. coli. Dumpling Brook (NHRIV700060804-02), which crosses under the Turnpike within the project area, is impaired by mercury.

One wet pond is proposed to treat stormwater for approximately 9.4 acres of impervious area. The proposed project is not anticipated to cause or contribute to surface water impairments.

2.1 Are there streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?

As mentioned above in Section 1.1, Dumpling Brook is a perennial stream and tributary of the Merrimack River that flows east through the project via a 36" RCP.

2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport, & wildlife passage?

The 36" culvert carrying Dumpling Brook under the roadway will be replaced with a 42" culvert on a new alignment. The proposed culvert will provide improved hydraulic capacity, sediment transport, and aquatic organism passage.

3.1 Has the NHB & USFWS determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project?

The US Fish and Wildlife Service Information for Planning and Consultation (IPaC) Tool Official Species List indicated that the proposed project area is within the documented range of the northern Long-eared bat. The proposed project is anticipated to require < 10.7 acres of tree clearing. The proposed project was evaluated in IPaC using the Northern Long-Eared Bat Consultation and 4(d) Rule Consistency Determination Key. Based on the results of this evaluation the proposed project resulted in a may affect determination. A Verification Letter was issued on September 28, 2022 confirming that while the project may affect northern long-eared bats, the proposed project is consistent with the activities covered under the Programmatic Biological Opinion and not prohibited under the Section 4(d) Rule. An acoustic survey for northern long-eared bat was completed Summer 2022 and did not identify this species. NHDOT will continue to consult with the USFWS to address the anticipated relisting of northern long-eared bat as endangered.

The NH Natural Heritage Bureau (NHB) reviewed the project area and identified documented records of the following species in the vicinity of the proposed project area:

Bird-foot violet

Blanding's Turtle
Eastern Hognose Snake
New England Cottontail
Wood Turtle

A survey for bird's foot violet was completed by McFarland Johnson in September 2021 and June 2022. Four populations were identified. A population approximately 6 square meters in size is located within the Contract E project area. Consultation with the NHB resulted in the recommendation of transplanting the impacted populations to new locations. A transplanting protocol will be prepared based on NHB's recommendations, which will be included in the construction contract.

The following measures will be implemented to avoid or minimize impacts to wildlife species:

- The contractor will be required to use erosion control berm, white Filtrexx Degradable Woven Silt Sock, or other "wildlife friendly" options such as woven organic material (e.g. coco or jute matting such as North American Green SC150BN or equivalent) instead of welded plastic or "biodegradable plastic" netting or thread for erosion control matting. Specific products used shall be detailed in the contractor's SWPPP.
- Contract documents will detail that all observations of Eastern hognose snake must be immediately reported to NHFG: Melissa Doperalski (603-479-1129) or Brendan Clifford (603-944-0885).
- Construction workers will be made aware of the potential to encounter protected turtles from April through November at the site. If spotted or Blanding's turtles are found laying eggs in a work area, NHFG will be contacted for further instructions (Melissa Doperalski (603-479-1129) or Josh Megyesy (cell 978-578-0802)).
- NHFG flyers/photos of snakes and turtles will be included in the contract.

3.1 Would work occur in any area identified as either "Highest Ranked Habitat in N.H." or "Highest Ranked Habitat in Ecological Region"? (These areas are colored magenta and green, respectively, on NH Fish and Game's map, "2010 Highest Ranked Wildlife Habitat by Ecological Condition.")

There is no "Highest Ranked Habitat in N.H" in the project area. There is an area of "Supporting Landscape" that overlaps with the Dumpling Brook Wildlife Management Area. Proposed impacts in this area will not substantially change the value of the habitat for wildlife.

5. Historic/Archaeological Resources

The Request for Project Review (RPR) was sent to NH DHR and Section 106 consultation was carried out for the project. It was determined that the proposed project would have no adverse effect on known or potential cultural, historic, or archaeological resources. The No Adverse Effect memo is included with this submittal.

6.2 Have the impacts to the aquatic resources been avoided and minimized to the extent practicable?

Avoidance and minimization measures include refining and steepening roadway slopes to specifically avoid and minimize wetland and stream impacts. Stormwater treatment BMPs have also been incorporated into the design in order to treat runoff from additional pavement surfaces, thereby ensuring water quality of surface waters in the vicinity is maintained.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 13761E City/County: Merrimack Sampling Date: 06/09/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 1-UPL

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 42.887196 Long: -71.478091 Datum:

Soil Map Unit Name: PiA—Pipestone loamy sand, 0 to 3 percent slopes NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** x
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): ____

Water Table Present? Yes ____ No ____ Depth (inches): ____

Saturation Present? Yes ____ No ____ Depth (inches): ____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ____ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 1-UPL

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pinus strobus*	35	Yes	FACU
2. *Quercus rubra*	40	Yes	FACU
3. *Acer rubrum*	15	No	FAC
4.			
5.			
6.			
7.			
	90	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Pinus strobus*	17	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	17	=Total Cover	
Herb Stratum (Plot size:)			
1. *Vaccinium angustifolium*	85	Yes	FACU
2. *Gaultheria procumbens*	17	No	FACU
3. *Osmunda claytoniana*	22	No	FAC
4. *Pinus strobus*	8	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	132	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	37	x 3 =	111
FACU species	202	x 4 =	808
UPL species	0	x 5 =	0
Column Totals:	239 (A)		919 (B)

Prevalence Index = B/A = 3.85

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 1-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/1	100					Mucky Loam/Clay	loam
4-14	7.5YR 3/3	100					Loamy/Clayey	silt loam
14-18	10YR 3/1	100					Loamy/Clayey	possible fill on top of soil?

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 13761E City/County: Merrimack Sampling Date: 06/08/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 1-WET

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): toe of slope Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 42.887421 Long: -71.477790 Datum:

Soil Map Unit Name: PiA—Pipestone loamy sand, 0 to 3 percent slopes NWI classification: PEM1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes x	No ____	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- x Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- x Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes x	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 1-WET

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. *Spiraea alba*	20	Yes	FACW
2. *Ilex verticillata*	45	Yes	FACW
3. *Vaccinium corymbosum*	10	No	FACW
4.			
5.			
6.			
7.			
	75 =Total Cover		
Herb Stratum (Plot size:)			
1. *Iris versicolor*	65	Yes	OBL
2. *Carex crinita*	35	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	75	x 2 =	150
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	175 (A)		250 (B)

Prevalence Index = B/A = 1.43

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 1-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/1	100					Mucky Loam/Clay	
4-18	10YR 5/2	75	7.5YR 3/3	25	C	M	Loamy/Clayey	silt loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 13761E City/County: Merrimack Sampling Date: 06/08/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 2-UPL

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 42.892460 Long: -71.472865 Datum:

Soil Map Unit Name: CaC—Canton fine sandy loam, 8 to 15 percent slopes NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No x	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** x
Wetland Hydrology Present?	Yes ____	No x	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): ____

Water Table Present? Yes ____ No ____ Depth (inches): ____

Saturation Present? Yes ____ No ____ Depth (inches): ____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ____ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 2-UPL

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *Acer rubrum*	70	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	70	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Pinus strobus*	25	Yes	FACU
2. *Acer rubrum*	30	Yes	FAC
3. *Quercus rubra*	20	Yes	FACU
4.			
5.			
6.			
7.			
	75	=Total Cover	
Herb Stratum (Plot size:)			
1. *Lysimachia quadrifolia*	10	No	FACU
2. *Toxicodendron radicans*	30	Yes	FAC
3. *Acer rubrum*	5	No	FAC
4. *Maianthemum canadense*	75	Yes	FACU
5. *Parathelypteris noveboracensis*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	125	=Total Cover	
Woody Vine Stratum (Plot size:)			
1. *Celastrus orbiculatus*	5	Yes	UPL
2. *Toxicodendron radicans*	5	Yes	FAC
3.			
4.			
	10	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	145	x 3 =	435
FACU species	130	x 4 =	520
UPL species	5	x 5 =	25
Column Totals:	280 (A)		980 (B)
Prevalence Index = B/A =			3.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 2-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 2.5/3	100					Loamy/Clayey	silt loam
10-18	7.5YR 2.5/3	50					Loamy/Clayey	silt loam
	7.5YR 5/4	50						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 13761 City/County: Merrimack Sampling Date: 06/08/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 2-WET

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): toe of slope Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 42.892393 Long: -71.472804 Datum:

Soil Map Unit Name: CaC—Canton fine sandy loam, 8 to 15 percent slopes NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes x No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** x **No**
Wetland Hydrology Present?	Yes x	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- High Water Table (A2)
- x Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- x Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes x	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 2-WET

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	65	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	65	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Rosa multiflora*	15	Yes	FACU
2. *Vaccinium corymbosum*	25	Yes	FACW
3. *Acer rubrum*	10	Yes	FAC
4.			
5.			
6.			
7.			
	50	=Total Cover	
Herb Stratum (Plot size:)			
1. *Solanum dulcamara*	50	Yes	FAC
2. *Impatiens capensis*	20	Yes	FACW
3. *Osmundastrum cinnamomeum*	10	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	55	x 2 =	110
FAC species	125	x 3 =	375
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	195 (A)		545 (B)

Prevalence Index = B/A = 2.79

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 2-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1	100					Mucky Sand	mucky loamy sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 13761E City/County: Merrimack Sampling Date: 06/22/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 3-UPL

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 42.893523 Long: -71.472770 Datum:

Soil Map Unit Name: HsB—Hinckley loamy sand, 3 to 8 percent slopes NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes x No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes No Depth (inches):

Water Table Present? Yes No Depth (inches):

Saturation Present? Yes No Depth (inches):

(includes capillary fringe)

Wetland Hydrology Present? **Yes** **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 3-UPL

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	40	Yes	FACU
2. *Tsuga canadensis*	30	Yes	FACU
3. *Ulmus americana*	10	No	FACW
4. *Acer rubrum*	5	No	FAC
5.			
6.			
7.			
	85	=Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Herb Stratum (Plot size:)			
1. *Dennstaedtia punctilobula*	10	Yes	UPL
2. *Gaultheria procumbens*	10	Yes	FACU
3. *Maianthemum canadense*	7	Yes	FACU
4. *Pinus strobus*	3	No	FACU
5. *Medeola virginiana*	2	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	32	=Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	5	x 3 =	15
FACU species	92	x 4 =	368
UPL species	10	x 5 =	50
Column Totals:	117 (A)		453 (B)
Prevalence Index = B/A =			3.87

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 3-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/2	100					Loamy/Clayey	
3-16	10YR 5/8	50					Loamy/Clayey	
	10YR 5/6	50						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 13761E City/County: Merrimack Sampling Date: 06/22/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 3-WET

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): toe of slope Local relief (concave, convex, none): none Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 42.893399 Long: -71.472810 Datum:

Soil Map Unit Name: HsB—Hinckley loamy sand, 3 to 8 percent slopes NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes x No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No	**within a Wetland?**	**Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- x Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- x Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches): 10

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 3-WET

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	25	Yes	FAC
2. *Quercus alba*	5	No	FACU
3.			
4.			
5.			
6.			
7.			
	30	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Vaccinium corymbosum*	20	Yes	FACW
2. *Ulmus americana*	20	Yes	FACW
3. *Pinus strobus*	5	No	FACU
4.			
5.			
6.			
7.			
	45	=Total Cover	
Herb Stratum (Plot size:)			
1. *Osmunda claytoniana*	35	Yes	FAC
2. *Impatiens capensis*	7	No	FACW
3. *Vaccinium corymbosum*	5	No	FACW
4. *Solidago rugosa*	10	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	57	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	52	x 2 =	104
FAC species	70	x 3 =	210
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	132 (A)		354 (B)

Prevalence Index = B/A = 2.68

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 3-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/2	100					Muck	organic
6-15	10YR 2/1	100					Muck	
15-21	2.5Y 5/2	70	10YR 2/1	30	C	M	Loamy/Clayey	sandy clay loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- X Histic Epipedon (A2)
- X Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 13761E City/County: Merrimack Sampling Date: 06/09/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 4-UPL

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 42.894816 Long: -71.471494 Datum:

Soil Map Unit Name: HsB—Hinckley loamy sand, 3 to 8 percent slopes NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No x	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** x
Wetland Hydrology Present?	Yes ____	No x	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): ____

Water Table Present? Yes ____ No ____ Depth (inches): ____

Saturation Present? Yes ____ No ____ Depth (inches): ____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ____ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 4-UPL

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus rubra*	13	No	FACU
2. *Acer rubrum*	70	Yes	FAC
3. *Tsuga canadensis*	5	No	FACU
4.			
5.			
6.			
7.			
	88	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Corylus cornuta*	5	Yes	FACU
2. *Quercus rubra*	5	Yes	FACU
3. *Pinus strobus*	7	Yes	FACU
4.			
5.			
6.			
7.			
	17	=Total Cover	
Herb Stratum (Plot size:)			
1. *Osmunda claytoniana*	20	Yes	FAC
2. *Dennstaedtia punctilobula*	55	Yes	UPL
3. *Maianthemum canadense*	10	No	FACU
4. *Quercus rubra*	5	No	FACU
5. *Acer rubrum*	7	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	97	=Total Cover	
Woody Vine Stratum (Plot size:)			
1. *Celastrus orbiculatus*	5	Yes	UPL
2. *Toxicodendron radicans*	5	Yes	FAC
3.			
4.			
	10	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 37.5% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	102	x 3 =	306
FACU species	50	x 4 =	200
UPL species	60	x 5 =	300
Column Totals:	212 (A)		806 (B)

Prevalence Index = B/A = 3.80

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 4-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loamy/Clayey	loam with gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

looks to be fill over existing soil

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 13761E City/County: Merrimack Sampling Date: 06/09/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 4-WET

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): toe of slope Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 42.894816 Long: -71.471362 Datum:

Soil Map Unit Name: HsB—Hinckley loamy sand, 3 to 8 percent slopes NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes x No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No	**within a Wetland?**	**Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- x Surface Water (A1)
- x High Water Table (A2)
- x Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- x Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes x	No	Depth (inches):	
Water Table Present?	Yes x	No	Depth (inches):	12
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches):	10

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 4-WET

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Iris versicolor*	20	Yes	OBL
2. *Onoclea sensibilis*	40	Yes	FACW
3. *Solidago rugosa*	10	No	FAC
4. *Impatiens capensis*	10	No	FACW
5. *Thelypteris palustris*	5	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	55	x 2 =	110
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	85 (A)		160 (B)

Prevalence Index = B/A = 1.88

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 4-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 2/1	100					Muck	organic/muck
2-11	10YR 3/1	100					Mucky Sand	loamy sand
11-24	7.5YR 6/3	70	2.5YR 3/4	30	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 18589.00 FEET City/County: Merrimack Sampling Date: 06/08/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 5-UPL

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 42.894837 Long: -71.470256 Datum:

Soil Map Unit Name: WdC—Windsor loamy sand, 8 to 15 percent slopes NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No x	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** x
Wetland Hydrology Present?	Yes ____	No x	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 5-UPL

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Betula papyrifera*	30	Yes	FACU
2. *Acer rubrum*	30	Yes	FAC
3. *Pinus strobus*	10	No	FACU
4.			
5.			
6.			
7.			
	70	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Pinus strobus*	15	Yes	FACU
2. *Corylus cornuta*	15	Yes	FACU
3. *Acer rubrum*	5	No	FAC
4. *Quercus rubra*	5	No	FACU
5.			
6.			
7.			
	40	=Total Cover	
Herb Stratum (Plot size:)			
1. *Maianthemum canadense*	95	Yes	FACU
2. *Carex haydenii*	10	No	OBL
3. *Lysimachia borealis*	2	No	FAC
4. *Quercus rubra*	20	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	127	=Total Cover	
Woody Vine Stratum (Plot size:)			
1. *Celastrus orbiculatus*	5	Yes	UPL
2. *Toxicodendron radicans*	5	Yes	FAC
3.			
4.			
	10	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 28.6% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	0	x 2 =	0
FAC species	42	x 3 =	126
FACU species	190	x 4 =	760
UPL species	5	x 5 =	25
Column Totals:	247 (A)		921 (B)
Prevalence Index = B/A =			3.73

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 5-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 2.5/3	100					Loamy/Clayey	sandy loam
4-16	10YR 5/3	100					Sandy	sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 18589.00 FEET City/County: Merrimack Sampling Date: 06/08/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 5-WET

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 42.894734 Long: -71.470180 Datum:

Soil Map Unit Name: WdC—Windsor loamy sand, 8 to 15 percent slopes NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** ____ **No** x
Wetland Hydrology Present?	Yes x	No ____	If yes, optional Wetland Site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ____	Depth (inches): ____	
Water Table Present?	Yes ____	No ____	Depth (inches): ____	
Saturation Present? (includes capillary fringe)	Yes x	No ____	Depth (inches): 0	**Wetland Hydrology Present?** **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 5-WET

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	55	Yes	FAC
2. *Pinus strobus*	10	No	FACU
3.			
4.			
5.			
6.			
7.			
	65	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Betula populifolia*	5	No	FAC
2. *Alnus incana*	30	Yes	FACW
3. *Pinus strobus*	15	Yes	FACU
4.			
5.			
6.			
7.			
	50	=Total Cover	
Herb Stratum (Plot size:)			
1. *Carex haydenii*	70	Yes	OBL
2. *Maianthemum canadense*	25	Yes	FACU
3. *Pinus strobus*	5	No	FACU
4. *Impatiens capensis*	15	No	FACW
5. *Osmundastrum cinnamomeum*	5	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	70	x 1 =	70
FACW species	50	x 2 =	100
FAC species	60	x 3 =	180
FACU species	55	x 4 =	220
UPL species	0	x 5 =	0
Column Totals:	235	(A)	570 (B)

Prevalence Index = B/A = 2.43

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 5-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 2.5/2	95	7.5YR 3/4	5	C	M	Loamy/Clayey	
4-16	7.5YR 3/4	100					Sandy	loamy sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 18589.00 FEET City/County: Merrimack Sampling Date: 06/22/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 6&7-UPL

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 42.895999 Long: -71.470749 Datum:

Soil Map Unit Name: HsB—Hinckley loamy sand, 3 to 8 percent slopes NWI classification: PEM1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes x No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**	
Hydric Soil Present?	Yes	No X	**within a Wetland?**	**Yes** **No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No	Depth (inches):

Wetland Hydrology Present? **Yes** **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 6&7-UPL

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	60	Yes	FAC
2. *Quercus rubra*	20	Yes	FACU
3. *Pinus strobus*	5	No	FACU
4.			
5.			
6.			
7.			
	85	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Pinus strobus*	20	Yes	FACU
2. *Ulmus americana*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	40	=Total Cover	
Herb Stratum (Plot size:)			
1. *Carex haydenii*	40	Yes	
2. *Ulmus americana*	25	Yes	FACW
3. *Quercus rubra*	12	No	FACU
4. *Gaultheria procumbens*	17	No	FACU
5. *Maianthemum canadense*	10	No	FACU
6. *Fragaria virginiana*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
12.			
	109	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	45	x 2 =	90
FAC species	60	x 3 =	180
FACU species	89	x 4 =	356
UPL species	0	x 5 =	0
Column Totals:	194 (A)		626 (B)
Prevalence Index = B/A =			3.23

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 6&7-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/4	100					Sandy	loamy sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 18589.00 FEET City/County: Merrimack Sampling Date: 06/22/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 6-WET

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 42.895868 Long: -71.470862 Datum:

Soil Map Unit Name: HsB—Hinckley loamy sand, 3 to 8 percent slopes NWI classification: PEM1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes x No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** x **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- x Surface Water (A1)
- High Water Table (A2)
- x Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- x Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes x	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes x	No	Depth (inches): 8

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: 6-WET

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Vaccinium corymbosum*	5	Yes	FACW
2. *Acer rubrum*	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	
Herb Stratum (Plot size:)			
1. *Carex haydenii*	100	Yes	OBL
2. *Solidago rugosa*	7	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	107	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	5	x 2 =	10
FAC species	22	x 3 =	66
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	127 (A)		176 (B)

Prevalence Index = B/A = 1.39

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 6-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 2.5/1	100					Mucky Sand	
6-16	2.5Y 4/3	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 18589.00 FEET City/County: Merrimack Sampling Date: 06/22/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 7-WET

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 42.896472 Long: -71.470539 Datum:

Soil Map Unit Name: WdC—Windsor loamy sand, 8 to 15 percent slopes NWI classification: PFO1/4E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes x No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** **No**
Wetland Hydrology Present?	Yes x	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes No Depth (inches):

Water Table Present? Yes No Depth (inches):

Saturation Present? Yes No Depth (inches):

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 7-WET

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	45	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	45	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Vaccinium corymbosum*	60	Yes	FACW
2. *Acer rubrum*	25	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	85	=Total Cover	
Herb Stratum (Plot size:)			
1. *Osmunda regalis*	15	No	OBL
2. *Maianthemum canadense*	55	Yes	FACU
3. *Pinus strobus*	15	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	60	x 2 =	120
FAC species	70	x 3 =	210
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	215 (A)		625 (B)

Prevalence Index = B/A = 2.91

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 7-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 3/1	100					Loamy/Clayey	loam
1-16	10YR 5/4	70	10YR 2/2	20	C	M	Sandy	loamy sand
			7.5YR 4/4	10	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- X Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 13761E City/County: Merrimack Sampling Date: 06/08/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 8-UPL

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 42.898626 Long: -71.467601 Datum:

Soil Map Unit Name: CmC—Canton fine sandy loam, 8 to 15 percent slopes, very stony NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes x No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes x No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No** x
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No	Depth (inches):
Water Table Present?	Yes	No	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No	Depth (inches):

Wetland Hydrology Present? **Yes** **No** x

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 8-UPL

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *Quercus rubra*	5	Yes	FACU
3. *Pinus strobus*	5	Yes	FACU
4.			
5.			
6.			
7.			
	10	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size:)			
1. *Rumex acetosella*	80	Yes	FACU
2. *Achillea millefolium*	20	No	FACU
3. *Phleum pratense*	30	Yes	FACU
4. *Taraxacum officinale*	5	No	FACU
5. *Trifolium pratense*	2	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	137	=Total Cover	
Woody Vine Stratum (Plot size:)			
1. *Celastrus orbiculatus*	5	Yes	UPL
2. *Toxicodendron radicans*	5	Yes	FAC
3.			
4.			
	10	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 16.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	147	x 4 =	588
UPL species	5	x 5 =	25
Column Totals:	157 (A)		628 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 8-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/4	50					Sandy	loamy sand
	10YR 3/4	50						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: 13761E City/County: Merrimack Sampling Date: 06/08/2022

Applicant/Owner: NHDOT State: NH Sampling Point: 8-WET

Investigator(s): Jordan Tate Section, Township, Range:

Landform (hillside, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): LRR R Lat: 42.898481 Long: -71.467585 Datum:

Soil Map Unit Name: CmC—Canton fine sandy loam, 8 to 15 percent slopes, very stony NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**	
Hydric Soil Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	If yes, optional Wetland Site ID:	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- x Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- x Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): ____

Water Table Present? Yes ____ No ____ Depth (inches): ____

Saturation Present? Yes ____ No ____ Depth (inches): ____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: 8-WET

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Iris versicolor*	50	Yes	OBL
2. *Phalaris arundinacea*	60	Yes	FACW
3. *Asclepias syriaca*	5	No	UPL
4. *Lythrum salicaria*	10	No	OBL
5. *Carex brunnescens*	30	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	155 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	60	x 1 =	60
FACW species	90	x 2 =	180
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	155 (A)		265 (B)

Prevalence Index = B/A = 1.71

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 8-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/1	95	7.5YR 3/3	5	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

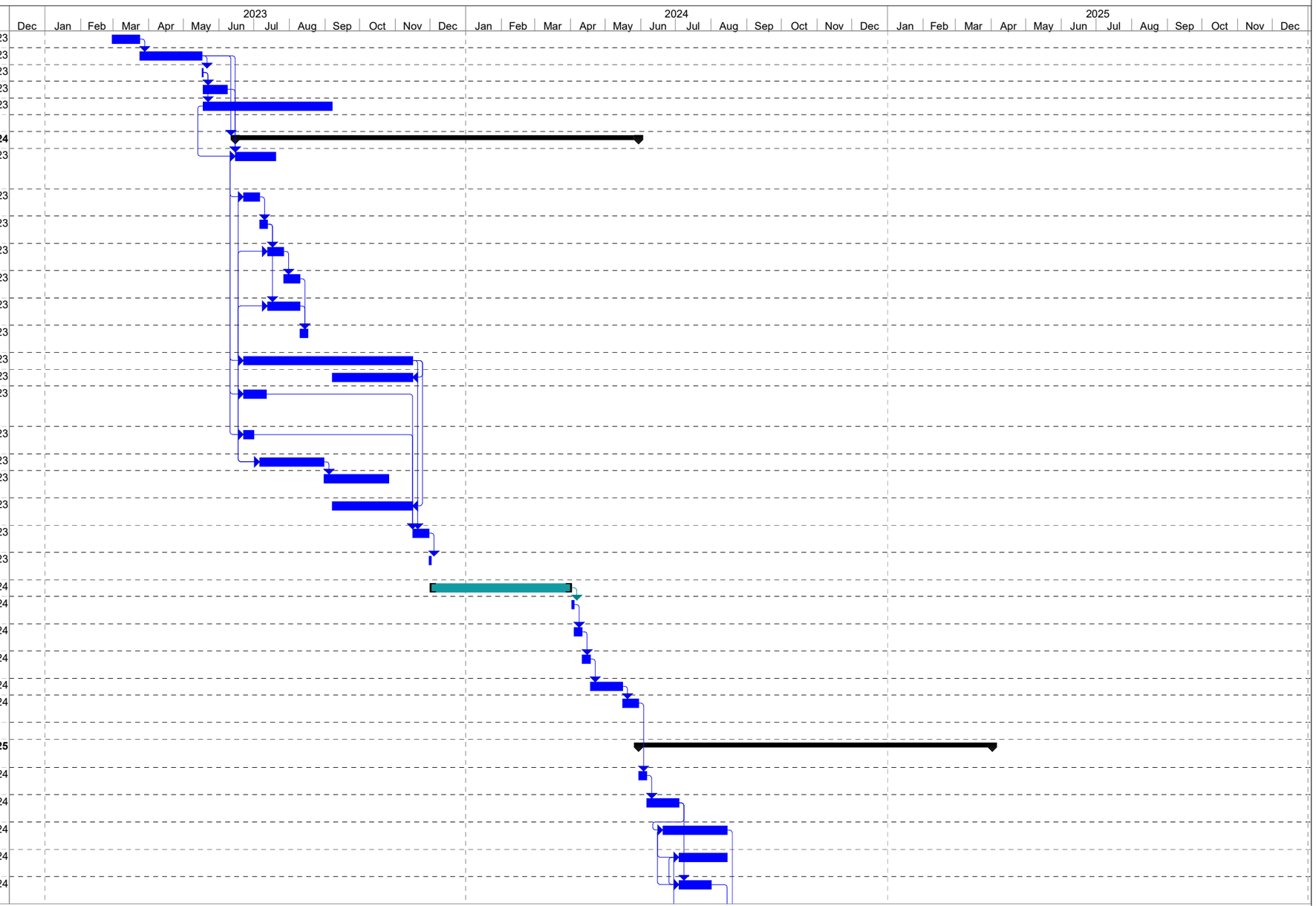
Remarks:

some gravel, seems like it could be associated with the roadway due to proximity

Construction Sequence

NASHUA-MERRIMACK-BEDFORD
13761E
PRELIMINARY CONSTRUCTION SCHEDULE

ID	Task Name	Duration	Start	Finish
1	Project Advertisement	18 days	Tue 2/28/23	Thu 3/23/23
2	Contract Execution	38 days	Fri 3/24/23	Tue 5/16/23
3	G&C Approval	1 day	Wed 5/17/23	Wed 5/17/23
4	NOI and Approval	15 days	Thu 5/18/23	Wed 6/7/23
5	Submittals/Reviews, and Pre-Con	80 days	Thu 5/18/23	Wed 9/6/23
6				
7	**Phase 1 - Temporary Widening**	**250 days**	**Thu 6/15/23**	**Wed 5/29/24**
8	Install PCB For Phase 1 Workzone Protection (16,600 lf), Impact Attenuators (2), and Lighting (2) Installations	25 days	Thu 6/15/23	Wed 7/19/23
9	Extend 24" Culvert @ Dumpling Brook (Downstream End)	10 days	Thu 6/22/23	Wed 7/5/23
10	Divert Water into 24" Culvert @ Dumpling Brook	5 days	Thu 7/6/23	Wed 7/12/23
11	Extend 36" Culvert @ Dumpling Brook (Downstream End)	10 days	Thu 7/13/23	Wed 7/26/23
12	Construct Temporary Channel @ 36" Culvert @ Dumpling Brook (Downstream End)	10 days	Thu 7/27/23	Wed 8/9/23
13	Construct 42" Culvert & Headwall @ Dumpling Brook (Downstream End Only)	20 days	Thu 7/13/23	Wed 8/9/23
14	Remove Water Diversion & Restore Flow to 36" Culvert @ Dumpling Brook	5 days	Thu 8/10/23	Wed 8/16/23
15	Construct Widening Earthwork (57,000 CY)	105 days	Thu 6/22/23	Wed 11/15/23
16	Construct BMP (20,000 CY)	50 days	Thu 9/7/23	Wed 11/15/23
17	Remove Overhead Signs and Dismantle Gantries (2 Total - Sta. 1174+56 & Sta. 1199+54)	14 days	Thu 6/22/23	Tue 7/11/23
18	Remove Overhead Signs and Dismantle Cantilever (1 Total - Sta. 1207+50 Rt.)	7 days	Thu 6/22/23	Fri 6/30/23
19	Construct Soundwall Earth Berms	40 days	Thu 7/6/23	Wed 8/30/23
20	Construct Soundwall Drilled Shafts (120 total @ 3 per day)	40 days	Thu 8/31/23	Wed 10/25/23
21	Construct Outside Drainage (? Lf and ? structures)	50 days	Thu 9/7/23	Wed 11/15/23
22	Construct Temporary Widening & Permanent Selects (6,000 CY)	10 days	Thu 11/16/23	Wed 11/29/23
23	Reset PCM to outside edge of low speed shoulder (16,600 lf)	2 days	Thu 11/30/23	Fri 12/1/23
24	***Winter Suspension***	87 days	Fri 12/1/23	Mon 4/1/24
25	Reset PCM to middle of low speed shoulder (16,600 lf)	2 days	Tue 4/2/24	Wed 4/3/24
26	Remove PCB and Replace with Barrels on Southern End To Allow Shim	5 days	Thu 4/4/24	Wed 4/10/24
27	Reshape Superelevation / Shim Southern Outside Shoulders	5 days	Thu 4/11/24	Wed 4/17/24
28	Pave Diversion / Widening (4,000 Tons)	20 days	Thu 4/18/24	Wed 5/15/24
29	Install Temporary Guardrail Along Outside Edge of the New Diversion	10 days	Thu 5/16/24	Wed 5/29/24
30				
31	**Phase 2 - Median & Pavement Reconstruction**	**220 days**	**Thu 5/30/24**	**Tue 4/1/25**
32	Install Striping & Shift Traffic To The Diversion(s)	5 days	Thu 5/30/24	Wed 6/5/24
33	Remove Existing Pavement Within Workzone (? CY)	20 days	Thu 6/6/24	Wed 7/3/24
34	Construct Median Selects & Regrade Existing Selects (7,000 CY)	40 days	Thu 6/20/24	Wed 8/14/24
35	Construct Median Drainage (? Lf and ? structures)	30 days	Thu 7/4/24	Wed 8/14/24
36	Construct 42" Culvert @ Dumpling Brook (Middle Section)	20 days	Thu 7/4/24	Wed 7/31/24

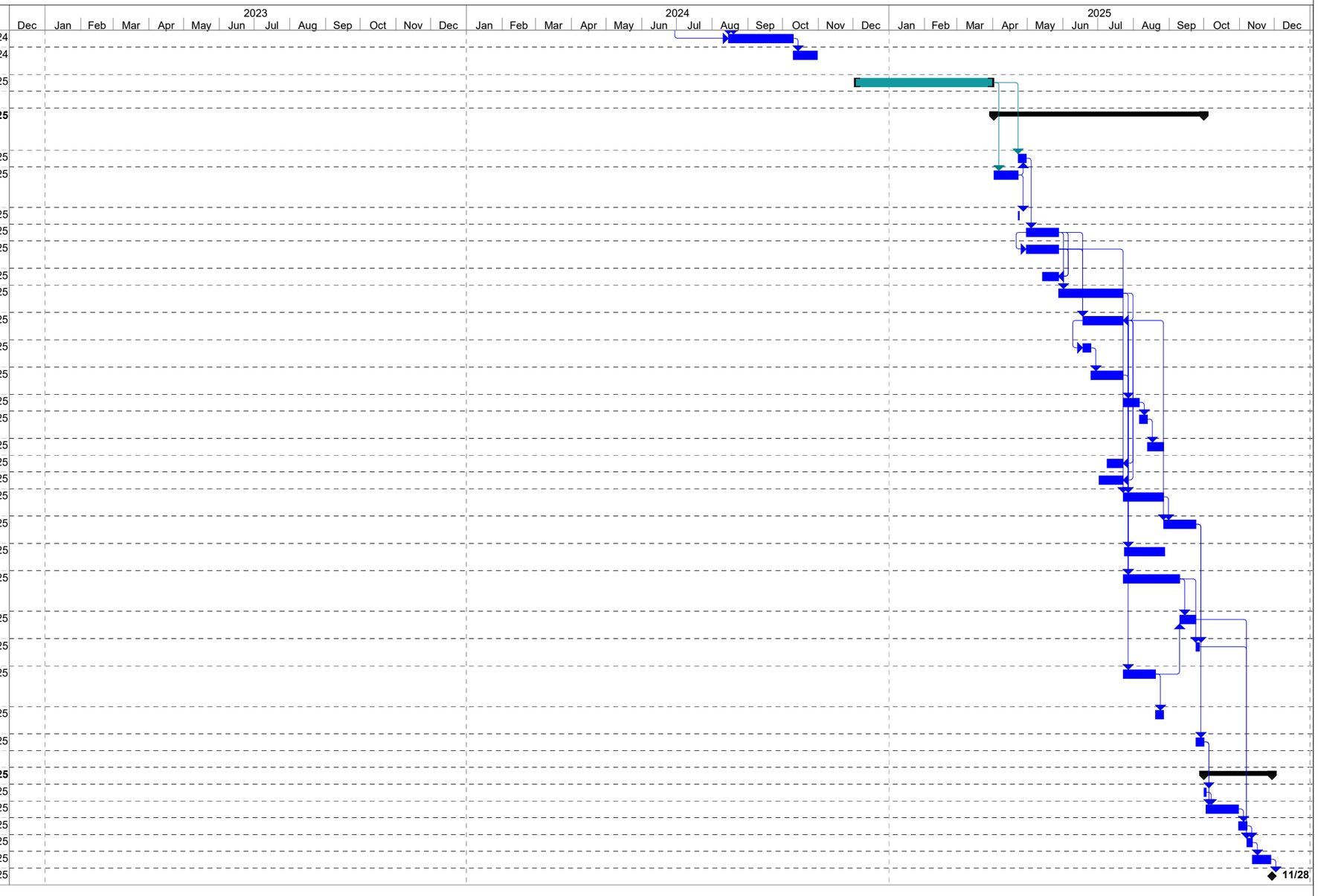


Project: FE Everett Widening 13761E
Date: Tue 11/1/22

Task	Summary	External Milestone	Inactive Summary	Manual Summary Rollup	Finish-only
Split	Project Summary	Inactive Task	Manual Task	Manual Summary	Progress
Milestone	External Tasks	Inactive Milestone	Duration-only	Start-only	Deadline

NASHUA-MERRIMACK-BEDFORD
13761E
PRELIMINARY CONSTRUCTION SCHEDULE

ID	Task Name	Duration	Start	Finish
37	Construct Median Barrier (4650 lf)	40 days	Thu 8/15/24	Wed 10/9/24
38	Pave Median and New Inside Lanes (To Binder) (2,500 Tons)	15 days	Thu 10/10/24	Wed 10/30/24
39	***Winter Suspension***	87 days	Mon 12/2/24	Tue 4/1/25
40				
41	**Phase 3 - Outside Pavement Reconstruction & Temporary Widening Removal**	**130 days**	**Wed 4/2/25**	**Tue 9/30/25**
42	Install Striping	5 days	Wed 4/23/25	Tue 4/29/25
43	Install PCB For Phase 3 Workzone Protection (27,720 lf), Impact Attenuators (2), and Lighting (2) Installations	15 days	Wed 4/2/25	Tue 4/22/25
44	Shift Traffic to the Inside Lanes	1 day	Wed 4/23/25	Wed 4/23/25
45	Remove Temporary Pavement (800 CY)	20 days	Wed 4/30/25	Tue 5/27/25
46	Remove Existing Pavement Within Workzone (? CY)	20 days	Wed 4/30/25	Tue 5/27/25
47	Remove Temporary GR	10 days	Wed 5/14/25	Tue 5/27/25
48	Remove Temporary widening Earthwork (Northern Taper) (? CY)	40 days	Wed 5/28/25	Tue 7/22/25
49	Reshape Outside Earthwork to the standard roadway template (? CY)	25 days	Wed 6/18/25	Tue 7/22/25
50	Divert Water into 24" Culvert @ Dumpling Brook	5 days	Wed 6/18/25	Tue 6/24/25
51	Construct 42" Culvert & Headwall @ Dumpling Brook (Upstream End Only)	20 days	Wed 6/25/25	Tue 7/22/25
52	Fill & Abandon 36" Culvert @ Dumpling Brook	10 days	Wed 7/23/25	Tue 8/5/25
53	Remove Water Diversion & Restore Flow to 42" Culvert @ Dumpling Brook	5 days	Wed 8/6/25	Tue 8/12/25
54	Fill & Abandon 24" Culvert @ Dumpling Brook	10 days	Wed 8/13/25	Tue 8/26/25
55	Adjust Outside Drainage Rims (?structures)	10 days	Wed 7/9/25	Tue 7/22/25
56	Remove or Plug Temporary Drainage	15 days	Wed 7/2/25	Tue 7/22/25
57	Construct / Regrade Widening Selects (?? CY)	25 days	Wed 7/23/25	Tue 8/26/25
58	Pave Outside Lane and Shoulder (To Binder)(3,900 Tons)	20 days	Wed 8/27/25	Tue 9/23/25
59	Install Soundwall Posts (120 EA), Leveling slabs (120 Ea.) and Concrete Panels (?? sf)	25 days	Thu 7/24/25	Wed 8/27/25
60	Construction of Gantry & Cantilever Foundations (includes all efforts from excavation to cure time) (5 Total) (?? CY)	35 days	Wed 7/23/25	Tue 9/9/25
61	Erect Proposed Gantries (2 Total - Sta. 1174+68 & Sta. 1199+68)	10 days	Wed 9/10/25	Tue 9/23/25
62	Erect Proposed Cantilever (1 Total - Sta. 1207+55 Rt.)	3 days	Wed 9/24/25	Fri 9/26/25
63	Construct ITS Facility Foundations (includes all efforts from excavation to cure time) (5 Total) (?? CY)	20 days	Wed 7/23/25	Tue 8/19/25
64	Erect ITS Facilities (2 Total - Sta. 1146+00, RT NB & Sta. 1221+00, RT NB)	5 days	Wed 8/20/25	Tue 8/26/25
65	Remove all PCB	5 days	Wed 9/24/25	Tue 9/30/25
66				
67	**Phase 4 - Final Paving and Striping**	**43 days**	**Wed 10/1/25**	**Fri 11/28/25**
68	Install Temporary Striping & Shift Traffic	2 days	Wed 10/1/25	Thu 10/2/25
69	Pave Final Wearing Course (3,900 Tons)	20 days	Fri 10/3/25	Thu 10/30/25
70	Install Final Striping	5 days	Fri 10/31/25	Thu 11/6/25
71	Install New Overhead Signs	3 days	Fri 11/7/25	Tue 11/11/25
72	Final Check List & Miscellaneous Cleanup	12 days	Wed 11/12/25	Thu 11/27/25
73	Project Completion	0 days	Fri 11/28/25	Fri 11/28/25



Project: FE Everett Widening 13761E
Date: Tue 11/1/22

Task	Summary	External Milestone	Inactive Summary	Manual Summary Rollup	Finish-only
Split	Project Summary	Inactive Task	Manual Task	Manual Summary	Progress
Milestone	External Tasks	Inactive Milestone	Duration-only	Start-only	Deadline

Photographs

Photo 1 – PSS1E, Impact Location A (June 2022)

Photo 2 – PFO1E, Impact Location B (August 2016)

Photo 3 – PFO1E, Impact Location C (June 2022)

Photo 4 – PFO1E, Impact Location D (August 2016)

Photo 5 – R4SB4J, Impact Location J (August 2022)

Photo 6 – Dumpling Brook (R2UB2), inlet, Impact Location F (August 2022)

Photo 7 – Dumpling Brook (R2UB2), upstream, Impact Location E (August 2022)

Photo 8 – Dumpling Brook (R2UB2), Outlet, Impact Location G (August 2016)

Photo 9 – Dumpling Brook (R2UB2), Downstream, Impact Location G (August 2016)

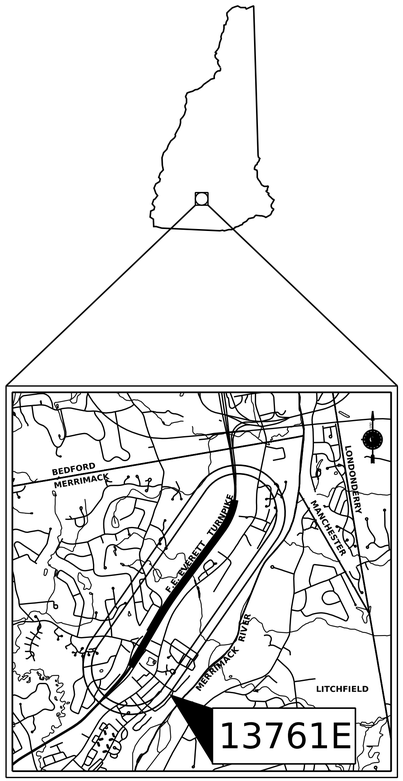
Photo 10 – PEM1E, Impact Location H (June 2022)

Wetland Impact and Erosion Control Plans

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

WETLANDS PLANS

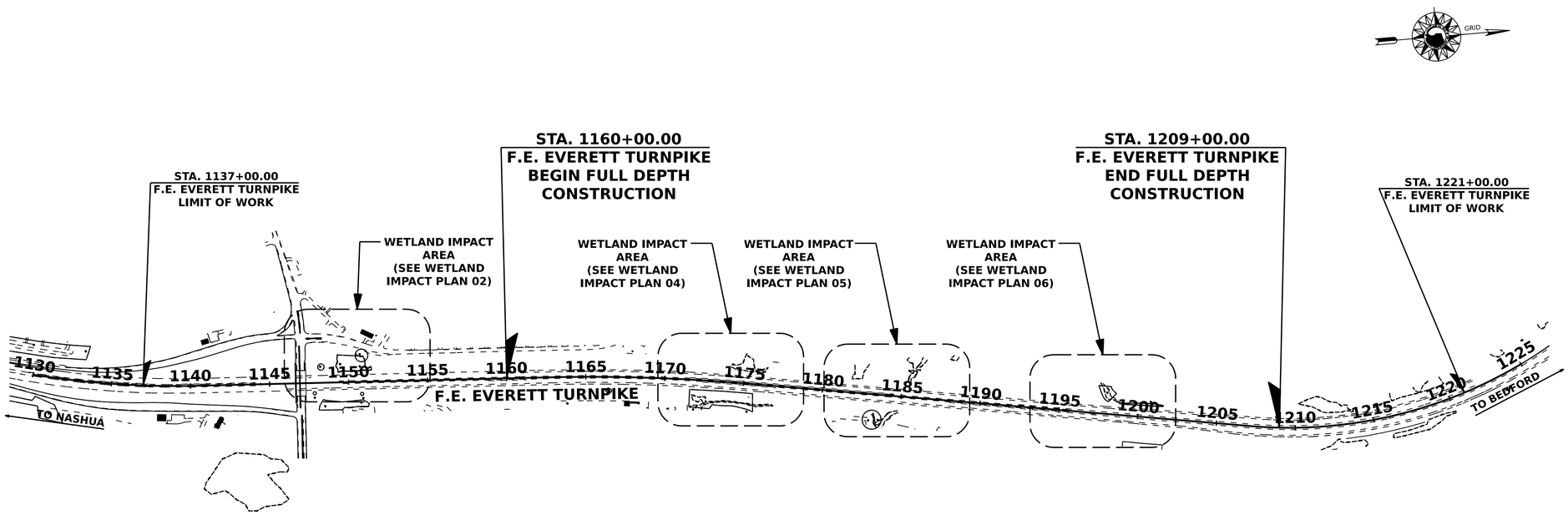
N.H. PROJECT NO. 13761E
F.E. EVERETT TURNPIKE CORRIDOR WIDENING PROJECT



LOCATION MAP

½ ¼ 0 ½ 1 mi.

GRAPHIC SCALE



GRID

TOWNS OF NASHUA-MERRIMACK-BEDFORD
COUNTY OF HILLSBOROUGH

SCALE: 1" = 400'

WETLAND IMPACT PLANS
DATE 11/4/2022

WETLANDS DELINEATED BY MCFARLAND-JOHNSON, INC. IN SUMMER 2017 AND SUMMER 2022, IN ACCORDANCE WITH THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL AND THE REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, VERSION 2.0, JANUARY 2012, US ARMY CORPS OF ENGINEERS.

FOR CONSTRUCTION AND ALIGNMENT DETAILS - SEE CONSTRUCTION PLANS

	DATE	DATE
DRAWN BY	MAL	10-12-22
CHECKED BY	CJP	10-12-22

WETLAND PLANS PREPARED BY

McFARLAND JOHNSON
CONCORD, N.H.

DELINEATION : 2017/2022

STATE OF NEW HAMPSHIRE
STEPHEN C. HOFFMANN
No. 00306
CERTIFIED WETLAND SCIENTIST

STATE OF NEW HAMPSHIRE
BRIAN P. DOLUHANTY
No. 11917
LICENSED PROFESSIONAL ENGINEER

HIGHWAY PLANS PREPARED BY

McFARLAND JOHNSON
CONCORD, N.H.

NHDOT THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR APPROVAL:

DIRECTOR OF PROJECT DEVELOPMENT — DATE

APPROVED:

ASSISTANT COMMISSIONER AND CHIEF ENGINEER — DATE

DRAWING NAME	FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
13761E-FrnWet [SHT]		13761E	1	19

GENERAL

EDGE OF PAVEMENT
TRAVELED WAY

PROPOSED ROADWAY | existing roadway | (pavement removed outside slope lines)

DRIVEWAYS

(label surface type)

BUILDINGS

(building to be removed)

(label house or type of building)

FOUNDATION

(label type)

LEACH FIELD

leach field

BRIDGE CROSSINGS

STREAM | OVERPASS

STEPS AND WALK

(label type)

INTERMITTENT WATER COURSE

SHORE LINE

river/stream | pond | (label name of water body)

POTENTIAL WET AREA SYMBOL

BRUSH OR WOODS LINE

TREES (PLANS)

(deciduous) (coniferous) (stump)

TREE OR STUMP (CROSS-SECTIONS)

(show station, circumference in feet & type)

HEDGE

(label type)

MONITORING WELL

mon

WELL

FLAG POLE

fp

ORIGINAL GROUND (TYPICALS)

ROCK OUTCROP

ROCK LINE (TYPICALS & SECTIONS ONLY)

GUARDRAIL (label type)

existing | PROPOSED

bgr

cgr

JERSEY BARRIER

CURB (LABEL TYPE)

STONE WALL

RETAINING WALL (LABEL TYPE)

(points toward retained ground)

FENCE (LABEL TYPE)

SIGNS

(single post)

(double post)

GAS PUMP

gp

FUEL TANK (ABOVE GROUND)

ft

(label size & type)

STORAGE TANK FILLER CAP

fc

SEPTIC TANK

GRAVE

gr

MAILBOX

mb

VENT PIPE

vp

SATELLITE DISH ANTENNA

da

PHONE

ph

GROUND LIGHT/LAMP POST

gl lp

BORING LOCATION

TEST PIT

INTERSTATE NUMBERED HIGHWAY

93

UNITED STATES NUMBERED HIGHWAY

3

STATE NUMBERED HIGHWAY

102

SHORELAND - WETLAND

WETLAND DESIGNATION AND TYPE

2
PUB2E

DELINEATED WETLAND
ORDINARY HIGH WATER
TOP OF BANK
TOP OF BANK & ORDINARY HIGH WATER
NORMAL HIGH WATER
WIDTH AT BANK FULL
PRIME WETLAND
PRIME WETLAND 100' BUFFER
NON-JURISDICTIONAL DRAINAGE AREA
COWARDIN DISTINCTION LINE
TIDAL BUFFER ZONE
DEVELOPED TIDAL BUFFER ZONE
HIGHEST OBSERVABLE TIDE LINE
MEAN HIGH WATER
MEAN LOW WATER
VERNAL POOL
SPECIAL AQUATIC SITE
REFERENCE LINE
WATER FRONT BUFFER
NATURAL WOODLAND BUFFER
PROTECTED SHORELAND
INVASIVE SPECIES LABEL

I.S. I | I.S. II

INVASIVE SPECIES

FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY
100 YEAR FLOODPLAIN BOUNDARY
FLOODWAY

ENGINEERING

CONSTRUCTION BASELINE

30 31 32

PC, PT, POT (ON CONST BASELINE)
PI (IN CONSTRUCTION BASELINES)
INTERSECTION OR EQUATION OF TWO LINES
ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)
PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)

SLOPE LINE | CLEARING LINE

CLEARING LINE
SLOPE LINE
SLOPE LINE (FILL)
SLOPE LINE (CUT)

PROFILES AND CROSS SECTIONS:
ORIGINAL GROUND ELEVATION (LEFT)
FINISHED GRADE ELEVATION (RIGHT)

72.5
79.14

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
02-25-2022	13761E-State Dtls SHT	13761E	2	19

Sheet 1 of 2 [SHT]

DRAINAGE

MANHOLE

CATCH BASIN

DROP INLET

(existing) (PROPOSED)

DRAINAGE PIPE (existing)

DRAINAGE PIPE (PROPOSED)

UNDERDRAIN (existing) W/ FLUSHING BASIN

UNDERDRAIN (PROPOSED) W/ FLUSHING BASIN

show direction of flow

(label size & type)

(label size & type)

HEADER (existing & PROPOSED)

(with stone outlet protection)

END SECTION (existing & PROPOSED)

METAL or PLASTIC

RCP

OPEN DITCH (PROPOSED)

EROSION CONTROL/ STONE SLOPE PROTECTION

BOUNDARIES / RIGHT-OF-WAY

RIGHT-OF-WAY LINE (label type)

RR RIGHT-OF-WAY LINE

PROPERTY LINE

PROPERTY LINE (COMMON OWNER)

TOWN LINE BOW / CONCORD

COUNTY LINE COOS / GRAFTON

STATE LINE MAINE / NEW HAMPSHIRE

NATIONAL FOREST

CONSERVATION LAND

BENCH MARK / SURVEY DISK

BOUND (PROPOSED)

STATE LINE/ TOWN LINE MONUMENT

NHDOT PROJECT MARKER

IRON PIPE OR PIN

DRILL HOLE IN ROCK

TAX MAP AND LOT NUMBER

156 14

1642/341

6.80 Ac.±

PROPERTY PARCEL NUMBER

HISTORIC PROPERTY

UTILITIES

existing PROPOSED

TELEPHONE POLE

POWER POLE

JOINT OCCUPANCY

MISCELLANEOUS/UNKNOWN POLE

GUY POLE OR PUSH BRACE

(plot point at face not center of symbol)

LIGHT POLE

LIGHT ON POWER POLE

LIGHT ON JOINT POLE

POLE STATUS:
REMOVE, LEAVE, PROPOSED, OR TEMPORARY
AS APPLICABLE e.g.:

R L

P+04 25.0'

T+04 25.0'

RAILROAD

(label ownership)

RAILROAD SIGN

RAILROAD SIGNAL

UTILITY JUNCTION BOX

jb JB

OVERHEAD WIRE

(label type)

UNDERGROUND UTILITIES

WATER (on existing lines label size, type and note if abandoned)

SEWER

TELEPHONE

ELECTRIC

GAS

LIGHTING

INTELLIGENT TRANSPORTATION SYSTEM

FIBER OPTIC

WATER SHUT OFF

GAS SHUT OFF

HYDRANT

MANHOLES

SEWER MHS

TELEPHONE MHT

ELECTRICAL MHE

GAS MHG

UNKNOWN

WATER MHW

TRAFFIC SIGNALS / ITS

existing PROPOSED

MAST ARM 30' MA (NOTE ANGLE FROM E)

OPTICOM RECEIVER

OPTICOM STROBE

TRAFFIC SIGNAL

PEDESTAL WITH PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON UNIT

SIGNAL CONDUIT C PC

CONTROLLER CABINET cc CC

METER PEDESTAL mp MP

PULL BOX pb PB

LOOP DETECTOR (QUADRUPOLE) (label size)

LOOP DETECTOR (RECTANGULAR) (label size)

CAMERA POLE (CCTV)

FIBER OPTIC DELINEATOR fod FOD

FIBER OPTIC SPLICE VAULT S V F

ITS EQUIPMENT CABINET its ITS

MOTOR VEHICLE DETECTION SYSTEM (MVDS)

VARIABLE SPEED LIMIT SIGN

DYNAMIC MESSAGE SIGN

ROAD AND WEATHER INFO SYSTEM

CONSTRUCTION NOTES

CURB MARK NUMBER - BITUMINOUS	B-1
CURB MARK NUMBER - GRANITE	G-1
CLEARING AND GRUBBING AREA	A
DRAINAGE NOTE	1
EROSION CONTROL NOTE	A
FENCING NOTE	A
GUARDRAIL NOTE	1
ITS NOTE	1
LIGHTING NOTE	A
TRAFFIC SIGNAL NOTE	1

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

Sheet 2 of 2 [SHT]	REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
	02-25-2022	13761E-State Dtls SHT	13761E	3	19

WETLAND IMPACT SUMMARY												
WETLAND NUMBER	WETLAND CLASS-IFICATION	LOCATION	AREA IMPACTS						LINEAR STREAM IMPACTS FOR MITIGATION		
			PERMANENT				TEMPORARY		PERMANENT		
			N.H.W.B. (NON-WETLAND)		N.H.W.B. & A.C.O.E. (WETLAND)				BANK LEFT	BANK RIGHT	CHANNEL
			SF	LF	SF	LF	SF	LF	LF	LF	LF
1	PSS1E	A			3633		688				
2	PFO1E	B			1551						
3	PFO1E	C			4650		270				
4	PFO1E	D			470		215				
6	R2UB2	E					3465	146			
6	R2UB2	F			143	13					13
6	R2UB2	G			1507	80	597	19			80
8	PEM1E	H			91		95				
5	R4SB4J	J			206	27	30	5			27
		TOTAL			12,251	120	5,360	170			120

PERMANENT IMPACTS: 12,251 SF
TEMPORARY IMPACTS: 5,360 SF

TOTAL IMPACTS: 17,611 SF

WETLAND CLASSIFICATION CODES	
PSS1E	PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED
PFO1E	PALUSTRINE, FORESTED, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED/SATURATED
R4SBAJ	RIVERINE, INTERMITTENT, STREAMBED, SAND, INTERMITTENTLY FLOODED
R2UB2	RIVERINE, LOWER PERENNIAL, UNCONSOLIDATED BOTTOM, SAND
PEM1E	PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED/SATURATED
PFO1/4	PALUSTRINE, FORESTED, BROAD-LEAVED DECIDUOUS/NEEDLE-LEAVED EVERGREEN

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	DATE	STATION

SDR PROCESSED NAME1 DATE DATE1
NEW DESIGN NAME2 DATE DATE2
SHEET CHECKED NAME3 DATE DATE3
AS BUILT DETAILS DATE

McFarland Johnson

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF ENVIRONMENT

WETLAND IMPACT SUMMARY SHEET

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
13761E-Wet_Sum SHT	13761E	4	19

WetSum [SHT]

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	DATE	STATION

	DATE
SDR PROCESSED	
NEW DESIGN	
SHEET CHECKED	
AS BUILT DETAILS	

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

WETLAND DESIGNATION NUMBER
WETLAND IMPACT LOCATION
WETLAND MITIGATION AREA
MITIGATION

STA. 1137+00.00
F.E. EVERETT TURNPIKE
LIMIT OF WORK

PT 1140+46.73

N30°14'42.9"E

MATCH TO 1143+50.00 PLAN 02

F.E. EVERETT TURNPIKE
CONSTRUCTION ℄

EXIT 12
SOUTHBOUND ON-RAMP

EXIT 12
NORTHBOUND OFF-RAMP

HARRIS AVENUE

M130 LANDS N/F MARIE VAN DE WEGHE

M131 LANDS N/F JASON CHAMPIGNY

M132 LANDS N/F ROUTE 3 MERRIMACK BB LLC

M133 LANDS N/F STATE OF NEW HAMPSHIRE

M134 LANDS N/F CHAPLE LANE

M135 LANDS N/F PAULINE K. & DAVID P. PARENT

M136 LANDS N/F THOMAS M. CONTI

M137 LANDS N/F JOSEPH N. & CHERYL M. STRUBE

M138 LANDS N/F HAROLD W. & BARBARA A. WATSON

M139 LANDS N/F LAWRENCE C. WRIGHT

M140 LANDS N/F BRADFORD A. & KARIN M. KNIGHT

M141 LANDS N/F ANDREW M. DIANE L. MOORE

EXIST. L.A.R.O.W. 10353

EXIST. L.A.R.O.W. P2650E

SCALE IN FEET: 50 0 50 100

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLAN 01

McFarland Johnson

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	WetPln 1 [SHT]	13761E-WetPln SHT	13761E	5	19

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

	DATE
SDR PROCESSED	
NEW DESIGN	
SHEET CHECKED	
AS BUILT DETAILS	

MATCH TO 1143+50.00 PLAN 01

MATCH TO 1156+50.00 PLAN 03

M142
LANDS N/F
HAROLD W. & BARBARA A. WATSON

M145
LANDS N/F
NICHOLAS G. GIRGUS

M151
LANDS N/F
JOHN R. &
THERESA A. PRICE

M152
LANDS N/F
ERIC P. & MAURA L.
SULLIVAN

M153
LANDS N/F
SERGIO LUIZ V.
DEBRITO

M154
LANDS N/F
MICHAEL K. &
NATASHA D. COTE

M155
LANDS N/F
YONKIN FAMILY
REVOCABLE TRUST

GRID

EXIST. L.A.R.O.W. 10353

EXIT 12
SOUTHBOUND ON-RAMP

BACK RIVER ROAD

EXIST. L.A.R.O.W. P2650E

F.E. EVERETT TURNPIKE
CONSTRUCTION ℄

F.E. EVERETT TURNPIKE

1144 1145 1146 1147 1148 1149 1150 1151 1152 1153 1154 1155 1156

N30°14'42.9"E

ITS CAMERA

EXIT 12
NORTHBOUND OFF-RAMP

no light pole
just base

NON-FIELD
DELINEATED
WETLAND

BEDFORD ROAD

M141
LANDS N/F
ANDREW M. DIANE L. MOORE

M147
LANDS N/F
WALTER E. & MARJORIE
J. JOHNSTON

M148
LANDS N/F
DONZI REALTY LLC

M149
LANDS N/F
JAMES T. DRAPEAU

M150
LANDS N/F
KELLER REALTY TRUST

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

- # — WETLAND DESIGNATION NUMBER
- # — WETLAND IMPACT LOCATION
- # — WETLAND MITIGATION AREA
- MITIGATION

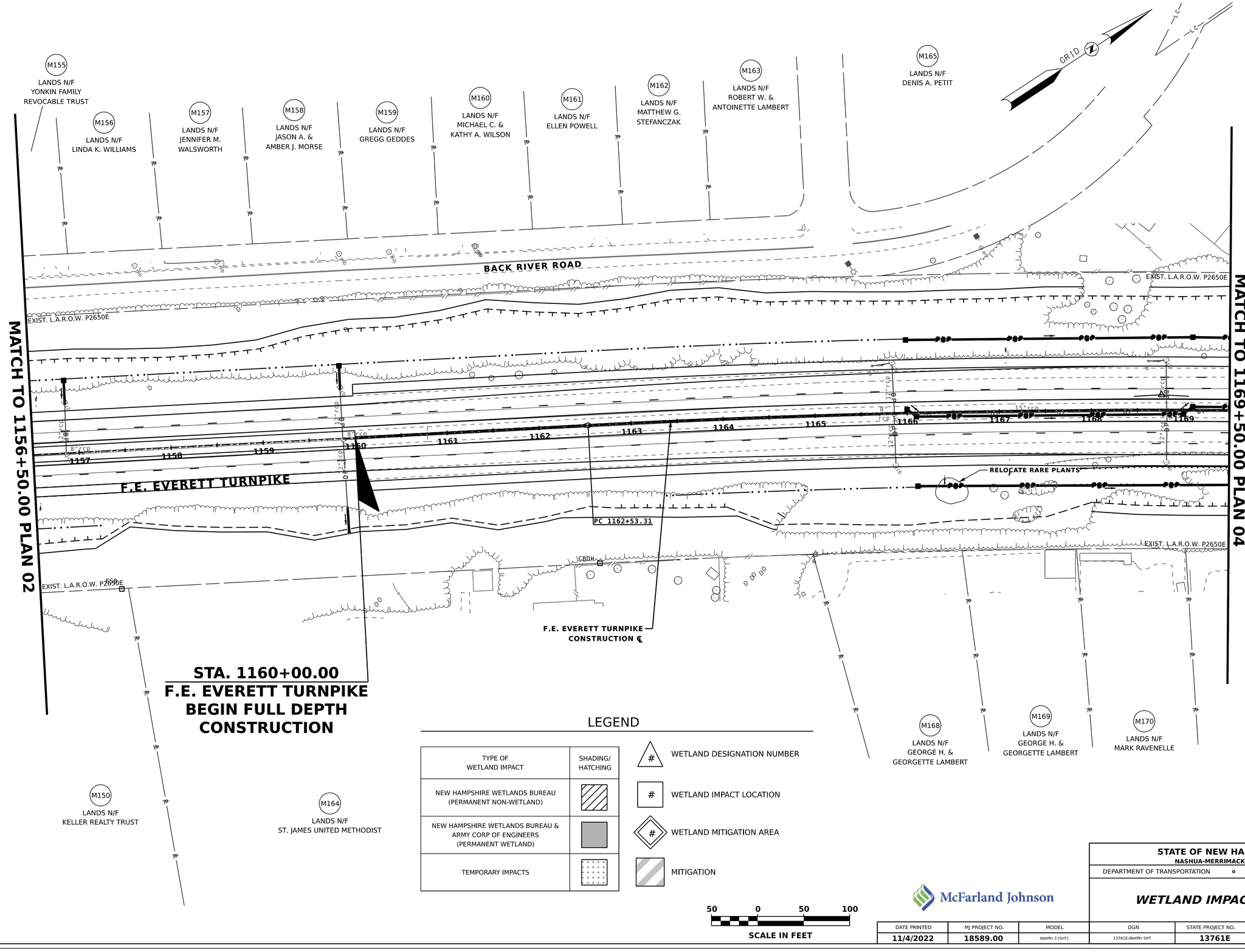
50 0 50 100
SCALE IN FEET

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLAN 02

McFarland Johnson

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	WetPln 2 [SHT]	13761E-WetPln SHT	13761E	6	19



REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	DATE	STATION

	DATE
SDR PROCESSED	
NEW DESIGN	
SHEET CHECKED	
AS BUILT DETAILS	

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLAN 03

McFarland Johnson

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	WetPln 3 [SHT]	13761E-WetPln SHT	13761E	7	19

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

- # — WETLAND DESIGNATION NUMBER
- # — WETLAND IMPACT LOCATION
- # — WETLAND MITIGATION AREA
- MITIGATION

MATCH TO 1169+50.00 PLAN 03

MATCH TO 1183+50.00 PLAN 05

M166
LANDS N/F
NORMAN W. & VIRGINA BARTLETT

M167
LANDS N/F
STATE OF NEW HAMPSHIRE

M167
LANDS N/F
STATE OF NEW HAMPSHIRE

GRID

EXIST. L.A.R.O.W. P2650E

F.E. EVERETT TURNPIKE
CONSTRUCTION ℄

TEMPORARY CONSTRUCTION EASEMENT

F.E. EVERETT TURNPIKE

C

3
PFO1E

CBDH

D

4
PFO1E

2
PFO1E

B

PFO1Bd

PSS1E

PT 1174+99.00

M174
LANDS N/F
JEROME P. & JUDITH A. HILL

M177
LANDS N/F
MOOSE MOUNTAIN REALTY TRUST

PROPOSED SOUNDWALL

100

FEET NB STA. 1183+00.00, RT 97.00' = SOUNDWALL STA. 100+00.00

J

5
R4SB4J

MAINTENANCE ACCESS

PFO1E

M171
LANDS N/F
KIM E. & DENIS MICHAUD

M172
LANDS N/F
WILLEY REAL ESTATE LLC

M173
LANDS N/F
BHL REAL ESTATE HOLDING LLC

M175
LANDS N/F
DAVID C. & SYLVIA HUNTER

M176
LANDS N/F
HAL & LOUIS KLIPPER

M177
LANDS N/F
MOOSE MOUNTAIN REALTY TRUST

1170 1171 1172 1173 1174 1175 1176 1177 1178 1179 1180 1181 1182 1183

50 0 50 100
SCALE IN FEET

McFarland Johnson

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLAN 04

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	WetPln 4 [SHT]	13761E-WetPln SHT	13761E	8	19

NUMBER	DATE	STATION	DESCRIPTION

REVISIONS AFTER PROPOSAL

SDR PROCESSED	DATE
NEW DESIGN	DATE
SHEET CHECKED	DATE
AS BUILT DETAILS	DATE

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

WETLAND DESIGNATION NUMBER

WETLAND IMPACT LOCATION

WETLAND MITIGATION AREA

MITIGATION

GRID

M179
LANDS N/F
STATE OF NEW HAMPSHIRE

M167
LANDS N/F
STATE OF NEW HAMPSHIRE

TEMPORARY CONSTRUCTION EASEMENT

PROPOSED L.A.R.O.W.

PROPOSED L.A.R.O.W.

PROPOSED L.A.R.O.W.

PFO1E

PFO1E

EXIST. L.A.R.O.W. P2650E

EXIST. L.A.R.O.W. P2650E

MATCH TO 1183+50.00 PLAN 04

MATCH TO 1195+50.00 PLAN 06

F.E. EVERETT TURNPIKE

N36°27'05.6"E

1184 1185 1186 1187 1188 1189 1190 1191 1192 1193 1194 1195

101 102 103 104 105 106 107 108 109 110 111 112

F.E. EVERETT TURNPIKE
CONSTRUCTION ℄

EXIST. L.A.R.O.W. P2650E

EXIST. L.A.R.O.W. P2650E

DUMPLING BROOK

TEMPORARY PIPE EXTENSION (SEE NOTES)

TEMPORARY CUT LINE

PROPOSED SOUNDWALL

PERMANENT FILL LINE

TEMPORARY SHORING

TEMPORARY CHANNEL
(SEE NOTES)

MAINTENANCE ACCESS

R2UB2

R2UB2

M178
LANDS N/F
WEBSTER GREEN SUBDIVISION
145 HOUSING UNITS

50 0 50 100
SCALE IN FEET

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

	DATE
SDR PROCESSED	
NEW DESIGN	
SHEET CHECKED	
AS BUILT DETAILS	

McFarland Johnson

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLAN 05

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	WetPln 5 [SHT]	13761E-WetPln SHT	13761E	9	19

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

WETLAND DESIGNATION NUMBER

WETLAND IMPACT LOCATION

WETLAND MITIGATION AREA

MITIGATION

M179
LANDS N/F
STATE OF NEW HAMPSHIRE

GRID N

STA. 1206+50.00
F.E. EVERETT TURNPIKE
END FULL DEPTH
CONSTRUCTION

MATCH TO 1195+50.00 PLAN 05

MATCH TO 1209+50.00 PLAN 07

8
PEM1E

H

F.E. EVERETT TURNPIKE CONSTRUCTION ℄

FSB

EXIST. L.A.R.O.W. P2650E

CBDH

PC 1207+22.27

F.E. EVERETT TURNPIKE

N36°27'05.6"E

113 114 1196 1197 1198 1199 1200 1201 1202 1203 1204 1205 1206 1207 1208 1209

PROPOSED SOUNDWALL

FEET NB STA. 1197+60.00, RT 97.0' = SOUNDWALL STA. 114+60.00

M180
LANDS N/F
SOUTHERN NEW HAMPSHIRE
MEDICAL

M181
LANDS N/F
GOLD CHARM PROPERTIES LLC

M182
LANDS N/F
MAPLE RIDGE SUBDIVISION
72 UNITS

50 0 50 100
SCALE IN FEET

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	DATE

	DATE
SDR PROCESSED	
NEW DESIGN	
SHEET CHECKED	
AS BUILT DETAILS	

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLAN 06

McFarland Johnson

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	WetPln 6 [SHT]	13761E-WetPln SHT	13761E	10	19

M179
LANDS N/F
STATE OF NEW HAMPSHIRE

GRID N

MATCH TO 1209+50.00 PLAN 06

EXIST. L.A.R.O.W. P2650E

PF01/4

CBDH

STA. 1221+00.00
F.E. EVERETT TURNPIKE
LIMIT OF WORK

F.E. EVERETT TURNPIKE
CONSTRUCTION ℄

EXIST. L.A.R.O.W. P2650E

1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223

15" rcp

15" 6" rcp

F.E. EVERETT TURNPIKE

ITS CAMERA

EXIST. L.A.R.O.W. P2650E

PF01

EXISTING SOUNDWALL

M184
LANDS N/F
746 DWH LLC

M183
LANDS N/F
MM REALTY TRUST

M182
LANDS N/F
MAPLE RIDGE SUBDIVISION
72 UNITS

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

WETLAND DESIGNATION NUMBER

WETLAND IMPACT LOCATION

WETLAND MITIGATION AREA

MITIGATION

50 0 50 100
SCALE IN FEET

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	STATION	DESCRIPTION

SDR PROCESSED	DATE
NEW DESIGN	DATE
SHEET CHECKED	DATE
AS BUILT DETAILS	DATE

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

McFarland Johnson

WETLAND IMPACT PLAN 07

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	WetPln 7 [SHT]	13761E-WetPln SHT	13761E	11	19

EROSION CONTROL STRATEGIES

1. ENVIRONMENTAL COMMITMENTS:
   1.1. THESE GUIDELINES DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH ANY CONTRACT PROVISIONS, OR APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
   1.2. THIS PROJECT WILL BE SUBJECT TO THE US EPA'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT AS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROJECT IS SUBJECT TO REQUIREMENTS IN THE MOST RECENT CONSTRUCTION GENERAL PERMIT (CGP).
   1.3. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE NHDES WETLAND PERMIT, THE US ARMY CORPS OF ENGINEERS PERMIT, WATER QUALITY CERTIFICATION AND THE SPECIAL ATTENTION ITEMS INCLUDED IN THE CONTRACT DOCUMENTS.
   1.4. ALL STORM WATER, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2008) (BMP MANUAL) AVAILABLE FROM THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NHDES).
   1.5. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17, AND ALL, PUBLISHED NHDES ALTERATION OF TERRAIN ENV-WQ 1500 REQUIREMENTS (HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM)
   1.6. THE CONTRACTOR IS DIRECTED TO REVIEW AND COMPLY WITH SECTION 107.1 OF THE CONTRACT AS IT REFERS TO SPILLAGE, AND ALSO WITH REGARDS TO EROSION, POLLUTION, AND TURBIDITY PRECAUTIONS.

2. STANDARD EROSION CONTROL SEQUENCING APPLICABLE TO ALL CONSTRUCTION PROJECTS:
   2.1. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. PERIMETER CONTROLS AND STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AS SHOWN IN THE BMP MANUAL AND AS DIRECTED BY THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARER.
   2.2. EROSION, SEDIMENTATION CONTROL MEASURES AND INFILTRATION BASINS SHALL BE CLEANED, REPLACED AND AUGMENTED AS NECESSARY TO PREVENT SEDIMENTATION BEYOND PROJECT LIMITS THROUGHOUT THE PROJECT DURATION.
   2.3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 645 OF THE NHDOT SPECIFICATIONS FOR ROAD AND BRIDGES CONSTRUCTION.
   2.4. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
      (A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
      (B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
      (C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED;
      (D) TEMPORARY SLOPE STABILIZATION CONFORMING TO TABLE 1 HAS BEEN PROPERLY INSTALLED
   2.5. ALL STOCKPILES SHALL BE CONTAINED WITH A PERIMETER CONTROL. IF THE STOCKPILE IS TO REMAIN UNDISTURBED FOR MORE THAN 14 DAYS, MULCHING WILL BE REQUIRED.
   2.6. A WATER TRUCK SHALL BE AVAILABLE TO CONTROL EXCESSIVE DUST AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR.
   2.7. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN UNTIL THE AREA HAS BEEN PERMANENTLY STABILIZED.
   2.8. CONSTRUCTION PERFORMED ANY TIME BETWEEN NOVEMBER 30" AND MAY 1" OF ANY YEAR SHALL BE CONSIDERED WINTER CONSTRUCTION AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
      (A) ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED IN ACCORDANCE WITH TABLE 1.
      (B) ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.
      (C) AFTER NOVEMBER 30" INCOMPLETE ROAD SURFACES, WHERE WORK HAS STOPPED FOR THE SEASON, SHALL BE PROTECTED IN ACCORDANCE WITH TABLE 1.
      (D) WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE PROJECT IS WITHOUT STABILIZATION AT ONE TIME, UNLESS A WINTER CONSTRUCTION PLAN HAS BEEN APPROVED BY NHDOT THAT MEETS THE REQUIREMENTS OF ENV-WQ 1505.02 AND ENV-WQ 1505.05.
      (E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WQ 1505.05) AND INCLUDING THE REQUIREMENTS OF NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30".

GENERAL CONSTRUCTION PLANNING AND SELECTION OF STRATEGIES TO CONTROL EROSION AND SEDIMENT ON HIGHWAY CONSTRUCTION PROJECTS

3. PLAN ACTIVITIES TO ACCOUNT FOR SENSITIVE SITE CONDITIONS:
   3.1. CLEARLY FLAG AREAS TO BE PROTECTED IN THE FIELD AND PROVIDE CONSTRUCTION BARRIERS TO PREVENT TRAFFICKING OUTSIDE OF WORK AREAS.
   3.2. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS.
   3.3. PROTECT AND MAXIMIZE EXISTING NATIVE VEGETATION AND NATURAL FOREST BUFFERS BETWEEN CONSTRUCTION ACTIVITY AND SENSITIVE AREAS.
   3.4. WHEN WORK IS PERFORMED IN AND NEAR WATER COURSES, STREAM FLOW DIVERSION METHODS SHALL BE IMPLEMENTED PRIOR TO ANY EXCAVATION OR FILLING.
   3.5. WHEN WORK IS PERFORMED WITHIN 50 FEET OF SURFACE WATERS (WETLAND, OPEN WATER OR FLOWING WATER), PERIMETER CONTROL SHALL BE ENHANCED CONSISTENT WITH SECTION 2.1.2.1. OF THE 2012 NPDES CONSTRUCTION GENERAL PERMIT.

4. MINIMIZE THE AMOUNT OF EXPOSED SOIL:
   4.1. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS. MINIMIZE THE AREA OF EXPOSED SOIL AT ANY ONE TIME. PHASING SHALL BE USED TO REDUCE THE AMOUNT AND DURATION OF SOIL EXPOSED TO THE ELEMENTS AND VEHICLE TRACKING.
   4.2. UTILIZE TEMPORARY MULCHING OR PROVIDE ALTERNATE TEMPORARY STABILIZATION ON EXPOSED SOILS IN ACCORDANCE WITH TABLE 1.
   4.3. THE MAXIMUM AMOUNT OF DISTURBED EARTH SHALL NOT EXCEED A TOTAL OF 5 ACRES FROM MAY 1" THROUGH NOVEMBER 30", OR EXCEED ONE ACRE DURING WINTER MONTHS, UNLESS THE CONTRACTOR DEMONSTRATES TO THE DEPARTMENT THAT THE ADDITIONAL AREA OF DISTURBANCE IS NECESSARY TO MEET THE CONTRACTORS CRITICAL PATH METHOD SCHEDULE (CPM), AND THE CONTRACTOR HAS ADEQUATE RESOURCES AVAILABLE TO ENSURE THAT ENVIRONMENTAL COMMITMENTS WILL BE MET.

5. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT:
   5.1. DIVERT OFF SITE RUNOFF OR CLEAN WATER AWAY FROM THE CONSTRUCTION ACTIVITY TO REDUCE THE VOLUME THAT NEEDS TO BE TREATED ON SITE.
   5.2. DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM DISTURBED AREAS, SLOPES, AND AROUND ACTIVE WORK AREAS AND TO A STABILIZED OUTLET LOCATION.
   5.3. CONSTRUCT IMPERMEABLE BARRIERS AS NECESSARY TO COLLECT OR DIVERT CONCENTRATED FLOWS FROM WORK OR DISTURBED AREAS.
   5.4. STABILIZE, TO APPROPRIATE ANTICIPATED VELOCITIES, CONVEYANCE CHANNELS OR PUMPING SYSTEMS NEEDED TO CONVEY CONSTRUCTION STORMWATER TO BASINS AND DISCHARGE LOCATIONS PRIOR TO USE.
   5.5. DIVERT OFF-SITE WATER THROUGH THE PROJECT IN AN APPROPRIATE MANNER SO NOT TO DISTURB THE UPSTREAM OR DOWNSTREAM SOILS, VEGETATION OR HYDROLOGY BEYOND THE PERMITTED AREA.

6. PROTECT SLOPES:
   6.1. INTERCEPT AND DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED AND NEWLY ESTABLISHED AREAS AND SLOPES TO A STABILIZED OUTLET OR CONVEYANCE.
   6.2. CONSIDER HOW GROUNDWATER SEEPAGE ON CUT SLOPES MAY IMPACT SLOPE STABILITY AND INCORPORATE APPROPRIATE MEASURES TO MINIMIZE EROSION.
   6.3. CONVEY STORMWATER DOWN THE SLOPE IN A STABILIZED CHANNEL OR SLOPE DRAIN.
   6.4. THE OUTER FACE OF THE FILL SLOPE SHOULD BE IN A LOOSE RUFFLED CONDITION PRIOR TO TURF ESTABLISHMENT. TOPSOIL OR HUMUS LAYERS SHALL BE TRACKED UP AND DOWN THE SLOPE, DISKED, HARROWED, DRAGGED WITH A CHAIN OR MAT, MACHINE-RAKED, OR HAND-WORKED TO PRODUCE A RUFFLED SURFACE.

7. ESTABLISH STABILIZED CONSTRUCTION EXITS:
   7.1. INSTALL AND MAINTAIN CONSTRUCTION EXITS, ANYWHERE TRAFFIC LEAVES A CONSTRUCTION SITE ONTO A PUBLIC RIGHT-OF-WAY.
   7.2. SWEEP ALL CONSTRUCTION RELATED DEBRIS AND SOIL FROM THE ADJACENT PAVED ROADWAYS AS NECESSARY.

8. PROTECT STORM DRAIN INLETS:
   8.1. DIVERT SEDIMENT LADEN WATER AWAY FROM INLET STRUCTURES TO THE EXTENT POSSIBLE.
   8.2. INSTALL SEDIMENT BARRIERS AND SEDIMENT TRAPS AT INLETS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM.
   8.3. CLEAN CATCH BASINS, DRAINAGE PIPES, AND CULVERTS IF SIGNIFICANT SEDIMENT IS DEPOSITED.
   8.4. DROP INLET SEDIMENT BARRIERS SHOULD NEVER BE USED AS THE PRIMARY MEANS OF SEDIMENT CONTROL AND SHOULD ONLY BE USED TO PROVIDE AN ADDITIONAL LEVEL OF PROTECTION TO STRUCTURES AND DOWN-GRADIENT SENSITIVE RECEPTORS.

9. SOIL STABILIZATION:
   9.1. WITHIN THREE DAYS OF THE LAST ACTIVITY IN AN AREA, ALL EXPOSED SOIL AREAS, WHERE CONSTRUCTION ACTIVITIES ARE COMPLETE, SHALL BE STABILIZED.
   9.2. IN ALL AREAS, TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED IN ACCORDANCE WITH THE STABILIZATION REQUIREMENTS (SECTION 2.2) OF THE 2012 CGP. (SEE TABLE 1 FOR GUIDANCE ON THE SELECTION OF TEMPORARY SOIL STABILIZATION MEASURES.)
   9.3. EROSION CONTROL SEED MIX SHALL BE SOWN IN ALL INACTIVE CONSTRUCTION AREAS THAT WILL NOT BE PERMANENTLY SEEDED WITHIN TWO WEEKS OF DISTURBANCE AND PRIOR TO SEPTEMBER 15, OF ANY GIVEN YEAR, IN ORDER TO ACHIEVE VEGETATIVE STABILIZATION PRIOR TO THE END OF THE GROWING SEASON.
   9.4. SOIL TACKIFIERS MAY BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND REAPPLIED AS NECESSARY TO MINIMIZE SOIL AND MULCH LOSS UNTIL PERMANENT VEGETATION IS ESTABLISHED.

10. RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES:
   10.1. TEMPORARY SEDIMENT BASINS (CGP-SECTION 2.1.3.2) OR SEDIMENT TRAPS (ENV-WQ 1506.10) SHALL BE SIZED TO RETAIN, ON SITE, THE VOLUME OF A 2-YEAR 24-HOUR STORM EVENT FOR ANY AREA OF DISTURBANCE OR 3,600 CUBIC FEET OF STORMWATER RUNOFF PER ACRE OF DISTURBANCE, WHICHEVER IS GREATER.
   TEMPORARY SEDIMENT BASINS USED TO TREAT STORMWATER RUNOFF FROM AREAS GREATER THAN 5-ACRES OF DISTURBANCE SHALL BE SIZED TO ALSO CONTROL STORMWATER RUNOFF FROM A 10-YEAR 24 HOUR STORM EVENT. ON-SITE RETENTION OF THE 10-YEAR 24-HOUR EVENT IS NOT REQUIRED.
   10.2. CONSTRUCT AND STABILIZE DEWATERING INFILTRATION BASINS PRIOR TO ANY EXCAVATION THAT MAY REQUIRE DEWATERING.
   10.3. TEMPORARY SEDIMENT BASINS OR TRAPS SHALL BE PLACED AND STABILIZED AT LOCATIONS WHERE CONCENTRATED FLOW (CHANNELS AND PIPES) DISCHARGE TO THE SURROUNDING ENVIRONMENT FROM AREAS OF UNSTABILIZED EARTH DISTURBING ACTIVITIES.

11. ADDITIONAL EROSION AND SEDIMENT CONTROL GENERAL PRACTICES:
   11.1. USE TEMPORARY MULCHING, PERMANENT MULCHING, TEMPORARY VEGETATIVE COVER, AND PERMANENT VEGETATIVE COVER TO REDUCE THE NEED FOR DUST CONTROL. USE MECHANICAL SWEEPERS ON PAVED SURFACES WHERE NECESSARY TO PREVENT DUST BUILDUP. APPLY WATER, OR OTHER DUST INHIBITING AGENTS OR TACKIFIERS, AS APPROVED BY THE NHDES.
   11.2. ALL STOCKPILES SHALL BE CONTAINED WITH TEMPORARY PERIMETER CONTROLS. INACTIVE SOIL STOCKPILES SHOULD BE PROTECTED WITH SOIL STABILIZATION MEASURES (TEMPORARY EROSION CONTROL SEED MIX AND MULCH, SOIL BINDER) OR COVERED WITH ANCHORED TARPS.
   11.3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH SECTION 645 OF NHDOT SPECIFICATIONS, WEEKLY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 IN. OF RAIN PER 24-HOUR PERIOD. EROSION AND SEDIMENT CONTROL MEASURES WILL ALSO BE INSPECTED IN ACCORDANCE WITH THE GUIDANCE MEMO FROM THE NHDES CONTAINED WITHIN THE CONTRACT PROPOSAL AND THE EPA CONSTRUCTION GENERAL PERMIT.
   11.4. THE CONTRACTOR SHOULD UTILIZE STORM DRAIN INLET PROTECTION TO PREVENT SEDIMENT FROM ENTERING A STORM DRAINAGE SYSTEM PRIOR TO THE PERMANENT STABILIZATION OF THE CONTRIBUTING DISTURBED AREA.
   11.5. PERMANENT STABILIZATION MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS TO STABILIZE AREAS. VEGETATIVE STABILIZATION SHALL NOT BE CONSIDERED PERMANENTLY STABILIZED UNTIL VEGETATIVE GROWTH COVERS AT LEAST 85% OF THE DISTURBED AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL FOR ONE YEAR AFTER PROJECT COMPLETION.
   11.6. CATCH BASINS: CARE SHALL BE TAKEN TO ENSURE THAT SEDIMENTS DO NOT ENTER ANY EXISTING CATCH BASINS DURING CONSTRUCTION. THE CONTRACTOR SHALL PLACE TEMPORARY STONE INLET PROTECTION OVER INLETS IN AREAS OF SOIL DISTURBANCE THAT ARE SUBJECT TO SEDIMENT CONTAMINATION.
   11.7. TEMPORARY AND PERMANENT DITCHES SHALL BE CONSTRUCTED, STABILIZED AND MAINTAINED IN A MANNER THAT WILL MINIMIZE SCOUR. TEMPORARY AND PERMANENT DITCHES SHALL BE DIRECTED TO DRAIN TO SEDIMENT BASINS OR STORM WATER COLLECTION AREAS.
   11.8. WINTER EXCAVATION AND EARTHWORK ACTIVITIES NEED TO BE LIMITED IN EXTENT AND DURATION, TO MINIMIZE POTENTIAL EROSION AND SEDIMENTATION IMPACTS. THE AREA OF EXPOSED SOIL SHALL BE LIMITED TO ONE ACRE, OR THAT WHICH CAN BE STABILIZED AT THE END OF EACH DAY UNLESS A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.
   11.9. CHANNEL PROTECTION MEASURES SHALL BE SUPPLEMENTED WITH PERIMETER CONTROL MEASURES WHEN THE DITCH LINES OCCUR AT THE BOTTOM OF LONG FILL SLOPES. THE PERIMETER CONTROLS SHALL BE INSTALLED ON THE FILL SLOPE TO MINIMIZE THE POTENTIAL FOR FILL SLOPE SEDIMENT DEPOSITS IN THE DITCH LINE.

BEST MANAGEMENT PRACTICES (BMP) BASED ON AMOUNT OF OPEN CONSTRUCTION AREA

12. STRATEGIES SPECIFIC TO OPEN AREAS LESS THAN 5 ACRES:
   12.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500; ALTERATION OF TERRAIN FOR CONSTRUCTION AND USE ALL CONVENTIONAL BMP STRATEGIES.
   12.2. SLOPES STEEPER THAN 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING.
   12.3. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT ALONE.
   12.4. AREAS WHERE HAUL ROADS ARE CONSTRUCTED AND STORMWATER CANNOT BE TREATED THE DEPARTMENT WILL CONSIDER INFILTRATION.
   12.5. FOR HAUL ROADS ADJACENT TO SENSITIVE ENVIRONMENTAL AREAS OR STEEPER THAN 5%, THE DEPARTMENT WILL CONSIDER USING EROSION STONE, CRUSHED GRAVEL, OR CRUSHED STONE BASE TO HELP MINIMIZE EROSION ISSUES.
   12.6. ALL AREAS THAT CAN BE STABILIZED SHALL BE STABILIZED PRIOR TO OPENING UP NEW TERRITORY.
   12.7. DETENTION BASINS SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE A 2 YEAR STORM EVENT.

13. STRATEGIES SPECIFIC TO OPEN AREAS BETWEEN 5 AND 10 ACRES:
   13.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES WILL BE UTILIZED.
   13.2. DETENTION BASINS WILL BE CONSTRUCTED TO ACCOMMODATE THE 2-YEAR 24-HOUR STORM EVENT AND CONTROL A 10-YEAR 24-HOUR STORM EVENT.
   13.3. SLOPES STEEPER THAN A 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS. OTHER ALTERNATIVE MEASURES, SUCH AS BONDED FIBER MATRIXES (BFMS) OR FLEXIBLE GROWTH MEDIUMS (FGMS) MAY BE UTILIZED, IF MEETING THE NHDES APPROVALS AND REGULATIONS.
   13.4. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS.

14. STRATEGIES SPECIFIC TO OPEN AREAS OVER 10 ACRES:
   14.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES AND BETWEEN 5 AND 10 ACRES WILL BE UTILIZED.
   14.2. THE DEPARTMENT ANTICIPATES THAT SOIL BINDERS WILL BE NEEDED ON ALL SLOPES STEEPER THAN 3:1, IN ORDER TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF SEDIMENT IN THE STORMWATER TREATMENT BASINS.
   14.3. THE CONTRACTOR WILL BE REQUIRED TO HAVE AN APPROVED DESIGN IN ACCORDANCE WITH ENV-WQ 1506.12 FOR AN ACTIVE FLOCCULANT TREATMENT SYSTEM TO TREAT AND RELEASE WATER CAPTURED IN STORM WATER BASINS. THE CONTRACTOR SHALL ALSO RETAIN THE SERVICES OF AN ENVIRONMENTAL CONSULTANT WHO HAS DEMONSTRATED EXPERIENCE IN THE DESIGN OF FLOCCULANT TREATMENT SYSTEMS. THE CONSULTANT WILL ALSO BE RESPONSIBLE FOR THE IMPLEMENTATION AND MONITORING OF THE SYSTEM.

TABLE 1
GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES [2]				ROLLED EROSION CONTROL BLANKETS [3]			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES [1]												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES [1]	YES [1]	YES	YES	NO	NO	YES	YES	NO	YES	YES	YES
3:1 SLOPE	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO
4:1 SLOPE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO
WINTER STABILIZATION	4T/AC	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
CHANNELS												
LOW FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
HIGH FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE
HMT	HAY MULCH & TACK	HM	HYDRAULIC MULCH	SNSB	SINGLE NET STRAW BLANKET
WC	WOOD CHIPS	SMM	STABILIZED MULCH MATRIX	DNSB	DOUBLE NET STRAW BLANKET
SG	STUMP GRINDINGS	BFM	BONDED FIBER MATRIX	DNSCB	2 NET STRAW-COCONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCB	2 NET COCONUT BLANKET

NOTES:
1. ALL SLOPE STABILIZATION OPTIONS ASSUME A SLOPE LENGTH \10 TIMES THE HORIZONTAL DISTANCE COMPONENT OF THE SLOPE, IN FEET.
2. PRODUCTS CONTAINING POLYACRYLAMIDE (PAM) SHALL NOT BE APPLIED DIRECTLY TO OR WITHIN 100 FEET OF ANY SURFACE WATER WITHOUT PRIOR WRITTEN APPROVAL FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.
3. ALL EROSION CONTROL BLANKETS SHALL BE MADE WITH WILDLIFE FRIENDLY BIODEGRADABLE NETTING.

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

EROSION CONTROL STRATEGIES

	REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
erosstrat [SHT]	02-25-2022	13761E-State Dtls SHT	13761E	12	19

EROSION CONTROL PLAN LEGEND

PC — PC	PERIMETER CONTROL
	SILT FENCE
	EROSION CONTROL MIX BERM
	EROSION CONTROL MIX SOX
	TURBIDITY CURTAIN
	SHEET PILE
	COFFER DAM
NB/PC — NB/PC	NATURAL BUFFER/PERIMETER CONTROL
	SILT FENCE
	EROSION CONTROL MIX BERM
	EROSION CONTROL MIX SOX
	TURBIDITY CURTAIN
	SHEET PILE
	COFFER DAM
CP — CP — CP	CHANNEL PROTECTION
CP — CP — CP	STONE CHECK DAMS
	STRAW WATTLES
	CHANNEL MATTING
	CLASS D EROSION STONE
	CLASS C STONE
CWB — CWB — CWB	CLEAN WATER BYPASS
CWB — CWB — CWB	PUMP THROUGH PIPE
	DRAIN THROUGH PIPE OR CHANNEL

M130
LANDS N/F
MARIE VAN DE WEGHE

M131
LANDS N/F
JASON CHAMPIGNY

M137
LANDS N/F
JOSEPH N. &
CHERYL M. STRUBE

M138
LANDS N/F
HAROLD W. & BARBARA A. WATSON

EXIST. L.A.R.O.W. P2650E

EXIST. L.A.R.O.W. 10353

GRID

STA. 1137+00.00
F.E. EVERETT TURNPIKE
LIMIT OF WORK

F.E. EVERETT TURNPIKE

F.E. EVERETT TURNPIKE
CONSTRUCTION ℄

EXIT 12
SOUTHBOUND ON-RAMP

EXIT 12
NORTHBOUND OFF-RAMP

PT 1140+46.73

MATCH TO 1143+50.00 PLAN 02

N30°14'42.9"E

M133
LANDS N/F
STATE OF NEW HAMPSHIRE

M132
LANDS N/F
ROUTE 3 MERRIMACK BB LLC

M134
LANDS N/F
CHAPLE LANE

M139
LANDS N/F
LAWRENCE C. WRIGHT

M140
LANDS N/F
BRADFORD A. &
KARIN M. KNIGHT

M141
LANDS N/F
ANDREW M. DIANE L. MOORE

HARRIS AVENUE

50 0 50 100
SCALE IN FEET

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	DATE	STATION

SDR PROCESSED	DATE
NEW DESIGN	DATE
SHEET CHECKED	DATE
AS BUILT DETAILS	DATE

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLAN 01

McFarland Johnson

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	EroPln 1 [SHT]	13761E-EroPln SHT	13761E	13	19

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

	DATE
SDR PROCESSED	
NEW DESIGN	
SHEET CHECKED	
AS BUILT DETAILS	

MATCH TO 1143+50.00 PLAN 01

MATCH TO 1156+50.00 PLAN 03

M142
LANDS N/F
HAROLD W. & BARBARA A. WATSON

M145
LANDS N/F
NICHOLAS G. GIRGUS

M151
LANDS N/F
JOHN R. & THERESA A. PRICE

M152
LANDS N/F
ERIC P. & MAURA L. SULLIVAN

M153
LANDS N/F
SERGIO LUIZ V. DEBRITO

M154
LANDS N/F
MICHAEL K. & NATASHA D. COTE

M155
LANDS N/F
YONKIN FAMILY REVOCABLE TRUST

M150
LANDS N/F
KELLER REALTY TRUST

M149
LANDS N/F
JAMES T. DRAPEAU

M146
LANDS N/F
EXIT 12 REALTY LLC

M141
LANDS N/F
ANDREW M. DIANE L. MOORE

EXIST. L.A.R.O.W. 10353

EXIST. L.A.R.O.W. P2650E

EXIT 12
SOUTHBOUND ON-RAMP

EXIT 12
NORTHBOUND OFF-RAMP

BACK RIVER ROAD

BEDFORD ROAD

F.E. EVERETT TURNPIKE
CONSTRUCTION ℄

F.E. EVERETT TURNPIKE

ITS CAMERA

NON-FIELD DELINEATED WETLAND

1 PSS1E

N30°14'42.9"E

1144 1145 1146 1147 1148 1149 1150 1151 1152 1153 1154 1155 1156

EROSION CONTROL PLAN LEGEND

PERIMETER CONTROL
- SILT FENCE
- EROSION CONTROL MIX BERM
- EROSION CONTROL MIX SOX
- TURBIDITY CURTAIN
- SHEET PILE
- COFFER DAM

NATURAL BUFFER/PERIMETER CONTROL
- SILT FENCE
- EROSION CONTROL MIX BERM
- EROSION CONTROL MIX SOX
- TURBIDITY CURTAIN
- SHEET PILE
- COFFER DAM

CHANNEL PROTECTION
- STONE CHECK DAMS
- STRAW WATTLES
- CHANNEL MATTING
- CLASS D EROSION STONE
- CLASS C STONE

CLEAN WATER BYPASS
- PUMP THROUGH PIPE
- DRAIN THROUGH PIPE OR CHANNEL

50 0 50 100
SCALE IN FEET

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLAN 02

McFarland Johnson

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	EroPln 2 (SHT)	13761E-EroPln SHT	13761E	14	19

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE

MATCH TO 1156+50.00 PLAN 02

MATCH TO 1169+50.00 PLAN 04

M155 LANDS N/F YONKIN FAMILY REVOCABLE TRUST
M156 LANDS N/F LINDA K. WILLIAMS
M157 LANDS N/F JENNIFER M. WALSWORTH
M158 LANDS N/F JASON A. & AMBER J. MORSE
M159 LANDS N/F GREGG GEDDES
M160 LANDS N/F MICHAEL C. & KATHY A. WILSON
M161 LANDS N/F ELLEN POWELL
M162 LANDS N/F MATTHEW G. STEFANCZAK
M163 LANDS N/F ROBERT W. & ANTOINETTE LAMBERT
M165 LANDS N/F DENIS A. PETIT

BACK RIVER ROAD

EXIST. L.A.R.O.W. P2650E

F.E. EVERETT TURNPIKE

PC 1162+53.31

RELOCATE RARE PLANTS

F.E. EVERETT TURNPIKE CONSTRUCTION ℄

STA. 1160+00.00
F.E. EVERETT TURNPIKE
BEGIN FULL DEPTH CONSTRUCTION

M150 LANDS N/F KELLER REALTY TRUST

M164 LANDS N/F ST. JAMES UNITED METHODIST

M168 LANDS N/F GEORGE H. & GEORGETTE LAMBERT

M169 LANDS N/F GEORGE H. & GEORGETTE LAMBERT

M170 LANDS N/F MARK RAVENELLE

EROSION CONTROL PLAN LEGEND

- PERIMETER CONTROL
  - SILT FENCE
  - EROSION CONTROL MIX BERM
  - EROSION CONTROL MIX SOX
  - TURBIDITY CURTAIN
  - SHEET PILE
  - COFFER DAM
- NATURAL BUFFER/PERIMETER CONTROL
  - SILT FENCE
  - EROSION CONTROL MIX BERM
  - EROSION CONTROL MIX SOX
  - TURBIDITY CURTAIN
  - SHEET PILE
  - COFFER DAM
- CHANNEL PROTECTION
  - STONE CHECK DAMS
  - STRAW WATTLES
  - CHANNEL MATTING
  - CLASS D EROSION STONE
  - CLASS C STONE
- CLEAN WATER BYPASS
- PUMP THROUGH PIPE
  - DRAIN THROUGH PIPE OR CHANNEL

SCALE IN FEET 50 0 50 100

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLAN 03

McFarland Johnson

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	EroPln 3 [SHT]	13761E-EroPln SHT	13761E	15	19

EROSION CONTROL PLAN LEGEND

PC — PC	PERIMETER CONTROL
	SILT FENCE
	EROSION CONTROL MIX BERM
	EROSION CONTROL MIX SOX
	TURBIDITY CURTAIN
	SHEET PILE
	COFFER DAM
NB/PC — NB/PC	NATURAL BUFFER/PERIMETER CONTROL
	SILT FENCE
	EROSION CONTROL MIX BERM
	EROSION CONTROL MIX SOX
	TURBIDITY CURTAIN
	SHEET PILE
	COFFER DAM
CP CP CP	CHANNEL PROTECTION
CP CP CP	STONE CHECK DAMS
	STRAW WATTLES
	CHANNEL MATTING
	CLASS D EROSION STONE
	CLASS C STONE
CWB CWB CWB	CLEAN WATER BYPASS
CWB CWB CWB	PUMP THROUGH PIPE
	DRAIN THROUGH PIPE OR CHANNEL

MATCH TO 1169+50.00 PLAN 03

MATCH TO 1183+50.00 PLAN 05

M166
LANDS N/F
NORMAN W. & VIRGINA BARTLETT

M167
LANDS N/F
STATE OF NEW HAMPSHIRE

M167
LANDS N/F
STATE OF NEW HAMPSHIRE

GRID

EXIST. L.A.R.O.W. P2650E

F.E. EVERETT TURNPIKE CONSTRUCTION ℄

TEMPORARY CONSTRUCTION EASEMENT

EXIST. L.A.R.O.W.

F.E. EVERETT TURNPIKE

PROPOSED SOUNDWALL

PT 1174+99.00

PSS1E

PFO1E

PFO1Bd

FEET NB STA. 1183+00.00, RT 97.00' = SOUNDWALL STA. 100+00.00

MAINTENANCE ACCESS

M171
LANDS N/F
KIM E. & DENIS MICHAUD

M172
LANDS N/F
WILLEY REAL ESTATE LLC

M173
LANDS N/F
BHL REAL ESTATE HOLDING LLC

M174
LANDS N/F
JEROME P. & JUDITH A. HILL

M175
LANDS N/F
DAVID C. & SYLVIA HUNTER

M176
LANDS N/F
HAL & LOUIS KLIPPER

M177
LANDS N/F
MOOSE MOUNTAIN REALTY TRUST

M177
LANDS N/F
MOOSE MOUNTAIN REALTY TRUST

SCALE IN FEET: 50 0 50 100

McFarland Johnson

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

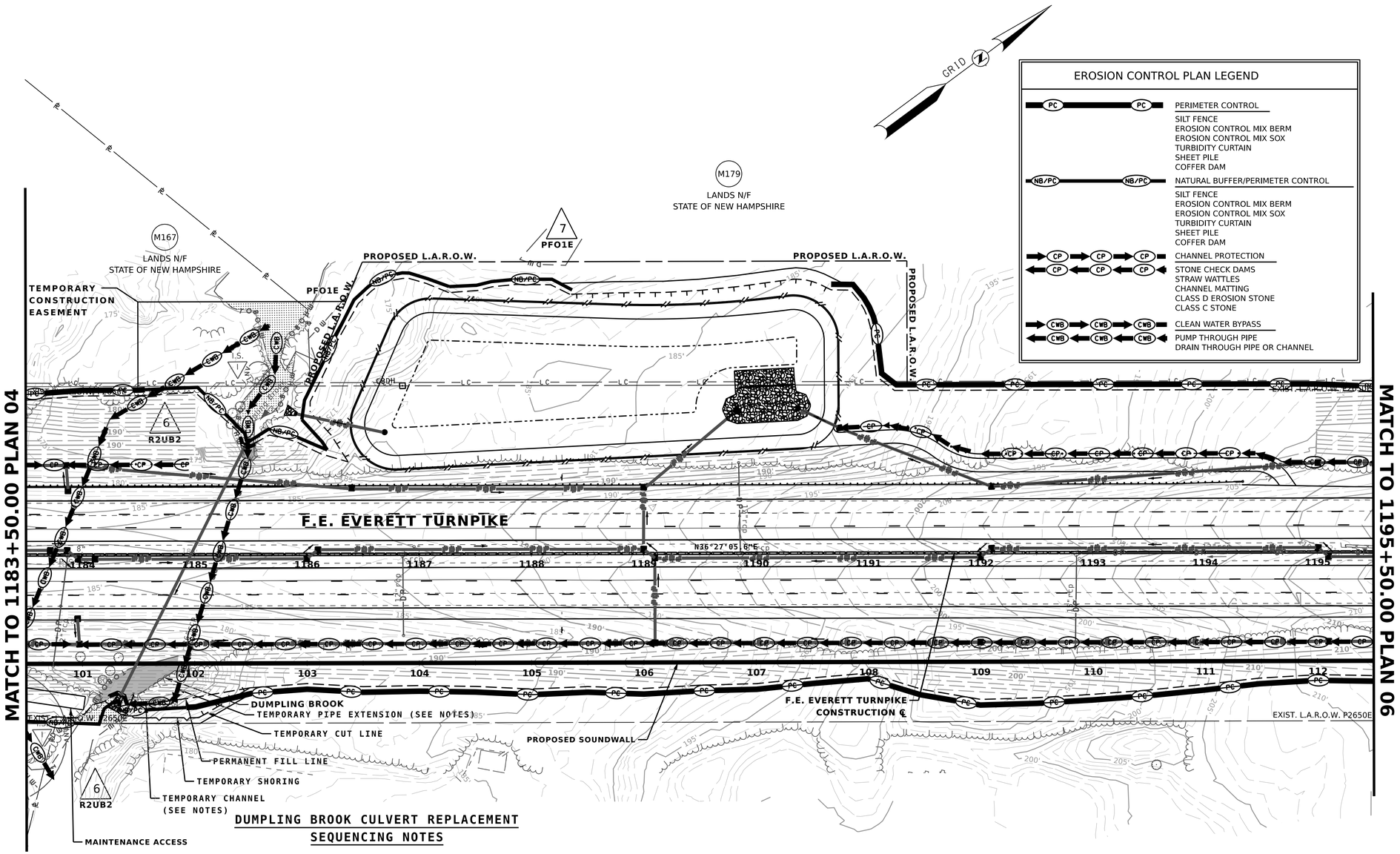
EROSION CONTROL PLAN 04

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	EroPln 4 [SHT]	13761E-EroPln SHT	13761E	16	19

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

	DATE
SDR PROCESSED	
NEW DESIGN	
SHEET CHECKED	
AS BUILT DETAILS	



DUMPLING BROOK CULVERT REPLACEMENT SEQUENCING NOTES

1. TEMPORARILY DIVERT ALL DUMPLING BROOK FLOW INTO EXISTING 24" CULVERT BY INSTALLING WATER DIVERSION AT UPSTREAM END OF EXISTING 36" CULVERT. (1 MONTH)
2. EXTEND EXISTING 36" CULVERT AND CONSTRUCT TEMPORARY CHANNEL AROUND WORK AREA WITHIN EXISTING RIGHT-OF-WAY. PLACE NATURAL STREAMBED MATERIAL IN TEMPORARY CHANNEL.
3. REMOVE TEMPORARY WATER DIVERSION AND RESTORE DUMPLING BROOK FLOW INTO EXISTING 36" CULVERT.
4. CONSTRUCT NEW 42" CULVERT UP TO EXISTING 36" CULVERT HEADWALL. (3 PHASES)
5. TEMPORARILY DIVERT ALL DUMPLING BROOK FLOW INTO EXISTING 24" CULVERT BY INSTALLING WATER DIVERSION UPSTREAM OF 42" CULVERT HEADWALL. (1 MONTH)
6. COMPLETE CONSTRUCTION OF NEW 42" CULVERT AND HEADWALL.
7. REMOVE TEMPORARY WATER DIVERSION AND RESTORE DUMPLING BROOK FLOW INTO NEW 42" CULVERT.
8. FILL AND ABANDON EXISTING 24" AND 36" CULVERTS.

NUMBER	DATE	STATION	DESCRIPTION
			REVISIONS AFTER PROPOSAL

SDR PROCESSED	DATE
NEW DESIGN	DATE
SHEET CHECKED	DATE
AS BUILT DETAILS	DATE

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLAN 05

McFarland Johnson

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	EroPln 5 [SHT]	13761E-EroPln SHT	13761E	17	19

EROSION CONTROL PLAN LEGEND

PERIMETER CONTROL
SILT FENCE
EROSION CONTROL MIX BERM
EROSION CONTROL MIX SOX
TURBIDITY CURTAIN
SHEET PILE
COFFER DAM

NATURAL BUFFER/PERIMETER CONTROL
SILT FENCE
EROSION CONTROL MIX BERM
EROSION CONTROL MIX SOX
TURBIDITY CURTAIN
SHEET PILE
COFFER DAM

CHANNEL PROTECTION
STONE CHECK DAMS
STRAW WATTLES
CHANNEL MATTING
CLASS D EROSION STONE
CLASS C STONE

CLEAN WATER BYPASS
PUMP THROUGH PIPE
DRAIN THROUGH PIPE OR CHANNEL

M179
LANDS N/F
STATE OF NEW HAMPSHIRE

GRID N

STA. 1206+50.00
F.E. EVERETT TURNPIKE
END FULL DEPTH
CONSTRUCTION

MATCH TO 1195+50.00 PLAN 05

MATCH TO 1209+50.00 PLAN 07

F.E. EVERETT TURNPIKE CONSTRUCTION ℄

F.E. EVERETT TURNPIKE

EXIST. L.A.R.O.W. P2650E

CBDH

FSB

PC 1207+22.20

PROPOSED SOUNDWALL

FEET NB STA. 1197+60.00, RT 97.0' = SOUNDWALL STA. 114+60.00

N36°27'05.6"E

M180
LANDS N/F
SOUTHERN NEW HAMPSHIRE
MEDICAL

M181
LANDS N/F
GOLD CHARM PROPERTIES LLC

M182
LANDS N/F
MAPLE RIDGE SUBDIVISION
72 UNITS

SCALE IN FEET: 50 0 50 100

McFarland Johnson

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLAN 06

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	EroPln 6 [SHT]	13761E-EroPln SHT	13761E	18	19

NUMBER | DATE | STATION | DESCRIPTION
REVISIONS AFTER PROPOSAL

SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE

M179
LANDS N/F
STATE OF NEW HAMPSHIRE

GRID N

MATCH TO 1209+50.00 PLAN 06

EXIST. L.A.R.O.W. P2650E

F.E. EVERETT TURNPIKE
CONSTRUCTION ℄

STA. 1221+00.00
F.E. EVERETT TURNPIKE
LIMIT OF WORK

F.E. EVERETT TURNPIKE

PF01/4

PF01

CBDH

NB/PC

CP

PC

EXISTING SOUNDWALL

ITS CAMERA

1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223

15" rcp

15" 6" rcp

M184
LANDS N/F
746 DWH LLC

M183
LANDS N/F
MM REALTY TRUST

M182
LANDS N/F
MAPLE RIDGE SUBDIVISION
72 UNITS

EROSION CONTROL PLAN LEGEND

PERIMETER CONTROL
- SILT FENCE
- EROSION CONTROL MIX BERM
- EROSION CONTROL MIX SOX
- TURBIDITY CURTAIN
- SHEET PILE
- COFFER DAM

NATURAL BUFFER/PERIMETER CONTROL
- SILT FENCE
- EROSION CONTROL MIX BERM
- EROSION CONTROL MIX SOX
- TURBIDITY CURTAIN
- SHEET PILE
- COFFER DAM

CHANNEL PROTECTION
- STONE CHECK DAMS
- STRAW WATTLES
- CHANNEL MATTING
- CLASS D EROSION STONE
- CLASS C STONE

CLEAN WATER BYPASS
- PUMP THROUGH PIPE
- DRAIN THROUGH PIPE OR CHANNEL

50 0 50 100
SCALE IN FEET

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED	DATE
NEW DESIGN	DATE
SHEET CHECKED	DATE
AS BUILT DETAILS	DATE

STATE OF NEW HAMPSHIRE
NASHUA-MERRIMACK-BEDFORD
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLAN 07

McFarland Johnson

DATE PRINTED	MJ PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11/4/2022	18589.00	EroPln 7 [SHT]	13761E-EroPln SHT	13761E	19	19