STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE: March 20, 2024

FROM: Joshua Brown
Wetlands Program Analyst

AT (OFFICE): Department of Transportation
Bureau of Environment

SUBJECT Dredge & Fill Application
Littleton, 43809

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 Bridge Design for the subject major impact project. The NHDOT is proposing a preservation/rehabilitation project for four bridges in Littleton: I-93 NB and SB over the Ammonoosuc River (#188/060 and #187/060) and over Industrial Park Road (#190/058 and #189/058). The goals for this project are to address the bridge and concrete age-related deficiencies. The project will consist of substructure repairs, expansion joint replacement, bearing replacement, and pavement overlay. Temporary access roads will be constructed and removed as part of the project, to access the piers for substructure repairs for the bridges over the Ammonoosuc River.

This project was reviewed at the Natural Resource Agency Coordination Meeting on June 21, 2023 and December 20, 2023. 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: https://www.dot.nh.gov/projects-plans-and-programs/programs/environmental-management-system/project-management-section-0.

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 not be required as the proposed work was determined to be self-mitigating.

Erosion Control Plans contained within this application should be considered final in accordance with Env-Wt 527.05(a).

The lead people to contact for this project are David Scott, Bureau of Bridge Design (271-2731or David.L.Scott@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 #750719) in the amount of $9,732.80.

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 Littleton (4 copies via certified mail)
Ammonoosuc River River LAC (1 copy via certified mail)
Mike Dionne & Kevin Newton, 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)

S:\Environment\PROJECTS\LITTLETON\43809\Wetlands\Final Wetlands Application 3.14.24\Application Submission Documents\WETAPP - Coverletter.doc

Bridges #187/060 & 188/060, I-93 NB and SB over the Ammonoosuc River and #189/058 & 190/058, I-93 NB and SB over Industrial Park Road Littleton, NH

NH Department of Transportation (NHDOT)
Federal Project Number: X-A005(203)
NHDOT Project Number: 43809

New Hampshire Department of Environmental Services

Wetlands Bureau Permit Application

Hoyle, Tanner Project Number: 21.092597.04

Prepared By:

HOYLE TANNER

February 2024

HOYLE TANNER

Trusted Experts | Innovative Results

March 7, 2024

D.E.S. Wetlands Bureau
P.O. Box 95
Concord, NH 03302-0095

Re: Wetlands Permit Application
NHDOT Littleton #43809
Bridges #187/060 & #188/60, I-93 NB and SB over the Ammonoosuc River and
#189/058 & 190/058, I-93 NB and SB over Industrial Park Road
Littleton, NH
Hoyle, Tanner Project No. 21.02597.04

Dear Sir/Madam:

The NHDOT is proposing a preservation/rehabilitation project for four bridges in Littleton: I-93 NB and SB over the Ammonoosuc River (#188/060 and #187/060) and over Industrial Park Road (#190/058 and #189/058). The goals for this project are to address the bridge and concrete age-related deficiencies and extend the service life for an additional 20 years and until such time when replacement is needed, and funding becomes available.

The project will consist of substructure repairs, expansion joint replacement, bearing replacement, and pavement overlay. Temporary access roads will be constructed and removed as part of the project to access the piers for substructure repairs for the bridges over the Ammonoosuc River. The temporary access roads will also be used for access to construct a temporary girder support system to support the superstructure of the bridges over the Ammonoosuc River during bearing replacement. The four bridges will be included into one combined project, which is anticipated to be constructed in 2024 and 2025, with an anticipated advertisement date of March 2024.

There will be temporary resource impacts as a result of the project. All areas of temporary disturbance will be restored. A filing fee of $9,732.80 is included with the package. The current schedule is to commence construction in the summer of 2024 and complete construction by fall 2025.

If you require any additional information, please feel free to contact me at your convenience.

Very truly yours,
HOYLE, TANNER & ASSOCIATES, INC.

Kimberly R. Peace
Senior Environmental Coordinator

TABLE OF CONTENTS

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 / David L. Scott, PE **TOWN NAME:** Littleton

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):
  ○ NHB Project ID #: NHB23-2873
	☐ 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): Ammonoosuc River Local Advisory Committee	☒ Yes ☐ No

• A copy of the application was sent to the LAC on Month: Day: Year:	
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): 131.5 sq miles or 84,160 Acres	

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 NHDOT is proposing a preservation/rehabilitation project for four bridges in Littleton: I-93 NB and SB over the Ammonoosuc River (#188/060 and #187/060) and over Industrial Park Road (#190/058 and #189/058). The goals for this project are to address the bridge and concrete age-related deficiencies.

The project will consist of substructure repairs, expansion joint replacement, bearing replacement, and pavement overlay. Temporary access roads will be constructed and removed as part of the project, to access the piers for substructure repairs for the bridges over the Ammonoosuc River. The temporary access roads will also be used for access to construct a temporary girder support system to support the superstructure of the bridges over the Ammonoosuc River during bearing replacement. The four bridges will be included into one combined project which is anticipated to be constructed in 2024 and 2025, with an anticipated advertisement date of March 2024.

The proposed project would result in a total of 24,332 square feet and 973 linear feet of temporary wetland/stream impact. Temporary impacts are associated with space for the installation of water diversion structures and other erosion control best management practices as well as vegetation clearing for the construction of access roads. Temporary impact areas will be restored to prior conditions as noted on the plans provided.

SECTION 3 - PROJECT LOCATION

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

ADDRESS: Bridges #188/060 and #187/060 carrying Interstate 93 over the Ammonoosuc River / Bridges #190/058 and #189/058 carrying Interstate 93 over Industrial Park Road.	
TOWN/CITY: Littleton	
TAX MAP/BLOCK/LOT/UNIT: Littleton Tax Maps 82 & 83 / NHDOT ROW	
US GEOLOGICAL SURVEY (USGS) TOPO MAP WATERBODY NAME: Ammonoosuc River ☐ N/A	
(Optional) LATITUDE/LONGITUDE in decimal degrees (to five decimal places):	44.30457° North / -71.79658° 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: NH Department of Transportation / David L. Scott, PE		
MAILING ADDRESS: P.O. Box 483, 7 Hazen Drive		
TOWN/CITY: Concord	STATE: NH	ZIP CODE: 03302
EMAIL ADDRESS: david.l.scott@dot.nh.gov		
FAX: (603) 271-2759	PHONE: (603) 271-2731	

ELECTRONIC COMMUNICATION: By initialing here:- DLS, 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.: Peace, Kimberly R.		
COMPANY NAME: Hoyle, Tanner & Associates, Inc.		
MAILING ADDRESS: 150 Dow Street		
TOWN/CITY: Manchester	STATE: NH	ZIP CODE: 03101
EMAIL ADDRESS: kpeace@hoyletanner.com		
FAX: 603-669-4168	PHONE: (603) 460-5205	

ELECTRONIC COMMUNICATION: By initialing here KRP, 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):

In accordance with Env-Wt 400 the jurisdictional areas within the project limits have been delineated by Joanne Theriault, NH Certified Wetland Scientist #305. A copy of the Wetland Delineation Report is included with this application. The jurisdictional areas are referenced on the included wetland impact plan.

The project has been designed in accordance with Env-Wt 904.01, Env-Wt 904.02, and Env-Wt 904.09 for the stream crossing structure (bridge) and Env-Wt 514 for bank stabilization. Project-specific information is contained within this permit application.

SECTION 8 - AVOIDANCE AND MINIMIZATION

The Avoidance and Minimization Checklist is attached to this permit application.

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: 12 Day: 18 Year: 2023
(☒ N/A - Mitigation is not required) All resource impacts will be temporary and restored upon construction completion.

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

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			☐	1,493		☐
	Scrub-shrub Wetland			☐	214		☐
	Emergent Wetland			☐			☐
	Wet Meadow			☐			☐
	Vernal Pool			☐			☐
	Designated Prime Wetland			☐			☐
	Duly-established 100-foot Prime Wetland Buffer			☐			☐
Surface Water	Intermittent / Ephemeral Stream			☐			☐
	Perennial Stream or River			☐	21,372	746	☐
	Lake / Pond			☐			☐
	Docking - Lake / Pond			☐			☐
	Docking - River			☐			☐
Banks	Bank - Intermittent Stream			☐			☐
	Bank - Perennial Stream / River			☐	1,253	227	☐
	Bank / Shoreline - Lake / Pond			☐			☐
Tidal	Tidal Waters			☐			☐
	Tidal Marsh			☐			☐
	Sand Dune			☐			☐
	Undeveloped Tidal Buffer Zone (TBZ)			☐			☐
	Previously-developed TBZ			☐			☐
	Docking - Tidal Water			☐			☐
TOTAL					**24,332**	**973**	

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):	24,332 SF	× $0.40 =	$ 9,732.80
Seasonal docking structure:	SF	× $2.00 =	$
Permanent docking structure:	SF	× $4.00 =	$
Projects proposing shoreline structures (including docks) add $400 =			$
		Total =	$ 9,732.80

The application fee for minor or major impact is the above calculated total or $400, whichever is greater = $ 9,732.80

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: DLS	To the best of the signer's knowledge and belief, all required notifications have been provided.
Initials: DLS	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: DLS	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.
Initials: N/A	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)

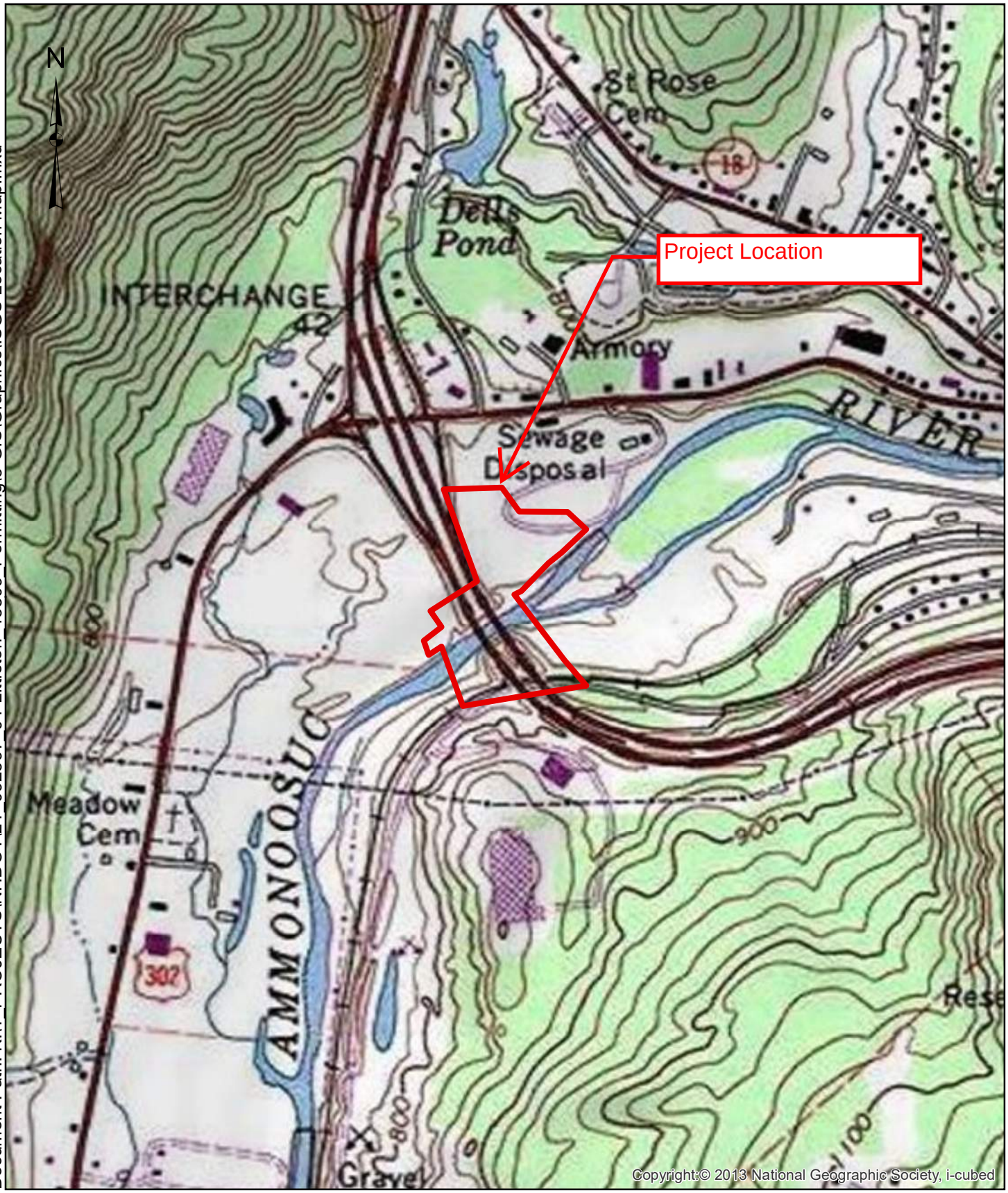
SIGNATURE (OWNER): David L. Scott	PRINT NAME LEGIBLY: David L. Scott	DATE: 3/15/2024
SIGNATURE (APPLICANT, IF DIFFERENT FROM OWNER):	PRINT NAME LEGIBLY:	DATE:
SIGNATURE (AGENT, IF APPLICABLE): Kimberly Peace	PRINT NAME LEGIBLY: Kimberly Peace	DATE: 3/07/2024

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: **Please refer to Env-Wt 311.05(a)(14) & RSA 482-A:3I(a)(I). The four town copies have sent via certified mail and filed directly with the Town of Littleton in accordance with the above rule and regulation.**
TOWN/CITY:	DATE:

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”.



Document Path: K:\1_PROJECTS\NHDOT\21_092597_04-Littleton_43809_Permitting\3-GIS\Graphics\ISGS Location Map.mxd

HOYLE TANNER	150 Dow Street Manchester, NH 03101 www.hoyletanner.com	LITTLETON #43809 BRIDGE #188/060, I-93 NB OVER THE AMMONOOSUC RIVER BRIDGE #187/060, I-93 SB OVER THE AMMONOOSUC RIVER BRIDGE #189/058, I-93 SB OVER INDUSTRIAL PARK ROAD, NHRR (ABD) BRIDGE #190/058, I-93 NB OVER INDUSTRIAL PARK ROAD, NHRR (ABD)
DR. BY dcoon	DATE 5/30/2023	SCALE 1 inch = 833 feet

PROJECT LOCATION MAP

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 / David L. Scott, PE **TOWN NAME:** Littleton

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.
Streambed and bank impacts have been minimized to the extent practicable while meeting the project purpose and need of preserving and rehabilitating the bridges. As a part of this project the contractor will need to construct temporary access roads to complete substructure repair work. The access roads will be installed one at a time and one will be removed prior to constructing the other. Temporary impact areas will be restored to prior conditions as noted on the plans provided.
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.
N/A – this project is not located within tidal waters or marshes.
SECTION I.III - HYDROLOGIC CONNECTION (Env-Wt 313.03(b)(3)) Describe how the project maintains hydrologic connections between adjacent wetland or stream systems.
Installation of the access roads will not have an effect on hydrologic connections between adjacent wetland or stream systems. The span of the river at the bridges is more than 100' at each location and only one access road will be in place at a time. This will result in a negligible effect on hydraulic connection. Refer to the attached Hydrologic and Hydraulic Analysis, HEB 2022.

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.

Impacts to the jurisdictional bank and bed of the Ammonoosuc River and floodplain wetlands are necessary to access the piers for necessary repairs for the protection of the bridge. These impacts have been minimized to the extent practicable. There are no exemplary natural communities, vernal pools, protected species or protected habitat, or documented fisheries. The NHDES Wetlands Permit Planning Tool shows the proposed project area is not predicted or cold-water fisheries habitat. Temporary bank impact areas that include soil disturbance and vegetation removal will be restored to prior conditions as noted on the plans provided.

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 preservation/rehabilitation project will have a positive effect on public commerce. The project will enhance roadway safety to the traveling public by extending the service life of the bridges.

The project will have no impact on navigation or recreation. Coordination with the US Coast Guard confirmed the Ammonoosuc River in this location is classified as non-navigable. Should recreational watercraft desire passage through the crossing, the river will remain passable on each respective side as work is completed on the opposite bank.

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.

The wetland delineation report (attached) prepared for the project indicates there are floodplain wetlands present within the project area. These wetlands have been avoided to the extent practicable. Necessary impacts to wetlands 1 and 7, as numbered in the report, are temporary, and it is anticipated that upon construction completion there will be no permanent impact to the flood storage that these wetlands provide. Both wetlands function primarily for flood storage with Wetland 7 also primarily functioning for shoreline anchoring. These functions will not be affected by the project as the impacts are minimal and temporary and the wetlands will be restored upon project completion.

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.

N/A

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.

N/A

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.
There will be no adverse impacts to stream channel and the ability of the channel to handle runoff of waters. Impacts to the Ammonoosuc River channel will be temporary and are necessary to access the pier for repairs. There will be no change in grade of the banks and once construction is complete the channel and banks will be restored to the pre-existing condition.
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 – No shoreline structures are proposed
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 – No shoreline structures are proposed
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 – No shoreline structures are proposed
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 – No shoreline structures are proposed
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 – No shoreline structures are proposed
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 – No shoreline structures are proposed

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: Hoyle, Tanner & Associates, Inc. has prepared a functional assessment using the NHDES Functional Assessment Worksheet (NHDES-W-06-049). A summary narrative of the assessment results is part of the Wetland Delineation Report included with this application.
NAME OF CERTIFIED WETLAND SCIENTIST (FOR NON-TIDAL PROJECTS) OR QUALIFIED COASTAL PROFESSIONAL (FOR TIDAL PROJECTS) WHO COMPLETED THE ASSESSMENT: Joanne Theriault, CWS #305
DATE OF ASSESSMENT: November 2 & 2, 2022 and May 17, 2023
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.

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES
WETLAND PERMIT APPLICATION
for
Bridges #187/060 & 188/060, I-93 SB over the Ammonoosuc River and
#189/058 & 190/058, I-93 SB over Industrial Park Road, NHRR (ABD)
Littleton, NH
Supplemental Narrative

The following information is offered as a supplement to the information provided in the Wetland Permit Application and Plans.

Purpose and Need:
The proposed preservation/rehabilitation project would consist of substructure repairs, expansion joint replacement, bearing replacement, and pavement overlay. Temporary access roads will be constructed and removed as part of the project to access the piers for substructure repairs for the bridges over the Ammonoosuc River. The temporary access roads will also be used for access to construct a temporary girder support system to support the superstructure of the bridges over the Ammonoosuc River during bearing replacement. The purpose of the project is to maintain safety and protect the traveling public by addressing the bridge and substructure age related deficiencies and to extend its service life. The need is based on the degraded condition of the existing structure.

Resources:
Hoyle, Tanner & Associates, Inc. (Hoyle Tanner) completed the wetland and streams delineation as well as functions and values assessment for NHDOT's Bridge Nos. 187/060, 188/060 Preservation/Rehabilitation Project. Wetlands were delineated in accordance with Env-Wt 406.01; Hoyle Tanner's methodology is described in the included Wetland Delineation Report. Hoyle Tanner describes the Ammonoosuc River in the vicinity of the I-93 crossing is R3UB1H (Riverine, Upper Perennial Flow Regime, Unconsolidated Bottom, Gravel/Cobble Substrate, Permanently Flooded). Three intermittent streams were noted and delineated to the south of the Ammonoosuc River and are located in proximity to Industrial Park Road. The classifications of these streams are R4SB2/7J (Riverine, Intermittent, Streambed, Rubble/Vegetated Substrate, Intermittently Flooded) and R4SB1/2 (Riverine, Intermittent, Streambed, Cobble/Gravel and Sand Substrate). A total of eight wetlands were identified and delineated in and around the project location. A summary narrative of the Functions and Values Assessment is part of the Wetland Delineation Report included with this application.

Explanation as to methods, timing, and manner as to how the project will meet applicable standard permit conditions required in Env-Wt 307 (Env-Wt 311.03(b)(7))

Env-Wt 307.02 (US Army Corps of Engineers (USACE) Conditions). Appendix B is attached to this permit application. NHDOT seeks and requests to receive review and approval by the Army Corps of Engineers through their General Permit and via submittal of this State wetlands permit application to NHDES.

Env-Wt 307.03 (Protection of Water Quality Required). The contractor shall be responsible for implementing Erosion and Sediment control measures in accordance with the "New Hampshire Stormwater Manual, Volume 3 Erosion and Sediment Controls during Construction" by NHDES. Erosion and siltation control measures will be installed by the Contractor prior to start of any work and will be maintained during the duration of the construction activities. It is the Contractor's responsibility to not cause violations of surface water quality standards. Upon completion of the project, the project will cause no adverse effects on the quality or quantity of surface or groundwater entering or exiting the project site.

Env-Wt 307.04 (Protection of Fisheries and Breeding Areas Required). There are no predicted or identified cold water fisheries associated with the Ammonoosuc River in this location.

Env-Wt 307.05 (Protection Against Invasive Species Required) Hoyle Tanner performed an invasive species review of the project area as a part of the wetland delineation. Glossy buckthorn and Japanese knotweed (*Reynoutria japonica*) were identified within the project area. The project contractor will be aware of and conform with the requirements in Env-Wt 307.05 and will be required to address the Best Management Practices For the Control of Invasive and Noxious Plant Species (2018) issued by NHDOT, including preparation of an Invasive Species Control and Management Plan to be submitted to the Contract Engineer for review and approval.

Env-Wt 307.06 (Protection of Rare, Threatened or Endangered Species and Critical Habitat) The NH Natural Heritage Bureau was contacted regarding the proposed project (see attached letter NHB23-2873, dated 09/28/2023). The database check determined that there are no recorded occurrences for sensitive species near the project area. A copy of the DataCheck Report is included with this application.

An official Federally-listed species list was obtained from the US Fish and Wildlife Service (USFWS) using the Information for Planning and Conservation (IPAC) online tool. The list includes the Federally-endangered Northern Long Eared Bat (*Myotis septentrionalis*; NLEB), Federally-threatened Canada Lynx (*Lynx canadensis*) and the Monarch Butterfly (*Danaus plexippus*) as a candidate species. A copy of the species list is included with this permit application.

The project has been reviewed within the IPaC system utilizing the FHWA, FRA, FTA Programmatic Consultation for Transportation Projects affecting NLEB or Indiana Bat Determination Key. A Consistency Letter was received that the Proposed Action will have no effect on the endangered Indiana bat (*Myotis sodalis*) or the endangered northern long-eared bat (*Myotis septentrionalis*). If the Proposed Action is not modified, no consultation is required for these two species. A copy of this letter is included with this application.

USF&W has reviewed the effects of the proposed project on Canada Lynx (*Lynx canadensis*) and concurred with NHDOT's determination that the project may affect, but is not likely to adversely affect, the federally threatened Canada lynx. A copy of the letter is included with this permit application.

Env-Wt 307.07 (Consistency Required with Shoreland Water Quality Protection Act). The Ammonoosuc River is a NHDES Designated River and is subject to the Shoreland Water Quality Protection Act (SWQPA) (NH RSA 483-B). A Shoreland Permit will be applied for the project.

Env-Wt 307.11 (Filling Activity Conditions). All fill material shall conform to the requirements listed in 307.11.

Env-Wt 307.12 (Restoring Temporary Impacts: Site Stabilization) Upon completion of the project all temporary impact areas will be restored per the requirements listed in Env-Wt 307.12. See Restoration Plan included in this application plan set. Plantings will be placed within those areas identified for temporary impact that are at risk of soil alteration or disturbance- bank areas identified as temporary impact that are not identified for plantings are those in which the contractor will be able to move across the ground surface with minimal vegetation removal (cut flush to the surface as needed) or soil disturbance or are currently covered in riprap.

Env-Wt 307.13 (Property Line Setbacks): The NHDOT is working with the property owners where easements will be required for the preservation/rehabilitation project. The project is receiving federal

funding and therefore needs to go through a formal right-of-way process. As a result of this, easements are not expected to be obtained prior to the issuance of the permit. Therefore, the NHDOT requests that submitting the easements to NHDES be made a condition of the permit.

Env-Wt 307.15 (Use of Heavy Equipment in Wetlands) In order to construct the proposed project, heavy equipment will need to traverse the stream banks. Access roads will be established with a temporary stone fill over geotextile fabric to minimize disruption of native soils and vegetation. Fills shall be limited to the wetland impact areas shown on the attached project plans. Temporary access routes will be restored to pre-construction condition at the conclusion of the proposed project.

Env-Wt 307.16 (Adherence to Approved Plans Required) All work shall be in accordance with the plans prepared by Hoyle Tanner and approved by NHDES.

Env-Wt 307.18 (Reports) The contractor will be responsible for preparing a Storm Water Pollution Prevention Plan. This plan will be submitted to NHDES for approval prior to the contractor working within jurisdictional resources.

Statement of whether the applicant has received comments from the local conservation commission and, if so, how the applicant has addressed the comments (Env-Wt 311.06(h))

A copy of this wetland permit application was submitted by the NHDOT to the Town of Littleton and for distribution to the Conservation Commission concurrent with submittal of the application to NHDES.

Stream Crossings (Env-Wt 900)

Since the proposed bridge rehabilitation project is located on a watercourse where the contributing watershed exceeds 640 acres, and the bridge is considered a tier 3 stream crossing, the stream crossing standards as outlined in New Hampshire Administrative Rule Env-Wt 900 must be addressed.

Env-Wt 904.01: General Design Considerations

(a) All stream crossings, whether over tidal or non-tidal waters, shall be designed and constructed so as to:

(1) Not be a barrier to sediment transport;

The proposed activities will maintain the existing hydrology of the stream crossing, ensuring that the project will not be a barrier to sediment transport.

(2) Not restrict high flows and maintain existing low flows;

The rehabilitated bridge will maintain the existing hydraulic capacity of the stream crossing. The substructure repairs and temporary access roads will have a temporary and negligible impact on the hydrology of the watercourse or surrounding features. Refer to the H&H report by HEB, 2022.

(3) Not obstruct or otherwise substantially disrupt the movement of aquatic organisms indigenous to the waterbody beyond the actual duration of construction;

Aside from temporary obstructions or disruptions resulting from the construction activities (i.e., instream

erosion control measures), the rehabilitated bridge structure will maintain the existing movement of aquatic life. The limited bed and bank impacts will not permanently impact aquatic organism passage.

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

The proposed project will be located within the floodway and 100-year floodplain of Ammonoosuc River; however, the hydraulic capacity of the stream crossing will be maintained. Therefore, there will be no increase in the frequency of flooding or overtopping of banks as a result of this project.

(5) Maintain or enhance geomorphic compatibility by:
a. Minimizing the potential for inlet obstruction by sediment, wood, or debris; and
b. Preserving the natural alignment of the stream channel;

The current geomorphic compatibility of the bridge will be maintained. The potential for sediment, wood, or debris obstruction post-construction will not exceed that of the existing structure. The existing channel alignment of Ammonoosuc River will be preserved, as no realignment is included in the project design. The proposed substructure repairs will have no measurable impact on geomorphic compatibility. All temporarily disturbed areas will be restored to pre-existing condition following project completion.

(6) Preserve watercourse connectivity where it currently exists;

No significant disruptions in overall hydrological connectivity currently exists at this crossing. The rehabilitated bridge structure will have the same footprint as the existing structure, thus maintaining and preserving the existing watercourse connectivity.

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

Not Applicable

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

The project will not cause erosion, aggradation, or scouring upstream or downstream of the crossing.

(9) Not cause water quality degradation.

The rehabilitated bridge structure will not cause water quality degradation.

(b) For stream crossings over tidal waters, the stream crossing shall be designed to:

(1) Match the velocity, depth, cross-sectional area, and substrate of the natural stream; and
(2) Be of sufficient size to not restrict bi-directional tidal flow over the natural tide range above, below, and through the crossing.

Not applicable, since the Ammonoosuc River is not a tidal waterway.

Env-Wt 904.05: Tier 3 Stream Crossings

(a) Subject to (b), below, a tier 3 stream crossing shall be a crossing located:

(1) On a watercourse where the contributing watershed is 640 acres or greater;

(2) Within a designated river corridor, unless:

a. *The crossing would be a tier 1 stream based on the contributing watershed size; or*

b. *The structure does not create a direct surface water connection to the designated river as depicted on the national hydrography dataset as found on GRANIT;*

(3) Within a 100-year flood plain;

(4) In a jurisdictional area having any protected species or habitat; or

(5) In a prime wetlands or within a duly-established 100-foot buffer, unless a waiver has been granted pursuant to RSA 482-A:11, IV(b) and Env-Wt 706.

The watershed of the Ammonoosuc River, which crosses under Bridges No. #188/060 and #187/060 located in Littleton, is approximately 84,160 acres in size (or 131.5 square miles). Refer to the Watershed Map included in this application. The stream crossing is also located within the 100-year floodplain of the Ammonoosuc River. Therefore, this stream crossing is classified as a Tier 3 stream.

(b) The applicant for a project in which a stream crossing is categorized as tier 3 based solely on being in a 100-year floodplain may request that the crossing be categorized as a tier 1 or tier 2 stream crossing, as applicable based on watershed size, if the impacts to the floodplain are specifically mitigated in accordance with Env-Wt 800.

Not applicable. The stream crossing is also categorized as tier 3 based on the contributing watershed size, not solely on being in a 100-year floodplain.

(c) If an applicant for a project in which a stream crossing is categorized as tier 3 based solely in a jurisdictional area having any protected species or habitat may request that the crossing be categorized as tier 1 or tier 2 based on watershed size, provided:

(1) The applicant consults with NHB to determine whether any protected plant species or habitat would be impacted;

(2) The applicant consults with NHF&G to determine whether any protected species or habitat is impacted; and

(3) The NHB, NHF&G, or both, as applicable, recommend(s) such a downgrade to the department in writing.

Not applicable. The stream crossing is not located in a jurisdictional area having any protected species or habitat, according to the NHB DataCheck Report attached.

(d) A tier 3 stream crossing shall be a span structure or an open-bottomed culvert with stream simulation, not a closed-bottom culvert or pipe arch.

The rehabilitated bridge structure is and will continue to be an open-bottomed span structure.

(e) The applicant shall use an alternative design by submitting a request as specified in Env-Wt 904.10.

Not applicable. No alternative design will be requested for this project.

(f) Compensatory mitigation shall not be required for:

(1) Any new tier 3 stream crossing that:

a. Meets the general design criteria in Env-Wt 904.01 and the tier-specific criteria of Env-Wt 904.07;

b. Is self-mitigating; and

c. Improves aquatic organism passage, connectivity, and hydraulics; or

(2) Any replacement of a crossing that met all applicable requirements when originally installed but is in a location that results in the crossing being classified as tier 3 under these rules, provided the proposed stream crossing meets the requirements of Env-Wt 904.09.

Not Applicable. The project proposes the preservation/rehabilitation of an existing crossing with no permanent impacts.

(g) Plans for a tier 3 stream crossing shall be dated and bear the signature of the professional engineer who prepared or had responsibility for and approved them, as required by RSA 310-A:18.

Refer to the attached Wetland Impact Plans and the Erosion Control Plan which have been dated and signed by a licensed NH professional engineer.

Env-Wt 904.09: Repair, Rehabilitation, or Replacement of Tier 3 and Tier 4 Existing Legal Crossings

(a) The repair, rehabilitation, or replacement of tier 3 stream crossings shall be limited to existing legal crossings where the tier classification is based only on the size of the contributing watershed.

The stream crossing is classified as tier 3 due to the size of the contributing watershed, but also because it is located within the 100-year floodplain of Ammonoosuc River.

(b) Rehabilitation of a culvert or other closed-bottom stream crossing structure pursuant to this section may be accomplished by concrete repair, slip lining, cured-in place lining, or concrete invert lining, or any combination thereof, except that slip lining shall not occur more than once.

Not applicable. The proposed project does not involve a culvert or closed-bottom stream crossing structure.

(c) A project shall qualify under this section only if a professional engineer certifies, and provides supporting analyses to show, that:

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

The existing crossing does not have a history of causing or contributing to damaging flooding events.

(2) The proposed stream crossing will:

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

Refer to the previous description for additional information regarding the proposed project's compliance with the general criteria specified in Env-Wt 904.01.

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

The project will maintain the hydraulic capacity of the stream crossing. As previously discussed, installation of temporary access roads will have a negligible effect on the hydraulic opening during construction. Post construction the hydraulic opening will be returned to the existing condition.

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

The capacity of the stream crossing to accommodate aquatic organism passage will be maintained. The bridge opening will not be narrowed and will remain an open bottom structure.

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

The connectivity of the stream reaches upstream and downstream of the crossing will be maintained. The limited scope of work proposed within jurisdictional areas (i.e., temporary causeway) will not negatively impact stream connectivity.

e. Not cause or contribute to the increase in the frequency of flooding or overtopping of the banks upstream or downstream of the crossing.

The proposed rehabilitation activities will not cause or contribute to the increase in the frequency of flooding or overtopping of the banks upstream or downstream of the crossing. The hydraulic capacity of the rehabilitated bridge will remain the same as the existing structure.

(d) Repair, rehabilitation, or replacement of a tier 4 stream crossing shall comply with Env-Wt 904.07(d).

Not applicable. The proposed work involves a tier 3 stream crossing.

Bank Stabilization (Env-Wt 514)

The proposed project will have temporary impacts to the bank of the Ammonoosuc River. Much of the project banks are riprap that was installed to protect the structure from scour and instability. These areas will largely remain unaltered with small exception at the north bank of the river adjacent to the existing pier. Refer to photos 1 and 2 in the wetland delineation report. These areas contain vegetation that has invaded the riprap and are identified for restoration as noted on the Restoration Plan provided in this application.

Pre-Application

Pre-application coordination with NHDES included attendance at two NHDOT Natural Resource Agency Meetings on June 21, 2023 and December 20, 2023. Copies of the meeting minutes are included with this permit application. The proposed configuration for the access roads and the impacts on the banks were discussed including the restoration of the banks upon completion of the project and have been incorporated into the project design.

Temporary Access

The temporary access road will utilize NHDOT Item 583.5 Riprap, Class V, as the base material for all fill. The surface of the access road will be a 12" thick layer of NHDOT Item 304.5 Crushed Stone (Coarse Gradation). All fill materials will be placed over NHDOT Item 593.210 Geotextile; Separation CL.1. The approximate volume of fill that will be placed and removed within the jurisdictional areas is 6,500 cubic yards.

Phased access road construction has been designed to minimize impacts on the river including associated water surface elevations and velocities, by limiting only one access road to be in place at one time and for the duration of a single year/construction season only. This approach leads to an increase in water surface elevation at the inlet (I-93 NB bridge) of only 0.86'; this increase equalizes at the outlet (I-93 SB bridge). While impacts on upstream and downstream abutting properties were not specifically studied, the proposed increases in water surface elevations and velocities are minimal and would equalize with existing conditions shortly upstream of the project site and at the downstream project limits. Upstream backwatering and downstream erosion will not be significant and will not extend beyond the duration of the project. All fill material associated with the temporary access road will be removed upon completion of the rehabilitation work.

The access roads elevations are specified to be greater than the 10% AEP storm event water surface elevations. The modeled 10% AEP storm event has a water surface elevation of 722.59’ at the inlet (I93 NB bridge) and 721.21’ at the outlet (I93 SB bridge). These elevations are based on installing one access road at a time. The 50% AEP storm event was not analyzed during hydraulic modeling and no water surface elevations for this storm have been calculated. Please see the attached the attached Hydrologic and Hydraulic Analysis, HEB 2022.

Turbidity curtains will be in place prior to water diversion installation to minimize sediment transport. A geotextile barrier will be placed below all proposed temporary fill material to maintain separation between these materials and existing natural riverbed sediments. Additionally, the proposed riprap material will contain minimal fine material and will be relatively easy to remove completely. All placement and removal of fill will occur behind appropriate water diversion structures to avoid impacts on aquatic organism species.

Mitigation

Mitigation is not proposed for the project as all impacts are temporary and the banks of the river will be restored upon project completion as noted in the Restoration Plan included in the plan set for this application. Plantings will only be placed within those areas identified for temporary impact that are at risk of soil alteration or disturbance- bank areas identified as temporary impact that are not identified for plantings are those in which the contractor will be able to move across the ground surface with minimal vegetation removal (cut flush to the surface as needed) or soil disturbance and are currently riprap.

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 / David L. Scott. PE	
PROJECT STREET ADDRESS: Bridges #188/060 and #187/060 carrying Interstate 93 over the Ammonoosuc River / Bridges #190/058 and #189/058 carrying Interstate 93 over Industrial Park Road	PROJECT TOWN: Littleton
TAX MAP/LOT NUMBER: Littleton Tax Maps 82 & 83 / NHDOT 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 project is to maintain safety and protect the traveling public by addressing bridge and substructure age related deficiencies and bridge preservation/rehabilitation measures to extend the service life of the bridge.		

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

Natural Resources Agency Coordination Meeting Minutes

Note: Pages not applicable to the permit application have been removed.

BUREAU OF ENVIRONMENT
CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: December 20, 2023
LOCATION OF CONFERENCE: Virtual meeting held via Zoom

ATTENDED BY:

NHDOT
Andrew O'Sullivan
Joshua Brown
Jon Evans
Mark Hemmerlein
Rebecca Martin
Tim Mallette
Dave Smith
Dillan Schmidt
Marc Laurin
Dan Prehemo
Tony King
Jason Ayotte
Wendy Johnson
Mike Mozer
David Scott
Meli Dube
Paul Lovely
Kathleen Corliss
Curtis Morrill
Kerry Ryan
Arin Mills
Rhona Thomson

ACOE
Mike Hicks

USCG
Gary Croot

EPA
Absent

NHDES
Karl Benedict
Seta Detzel
Emily Nichols
Mary Ann Tilton

NHB
Absent

NH Fish & Game
Mike Dionne
Kevin Newton

Federal Highway
Jamie Sikora

US Fish & Wildlife
Absent

The Nature Conservancy
Absent

NH Transportation & Wildlife Workgroup
Absent

Consultants/ Public Participants
Kyle Higgins
Mike Dugas
Mark Debowski
Christine Perron
John Parelli
Steve Hoffman
Brian Colburn
Carol Foss
Peter Steckler
Jennifer Riordan
Seth Hill
Kimberly Peace
Deb Coon
Chris Fournier
Josif Bicja
Tucker Gordon
Katy Lewis
Linda Hutchins
Madelyn Glavin
Trevor Ricker

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

Table of Contents

Emily Nichols (NHDES)

- No comments. Recommended that impacts continue to be avoided and minimized.

Mike Dionne (NH Fish & Game)

- No comments

Kevin Newton (NH Fish & Game)

- Received consultation materials and will provide a response. Recommendations will likely include minimizing entrapment of reptile species in drainage features and possible time of year restrictions.

Mike Hicks (USACE)

- Will discuss vernal pool mitigation with others at USACE and will contact NHDOT/GM2 by the end of the week (12/22/2023) if mitigation is required for the vernal pool buffer impacts.

Littleton, 43809 (X-A005(203)):

The NH Department of Transportation (NHDOT) is proposing to rehabilitate four bridges in Littleton: I-93 NB and SB over the Ammonoosuc River (#188/060 and #187/060) and over Industrial Park Road (#190/058 and #189/058). The project will consist of substructure repairs, expansion joint replacement, bearing replacement, and pavement overlay. Temporary access roads will be constructed and removed as part of the project, to access the piers for substructure repairs for the bridges over the Ammonoosuc River. The temporary access roads will also be used for access to construct a temporary girder support system to support the superstructure of the bridges over the Ammonoosuc River during bearing replacement. The four bridges will be included into one combined project, which is anticipated to be constructed in 2024 and 2025, with an anticipated advertisement date of January 2024. A Standard Dredge and Fill Wetland Permit Application for a Tier 3 stream crossing and Shoreland PBN will be submitted for the project.

Kimberly Peace (KP) (Hoyle Tanner) provided an overview of the project and the natural resources in the project area. The purpose of the meeting was to receive input from NHDES with regard to impacts to wetlands, shoreland permitting, and proposed mitigation (ARM Fund payment) for the project.

Karl Benedict (KB) (NHDES) asked about the areas identified as permanent impacts. KP explained that much of the impacts have been identified in areas requiring excavation and regrading for installation of the temporary causeways and their associated footings. While the causeways and footings will ultimately be removed, due to the need to excavate and regrade these areas, permanent impacts were identified to accommodate for minor changes in the grade and substrate resulting from removal of the causeways. KB asked that a schedule including the timeframe for the installation and removal of the causeway be provided in the permit application. KB requested that the application include an indication of how areas below OWH would be restored and noted that the areas along the banks are a wildlife corridor and would like to see the banks restored. TR stated the causeways will be installed one at a time and that one would be removed prior to constructing the other. KP stated that the river is flashy and the limited

hydraulic analysis conducted for the project supports installing riprap on the banks for the causeway and as restoration, as the banks are currently. Chris Fournier (CF) (HEB Engineers, Inc) noted the riprap installed for causeway access is meant to be removed once the repair is done. KB stated that is what DES wants.

Emily Nichols (EM) (NHDES) stated she cannot speak to mitigation until the impacts are confirmed with KB.

Mike Dionne (MD) (NHF&G) stated with the water diversion there may be a time of year restriction for trout. He will follow up on this. Jonathan Evans (JE) (NHDOT) asked if he knew what that restriction would be and MD stated possibly no in water work October/November. MD stated he would talk to fisheries.

Kevin Newton (KN) (NHF&G) stated he doesn't have many concerns however he would like to see vegetation on the banks for wildlife.

Jamie Sikora (JS) (FHWA) asked if there has been coordination with the Town of Littleton. There is a trail that is in the area and while ATVs are not allowed on the trail, he believes there is an agreement with Town allowing ATVs on Industrial Park Road that could be impacted by the project. JS also noted that the trail may be a section 4(f) recreational resource. JE stated that the Department is aware of this 4(f) resource and coordination with the Town as well as the NH Department of Natural and Cultural Resources (DNCR) who operates the trail is ongoing to ensure any impacts or concerns associated with this resource have been adequately addressed.

Seta Detzel (SD) (NHDES) asked if there are any PRAs. KP stated there are pockets of floodplain wetlands that we are trying to avoid. Should there be impacts to these wetlands they will be minimal and temporary. SD stated that temporary impacts to PRAs would not require mitigation and that the permit application should include documentation that shows there is no loss to the functions and values of the wetlands.

David Scott (DS) (NHDOT) stated that the advertisement date for the project shown as January 2024 will likely shift to a date later in 2024 which has yet to be determined.

Acworth, 43566C (FEMA 670946):

Jason Ayotte (JA) (NHDOT Project Manager) provided an overview of the project, which will address a deteriorated and damaged culvert carrying an unnamed stream under NH Route 123A adjacent to the Cold River in the Town of Acworth. The original damage to the culvert and roadway occurred in 2021 during a high rainfall event which caused extensive flooding in the area. The Department is coordinating with the Federal Emergency Management Administration (FEMA) to receive funding for project, and is working to meet the resulting permitting, scheduling, and design requirements. Linda Hutchins (LH), representing FEMA, is also in attendance. JA explained that the NH Department of Transportation (the Department) has met with Town officials who agreed to allow the road to be closed during construction in order minimize construction timeframe and impacts to resources in the area, especially the Cold River. The Town also requested to schedule construction during the Summer of 2025 to avoid impacting the school bus routes in the area. The current advertisement date is July 16, 2024. The

Note: Pages not applicable to the permit application have been removed.

BUREAU OF ENVIRONMENT
CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: June 21, 2023
LOCATION OF CONFERENCE: Virtual meeting held via Zoom

ATTENDED BY:

NHDOT
Matt Urban
Andrew O'Sullivan
Mark Hemmerlein
Jim Commerford
Rhona Thomson
Kirk Mudgett
Arin Mills
Anthony Weatherbee
Jason Ayotte
Dillan Schmidt
David Scott

ACOE
Mike Hicks

USCG
Gary Croot

EPA
Absent

NHDES
Karl Benedict
Mary Ann Tilton
Chris Williams
Kristin Duclos

NHB
Ashley Litwinenko

NH Fish & Game
Mike Dionne
Kevin Newton

Federal Highway
Absent

US Fish & Wildlife
Absent

The Nature Conservancy
Absent

NH Transportation & Wildlife Workgroup
Absent

Consultants/ Public Participants
Kimberly Peace
Michael Leach
Rene LeBranche
Jenn Riordan
Tom Levins
Stephen Haas
Chris Fournier

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

Table of Contents

auxiliary turn lanes for accessing the commercial driveways along the corridor have been identified to be the focus of the Moultonborough 40639 project funded through the NHDOT Surface Transportation Program (STP). Potential improvements may include intersection realignment, auxiliary turn lanes, sight distance modifications, sidewalks, driveway access management, traffic signals (if warranted); along with associated signage, lighting, and drainage improvements as required.

The project limits begin at the western intersection of NH Route 25 and Lake Shore Drive (West) that is located almost adjacent to the Center Harbor/Moultonborough Town Line, beginning 350' west of the Bean Road/NH Route 25 intersection. The project extends along NH Route 25 to 300' east of the Lake Shore Drive/NH Route 25 intersection.

Environmental concerns driving alternative analysis include Rare Species, Historic, 4(f), Wetlands, Water Quality, Protected Shoreland, Contamination and Stream Crossings were presented and discussed. The project alternatives currently designed for consideration were presented. Following the presentation questions and comments were received.

Karl Benedict (NHDES Wetlands Bureau) commented on reducing impacts to the protected shoreland of Lake Kanasatka and Winnipesaukee during design as feasible, and that wetland impacts within the ROW seem reasonable for the project and will need permitting after avoidance and minimization. Because of the potential need for mitigation for USACE impacts to wetlands over 5,000 sq ft, wetland impacts will be evaluated during design to be reduced as feasible.
Mike Dionne (NHFGD) stated the impacts to the listed species and habitat on the NHNHB Datacheck, bridle shiner and common loon, can be avoided by not directly altering the lake shore habitat, which is proposed for the alternatives presented, but any potential impacts to the lake's vegetated buffers should also be avoided. He stated that it is likely that the project will not affect nesting loons but if possible, construction near Lake Kanasatka should occur outside of their nesting season, May 1- June 30.

NHNHB representatives were not present. Mike Hicks (USACE) had no comment. FHWA had no comment. USCG had no comment.

Littleton, 43809 (X-A005(203)):

Kimberly Peace (Hoyle Tanner) introduced the project, which consists of preservation of four bridges in Littleton. The project will include: a temporary superstructure support system with temporary scour protection and a temporary roadways and causeways to access the existing piers and abutment, and rehabilitation of the concrete piers for Bridge #187/060 and #188/060 (I93 SB & NB over the Ammonoosuc River); and a temporary superstructure support system and rehabilitation of the concrete piers for Bridge #189/058 and #190/058 (I-93 SB & NB over Industrial Park Road, NHRR (ABD)) . The four bridges will be included into one combined project, which is anticipated to be constructed in 2024 and 2025, with an anticipated advertisement date of January 2024.

Environmental concerns regarding Wetlands, Protected Shoreland for a Designated River, Floodways/floodplains and Contamination were presented and discussed. Following the presentation questions and comments were received.

Karl Benedict (NHDES Wetlands Bureau) noted that coordination with the LAC will be needed for the Designated River, and that impacts to wetlands in the southwest corner of the APE should be evaluated as potential Priority Resource Areas as Tier 3 floodplain wetlands. Impacts to these wetlands should be avoided as a higher priority than non-PRA wetlands. He also noted that DES will be asking for more details on the causeway design and location in the wetland permit application.

Mary Ann Tilton (NHDES Wetlands Assistant Bureau Administrator) asked if the river was evaluated during the functional assessment as high quality wildlife habitat, and they she expected it would be given the nature of rivers and floodplain wetlands have high wildlife habitat value. K. Peace said she will review the functional assessment with the CWS and will note that and will work with design to minimize impacts as feasible.

Mike Hicks had no comments, but offered to review the plans for the causeway when they are available for evaluation for the potential need for USACE mitigation with the other USACE staff.

Kevin Newton (NHFGD) noted that any efforts to preserve or replace vegetation within the riverbanks where it will be temporarily disturbed will be an enhancement to inland fishery resources in the river.

Mark Hemmerlein (DOT Water Quality Program Manager) noted that the wetland in the northeast section of the APE was a mitigation wetland from a project in the 1990's, possibly #10208, and should be avoided. Current design plans do not show impacts to this wetland and it will be avoided.

K. Peace asked K. Benedict if the wetland permit application could address Env-Wt Chapter 500 instead of Env-Wt Chapter 900 for Stream Crossings given that the project will not affect the crossing metrics, which was agreed to as long as there as a note in the permit application to this effect.

Supplemental Follow-up to Comments from NHDES at NR Meeting:

This permit application is using the term “access road” instead of causeway, to clarify that what is proposed will not be constructed into the river perpendicular to banks and flow, but rather parallel to the banks and streamflows with as minimal impacts as possible to the bank and streambed resources.

In response to Karl Benedict’s comments regarding
the timeframe for installation of the causeways, each access road will be constructed during a different construction season/year, and will be installed and removed completely before the opposite side will be constructed. Contractors will be limited to one year to complete work on each side of the river, resulting in a 2-year overall project schedule. Specific work months, and details regarding start and stop dates, will be left open for the contractor to address during means and methods in order to best utilize cost efficiencies where they may be proposed within the limits of the permit conditions and plan notes.

Coordination with NHF&G was completed and, per the attached email from Mike Dionne, there will be no Time of Year Restriction for in stream work due to wild brook trout.

Upon review of the meeting comments, all project impacts were revised to be shown as temporary due to the inclusion of a Restoration Plan that details efforts required to address disturbed resource areas. This meets the goals or minimization the extent feasible for the project and provides the best protection to the banks and stream channel. Because of this, compensatory mitigation is not proposed.

Coordination with the LAC was completed during NEPA review with no comments received; a copy of the wetland permit application has been submitted to them concurrent with submittal to NHDES.

From:	Dionne, Michael
To:	Peace, Kimberly R.
Cc:	Schmidt, Dillan; Coon, Deb L.
Subject:	[External] Re: Littleton-43809 Potential TOY Restriction?
Date:	Wednesday, February 7, 2024 2:39:35 PM
Attachments:	image001.png fce28c19-aa87-4509-a54c-4f941bae5ac0.png

Hi Kimberly,
Sorry for the delay. I talked to Inland Fisheries and they indicated water temp data and electrofishing data suggest there are very few or no wild brook trout in this part of the Ammo, so no TOY will be needed.

If you have further questions or concerns let me know.

Mike Dionne
Environmental Review Coordinator

NH Fish & Game Department
11 Hazen Drive
Concord, NH 03301
(603) 271-1136, michael.dionne@wildlife.nh.gov

NH Fish and Game…*connecting you to life outdoors*
www.wildnh.com, www.facebook.com/nhfishandgame

Did you know? *New Hampshire Fish and Game has been conserving New Hampshire's wildlife and their habitats since 1865.*

From: Peace, Kimberly R. <kpeace@hoyletanner.com>
Sent: Monday, February 5, 2024 9:38 AM
To: Dionne, Michael <Michael.A.Dionne@wildlife.nh.gov>
Cc: Schmidt, Dillan <Dillan.C.Schmidt@dot.nh.gov>; Coon, Deb L. <dcoon@hoyletanner.com>
Subject: Littleton-43809 Potential TOY Restriction?

Hi Mike, when we met for this project at the December NR meeting you commented on the potential for a TOY restriction for trout, and that you would discuss with fisheries staff and get back to us (meeting minutes attached). Can you please let us know what you decided? We are working on submitting the NHDES wetland permit application soon and would need to include that in the application and on plans. The project was cleared by NHNHB with no species hits, and the crossing is not identified for species habitat (including wild brook trout or cold water fishery) on the Aquatic Restoration mapper,

I have attached the NR Meeting presentation that includes the location map and plans, but if you need anything more for your review and coordination, please let me know.

Thanks-

Kimberly Peace
Vice President - Senior Environmental Coordinator at Hoyle Tanner
kpeace@hoyletanner.com

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Wetland Delineation Report, Functional Assessment & Site Photos

Wetland Delineation Report

NH Department of Environmental Services, Wetlands Bureau

Rehabilitation of Interstate 93 Bridge over the Ammonoosuc River
Littleton, NH

11/15/2023

Prepared for:
NH Department of Transportation
7 Hazen Drive
Concord, NH 03301

July 2023

HOYLE TANNER

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WETLAND DELINEATION REPORT
Rehabilitation of Interstate 93 Bridge over the Ammonoosuc River
NHDOT Project No. 43809

Hoyle Tanner Project Number: 21.092597.04

July 2023

Table of Contents

Appendices

1. Introduction

This report has been prepared by Hoyle, Tanner & Associates, Inc. (Hoyle Tanner) to document field conditions at the Interstate 93 Northbound and Southbound bridges over the Ammonoosuc River in Littleton, NH. Field investigations were performed on November 2 & 3, 2022 and May 17, 2023 by Joanne Theriault, NH Certified Wetland Scientist #305. Hoyle Tanner was contracted by the NH Department of Transportation to perform this investigation in addition to permitting for rehabilitation of the existing bridges.

The report documents delineations of wetland resources under the jurisdiction of the NH Department of Environmental Services (NHDES) Wetland Bureau and the US Army Corps of Engineers (USACE) including wetland boundaries, stream ordinary high water (OHW), and stream top-of-bank (TOB). The site was also evaluated for the presence of potential vernal pool habitat and invasive plant populations within the project boundary. Stream crossing data was collected to enable preparation of an NHDES Wetland Permit Application.

2. Site Overview

The project site is located just south of Exit 42 on Interstate 93, a limited access highway that extends north to south through the state of NH. The regional land use is forested with commercial and industrial development bordering Interstate 93, the Ammonoosuc River, and nearby downtown Littleton. Local crossroads include NH Route 302 located north of the river and Industrial Park Drive that runs parallel to the river on the south side. (Appendix A).

The Ammonoosuc River flows perennially northeast to southwest through the greater project area. It originates from the western slope of Mount Washington, flows south-southwest through greater Coos County, crosses into Grafton County and ultimately joins with the Connecticut River in Haverhill, NH.

Review of existing available information resulted in the following regarding this site:

- The stream crossing itself is not a Priority Resource Area (PRA) defined by the NHDES Wetland Rules Env-Wt 100-900; however, nearby wetlands are mapped as Floodplain Wetlands Adjacent to a Tier 3 Stream. The Ammonoosuc River has a watershed of 84,160 acres (Tier 3), and Hoyle Tanner's field delineation confirms the presence of floodplain wetlands.
- The Ammonoosuc River is a Designated River, as determined by the NHDES Rivers Management and Protection Program (RMPP). Impacts within ¼ mile of the river will require consultation with the Ammonoosuc River Local Advisory Committee.
- The stream crossing is located within the 250-ft protected Shoreland as defined by the Shoreland Water Quality Protection Act (RSA 483-B) and its associated rules, Env-Wq 1400.
- The stream crossing is located near, but not within, several areas identified on the NH Wildlife Action Plan (WAP) as Highest Ranked Habitat in Biological Region (Appendix B).
- The project area includes no Prime Wetlands as determined by the Town of Littleton.

3. Methods

Hoyle Tanner performed the wetland delineation of the project area according to the criteria described in the US Army Corps of Engineers Wetlands Delineation Manual (USACE 1987) and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northeast and Northcentral Region (USACE 2012). Stream top-of-bank (TOB) delineations were determined based on observation of a break in slope at the upper limit of the stream's adjacent transitional slope per NH Wetland Rules Env-Wt 102.5. Delineations of the stream's Ordinary High Water (OHW) mark was based on the observation of physical shoreline characteristics as described in NH RSA 483-B:4, XI-e. Wetlands and surface waters on the site were classified using Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979).

Stream crossing assessment/classification data was collected at the site using the NHDOT Stream Crossing Assessment Worksheet (revised April 2022). Elevations were measured with a Leica Zeno GPS Unit. The data collected is sufficient to complete the NHDES Stream Crossing Worksheet (NHDES-W-06-071) for existing crossings.

4. Results

The November 2022 site investigation included delineation of wetland and stream resources at the site and collection of stream assessment/classification data. Field conditions during this survey included temperatures ranging from 32-53˚ F, partly cloudy skies, and 5-10 mph winds. No major precipitation events occurred in the two weeks preceding the survey, and surface/ground water levels were typical for New England in fall.

The May 2023 site investigation included the delineation of wetland and stream resources using a revised project area, requiring extension of some wetland and stream boundaries and delineation of several new wetlands. Field conditions during the survey included temperatures ranging from 40-55 ˚ F with occasional flurries. Wind speeds were estimated at 10-15 mph.

The current project area includes Interstate 93 and its two crossings over the Ammonoosuc River and Industrial Park Drive. The Ammonoosuc River has moderately high banks in the project area, and the banks are altered from their natural state by fill associated with bridge footings in the immediate vicinity of the crossing. The river has a >200' forested riparian buffer on all sides of the bridge except for the northwest quadrant, where a Walmart and its parking lot are located. The forested buffer has a young overstory dominated variably by silver maple (*Acer saccharinum*), quaking aspen (*Populus tremuloides*) and some white pine (*Pinus strobus*).

4.1 Wetlands and Streams

The following resources were delineated within the project area as shown in Appendix C:

Stream 1 – Ammonoosuc River North and South Banks

Defined banks contain the Ammonoosuc River throughout the project area. OHW was identified by observing accumulated leaf debris and directional growth of herbaceous vegetation indicating exposure to stream flow, which extends over the first visible bank break in slope and extends nearly as high as the

I-93 bridge piers. The dramatic difference between the OHW and the observed edge of water indicates that the Ammonoosuc River has notably variable flow elevations between low and high waters. The observed OHW is coincident with a break in slope in many places; therefore, TOB was delineated in the same location as OHW on the southern bank and the eastern end of the northern bank.

Dominant vegetation in the vicinity of the Ammonoosuc River delineated boundaries includes goldenrod (*Solidago sp*.), meadowsweet (*Spiraea alba*), glossy buckthorn (*Frangula alnus*), quaking aspen (*Populus tremuloides*), red maple (*Acer rubrum*), and silver maple (*A. saccharinum*). The streambed substrate is dominated by cobble with interspersed sand, gravel, and boulders. The classification of the Ammonoosuc River in the vicinity of the Interstate 93 crossing is R3UB1H (Riverine, Upper Perennial Flow Regime, Unconsolidated Bottom, Gravel/Cobble Substrate, Permanently Flooded).

Streams 2 & 3

An intermittent stream (Field ID: Stream 2) was delineated on the south side of Industrial Park Road. The stream originates southeast of the project area, flows adjacent to Industrial Park Road for approximately 80', enters a culvert and flows under the road. Stream 2 lies at the bottom of a rip-rap reinforced fill slope leading to the Interstate 93 bridge. The continuation of Stream 2 then emerges briefly between Industrial Park Road and the parallel Ammonoosuc Rail Trail where a culvert inlet and outlet sit approximately 5' apart, and the stream (Field ID: Stream 3) flows between them. The stream is then conveyed by pipe under the rail trail and outlets into Wetland 6 east of the project boundary.

Dominant vegetation within and adjacent to Streams 2 &3 include meadowsweet, high bush blueberry (*Vaccinium corymbosum*), vetch (*Vicia sp*.), goldenrod, quaking aspen, and white pine (*Pinus strobus*). The substrate of Streams 3 & 3 consists of rooted vegetation, rip rap from the adjacent slope and some sandy and organic material. The classification of Stream 2 & 3 is R4SB2/7J (Riverine, Intermittent, Streambed, Rubble/Vegetated Substrate, Intermittently Flooded).

Wetland 1

A wetland was noted and delineated east of the Interstate 93 Northbound bridge just above the north bank of the Ammonoosuc River. Wetland 1 lies below an existing access trail and continues eastward out of the project area. The dominant vegetation in Wetland 1 is high bush blueberry, meadowsweet, glossy buckthorn with some sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmundastrum cinnamomeum*), and goldenrod. Hydric soils within Wetland 1 have a sandy loam texture. The classification of Wetland 1 is PSS1E (Palustrine, Scrub-Shrub, Broad-Leaf Deciduous Vegetation, Seasonally Flooded/Saturated).

Wetland 2

Wetland 2 was delineated during the May 2023 extension survey and is located above the north bank of the Ammonoosuc River and east of Interstate 93. This wetland is a flat and low-lying area sitting between the steep embankment created for I-93 and a wooded path extending north-south from the Ammonoosuc River. Wetland 2 has sections of perennial flooding vegetated with a near-monoculture of *Phragmites australis* interspersed with mounds containing meadowsweet (*Spiraea alba*), pussy willow (*Salix discolor*), blue flag iris (*Iris versicolor*), tussock sedge (*Carex stricta*), sensitive fern (*Onoclea sensibilis*), and swamp violet (*Viola cucullata*). Japanese knotweed is prolific on the margins of Wetland 2. The classification of Wetland 2 is PEM1/5E (Palustrine, Emergent, *Phragmites australis*/Persistent Vegetation, Seasonally Flooded/Saturated).

Wetland 3

Wetland 3 was delineated during the May 2023 extension survey and is located in the riparian area of the Ammonoosuc River's north bank east of Interstate 93. It contains an eroded side channel that inlets and outlets to the river on the wetland's northeast and southwest sides. This channel likely carries riverine flow during high flow events, but the elevation of the wetland and the established vegetation indicate that Wetland 3 sits above the Ammonoosuc River's OHW line. Dominant vegetation in Wetland 3 includes glossy buckthorn (*Frangula alnus*) and meadowsweet with mixed grasses and sedges (*Carex* sp). The classification of Wetland 3 is PEM1E (Palustrine, Emergent, Persistent Vegetation, Seasonally Flooded/Saturated).

Wetland 4

Wetland 4 was delineated east of the Walmart loading dock above the north bank of the Ammonoosuc River. Wetland 4 represents the southeastern-most finger of a vast open-water wetland system extending around the corner of the Walmart known as the Littleton Protected Marshlands (the Marshlands), which is associated with a perennial tributary to the Ammonoosuc River. Portions of this wetland are considered Floodplain Wetlands on a Tier 3 Watercourse and are therefore Priority Resource Areas per Env-Wt 103.66c; however, no portion of the mapped PRA extends into the project area. The Marshlands are primarily located on a town-owned parcel with portions extending onto the surrounding private lots.

Wetland 4 flows into a pipe at its southern extent, and the pipe outlet is located below the TOB of the Ammonoosuc River to the southeast. Wetland 4 was saturated and partially flooded at the time of survey. The dominant vegetation in Wetland 4 is an outer border of high bush blueberry and reed canary grass (*Phalaris arundinacea*) with an abrupt transition to upland soils dominated by goldenrod, young quaking aspen, and overhanging staghorn sumac (*Rhus typhina*). The classification of Wetland 4 within the project area is PSS1E (Palustrine, Scrub-Shrub, Broad-Leaf Deciduous Vegetation, Seasonally Flooded/Saturated).

Wetland 5

Little floodplain wetland development is present within the project area due to bank height and adjacent constructed slopes; however, one small floodplain wetland was delineated upstream of the northbound bridge above the southern bank. Wetland 5 is a small, bankside wetland whose hydrology is likely fed primarily by the Ammonoosuc River during times of medium to high flows. Its boundaries are derived from gentle riverside slopes and sudden stepwise slopes created by fallen trees. Vegetation in Wetland 5 is dominated by herbaceous strata species including seedling meadowsweet, reed canary grass, sphagnum moss (*Sphagnum sp*.), and sedges (*Carex sp*.). No trees are rooted within Wetland 5, but it is located beneath a mature tree canopy. The classification of Wetland 5 is PFO1E (Palustrine, Forested, Broad-Leaf Deciduous Vegetation, Seasonally Flooded/Saturated).

Wetland 6

Wetland 6 is the western side of a sizeable wetland system nested between the Ammonoosuc Rail Trail to the south, the Interstate 93 northbound bridge slope to the west, the Ammonoosuc River to the north, and a mowed/maintained area to the east. The central portions of Wetland 6 are dominated by emergent vegetation and were saturated at the time of survey. Edges of the wetland as the ground elevation gently increases are dominated by a combination of shrub and overstory vegetation with a less

dense understory. Dominant vegetation includes broad-leaf cattail (*Typha latifolia*), sensitive fern, silver maple, reed canary grass, meadowsweet, yellow birch (*Betula alleghaniensis*), sedges, goldenrod, high-bush blueberry, crab apple (*Malus sp*.), and meadow rue (*Thalictrum sp*.). Wetland 6's loamy sand soil transitioned from a depleted to a matrix with chroma >3 at its transitions to upland. The classification of Wetland 6 is PFO1/4E (Palustrine, Forested, Broad-Leaf Deciduous and Needle-Leaf Evergreen Vegetation, Seasonally Flooded/Saturated) at its margins. The center and most poorly drained portion is PEM1E (Palustrine Emergent Broad-Leaf Deciduous Vegetation, Seasonally Flooded/Saturated).

Wetland 7 & Stream 4

Wetland 7 and Stream 4 are a stream/wetland complex flowing northwestward with hydrology originating from Industrial Park Road and the Ammonoosuc Rail Trail from the southeast and southbound Interstate 93 from the northeast. Stormwater from the interstate enters Wetland 7 and Stream 4 through a pipe. Stream 4 flows intermittently through a somewhat sinuous defined channel with eroded, 2-3' banks, and Wetland 7 lies adjacent to Stream 4 and receives water both from floodwaters and a likely groundwater connection. Wetland 7 also widens, forming a floodplain wetland to the Ammonoosuc River near the Stream 4 confluence. Stream 4 and Wetland 7 receive stormwater from heavily utilized impervious surfaces and therefore contain notable quantities of roadway chemicals and oils. Dominant vegetation within the Wetland 7 & Stream 4 complex includes high bush blueberry, sensitive fern, red maple (*Acer rubrum*), paper birch (*Betula papyrifera*), young balsam fir (*Abies balsamea*), and meadowsweet. The classification of Wetland 7 is PFO1/4E (Palustrine, Forested, Broad-Leaf Deciduous and Needle-Leaf Evergreen Vegetation, Seasonally Flooded/Saturated). The classification of Stream 4 is R4SB1/2 (Riverine, Intermittent, Streambed, Cobble/Gravel and Sand Substrate).

Wetland 8

Wetland 8 was delineated during the May 2023 extension survey and is located at the southern extent of the project area, west of Interstate 93. It is a linear resource as its hydrology descends the roadside slope approaching Industrial Park Road and a culvert conveys it under the road. At the top of the road slope, Wetland 8 widens into a saturated, vegetated wetland with no defined channel. The high elevation of Wetland 8 indicates that its primary hydrology source is precipitation and run-off from the adjacent Interstate 93 to the east and Burndy Road to the south. Primary vegetation in Wetland 8 is meadowsweet, interrupted fern (*Osmunda claytoniana*), lady fern (*Athyrium filix-femina*), sensitive fern, red maple (*Acer rubrum*), speckled alder (*Alnus incana*), sarsparilla (*Smilax* sp.), and sedges in the most saturated areas. The Cowardin Classification of Wetland 8 is PEM1E (Palustrine, Emergent, Persistent Vegetation, Seasonally Flooded/Saturated).

4.2 Wetland Functions and Values

The Ammonoosuc River, and all additional delineated resources have been assessed for their functions and values in the vicinity of the Interstate 93 crossing (Appendix D). The Ammonoosuc River is a significant resource in the state of NH, providing economic value, wildlife habitat, and serving vast watershed areas from the White Mountains to Haverhill, NH; however, in the vicinity of the project area, the river flows through an area of high disturbance with some altered, eroded banks, and a towering roadbed overhead. The Ammonoosuc River in its entirety is suitable for numerous functions and values but primarily serves the following functions and values in the vicinity of the US Route 3 crossing: floodflow alteration, fish & wildlife habitat, and aesthetic quality.

The following principal functions and values are associated with the other delineated resources in the project area:

- Streams 2 & 3: Floodflow Alteration
- Wetland 1: Floodflow Alteration
- Wetland 2: Floodflow Alteration, Groundwater Discharge/Recharge, Nutrient Removal, Sediment/Toxicant Retention
- Wetland 3: Floodflow Alteration, Sediment/Shoreline Stabilization
- Wetland 4: Floodflow Alteration, Groundwater Discharge/Recharge, Nutrient Removal, Sediment/Toxicant Retention, Visual Quality/Aesthetics, Sediment/Shoreline Stabilization, and Wildlife Habitat
- Wetland 5: Floodflow Alteration
- Wetland 6: Floodflow Alteration, Groundwater Discharge/Recharge, Nutrient Removal, Sediment/Toxicant Retention, Visual Quality/Aesthetics, and Wildlife Habitat
- Wetland 7 & Stream 4: Floodflow Alteration, Sediment/Shoreline Stabilization
- Wetland 8: Floodflow Alteration

4.3 Vernal Pool Habitat

No vernal pool habitat was observed at the site.

4.4 Invasive Species

Glossy buckthorn and Japanese knotweed (*Reynoutria japonica*) were observed within the project area. Japanese knotweed is common on and above the banks of the Ammonoosuc River, particularly above the southern bank near the confluence of Stream 5. Glossy buckthorn can be found throughout the project area, particularly along wetland boundaries. Populations and individual stems of invasive species were flagged in the field and located with a GPS Unit.

5. Literature Cited

1. Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U. S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Jamestown, ND: Northern Prairie Wildlife Research Center.

2. New England Hydric Soils Technical Committee (NEHSTC). 2019 Version 4, Field Indicators for Identifying Hydric Soils in New England. New England Interstate Water Pollution Control Commission, Lowell, MA

3. US Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetlands Delineation Manual. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. Technical Report Y-87-1. 207 p.

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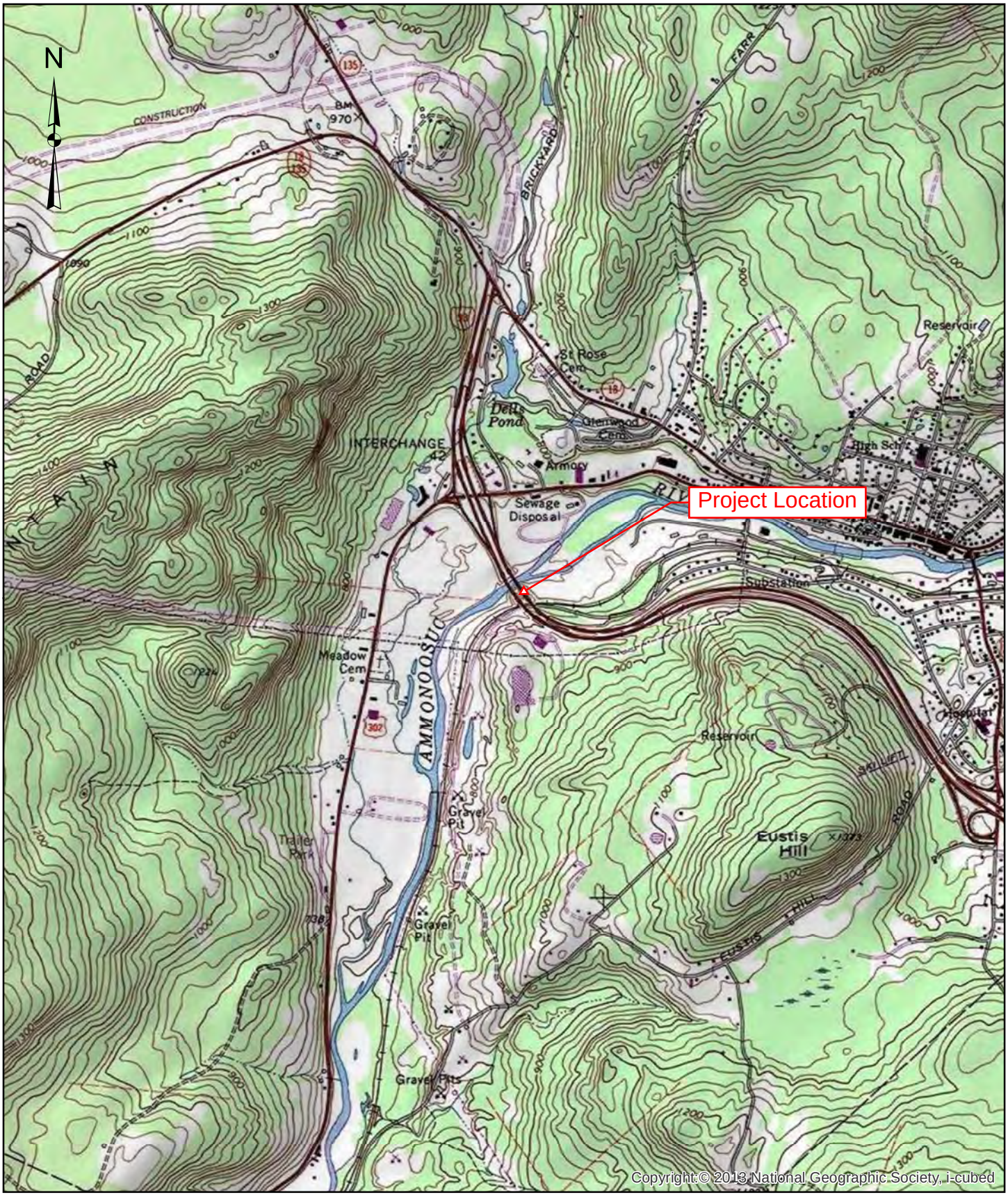
5. U.S. Army Corps of Engineers. 2011. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

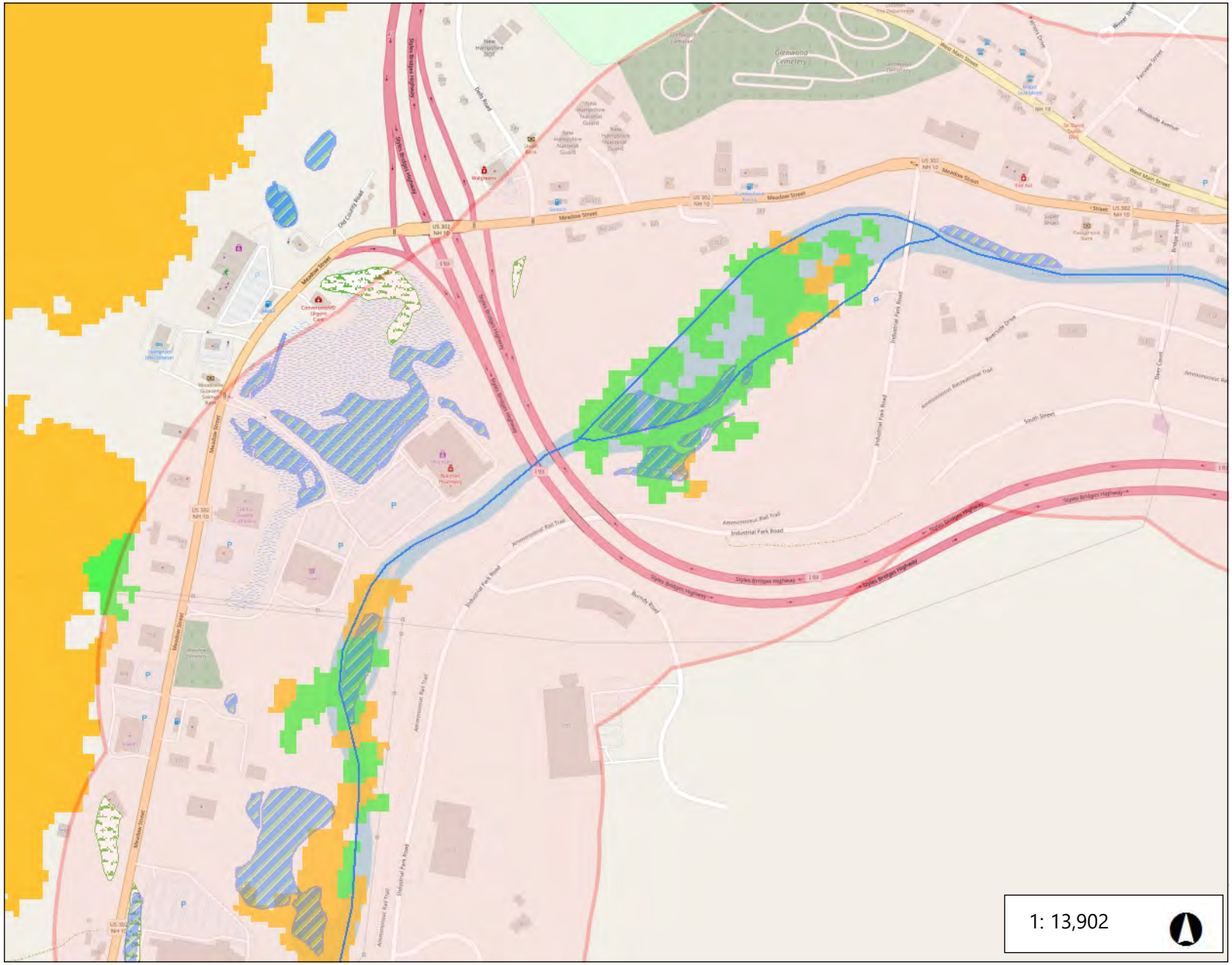
Appendix A: Project Location Map



HOYLE TANNER	150 Dow Street Manchester, NH 03101 www.hoyletanner.com		NHDOT PROJECT NO. 43809 I-93 OVER THE AMMONOOSUC RIVER LITTLETON, NH	APPENDIX A
DR. BY jtheriault	DATE 1/31/2023	SCALE 1 inch = 2,000 feet	PROJECT LOCATION MAP	

Appendix B: NH Wetland Permit Planning Tool Map

Your Organization | Appendix B: NH Wetland Permit Planning Tool Map



Legend

- Additional Lines
- Peatlands
- Designated River Corridor
  - Subject to SWQPA
  - Not Subject to SWQPA
- Flood Plain Wetlands Adjacent to Tier 3 Streams
- Marsh-Scrub / Shrub Wetlands Prime Wetlands
- Prime Wetlands with 100 ft Buffer
- Urban Exemptions
- Streams and Rivers
  - 4
  - 5
  - 6
  - 7
- Lakes and Ponds
- Highest Ranked Wildlife Habitat
  - 0
  - 1 Highest Ranked Habitat in NH
  - 2 Highest Ranked Habitat in Regior
  - 3 Supporting Landscape

Notes

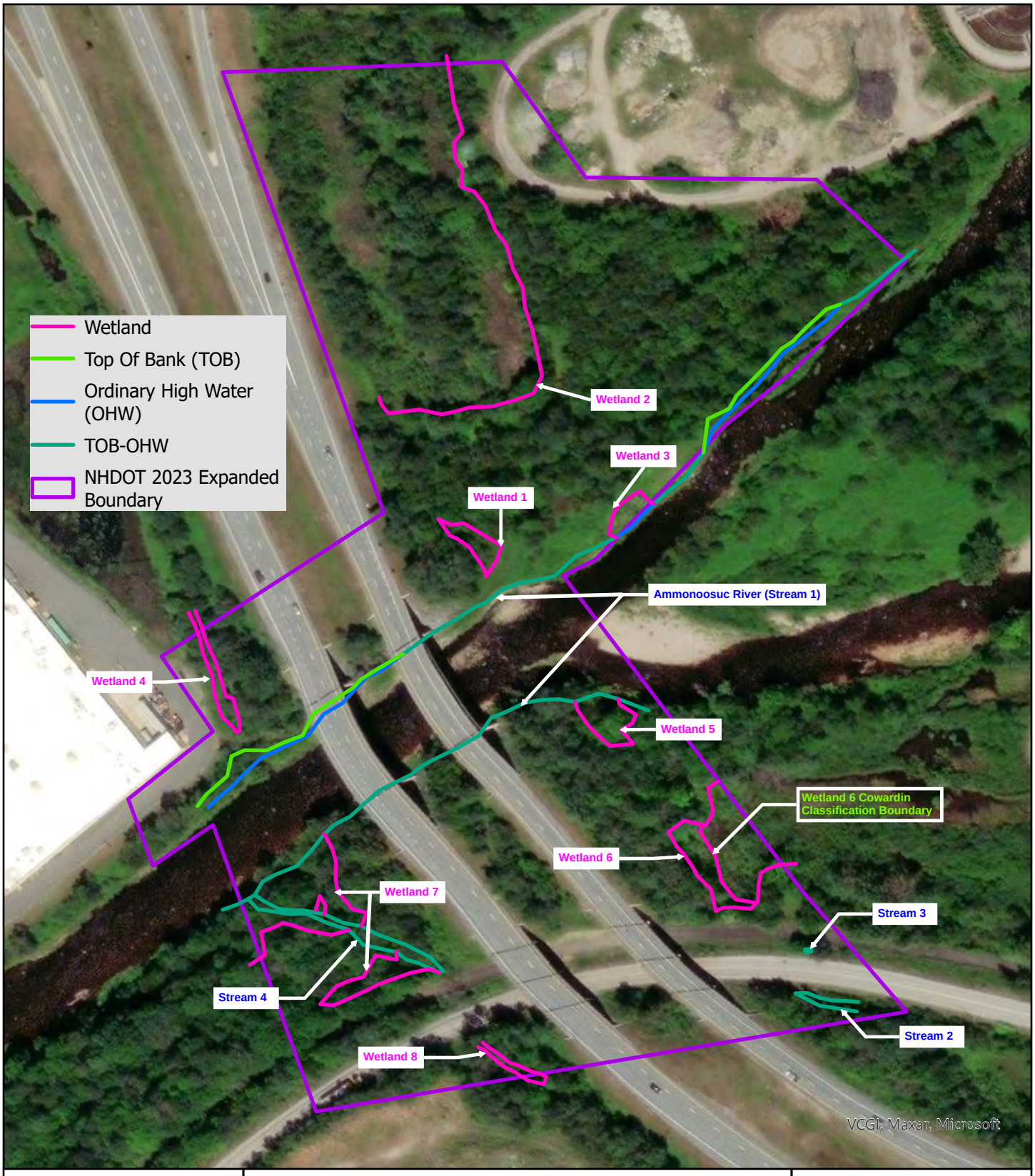
0.4 0 0.22 0.4 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Appendix C: Aerial Wetland Delineation Map



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NHDOT Project No. 43809
I-93 over the Ammonoosuc River
Littleton, NH

Wetland and Stream Map

Last updated on *Thursday, July 13, 2023* by *jtheriault*

N

SCALE
1 inch = 250 feet

Appendix D: Project Photographs

Photo 1 – Ammonoosuc North Bank Under Southbound Bridge Facing Downstream/SW – 11/2/2022

Photo 2 – Ammonoosuc North Bank Under Southbound Bridge Facing Upstream/NE – 11/2/2022

Photo 3 – Ammonoosuc North Bank Under Northbound Bridge Facing Upstream/NE – 11/2/2022

Photo 4 – Wetland 1 From Interior Facing North – 11/2/2022

Photo 5 – Wetland 1 From Path Facing North – 11/2/2022

Photo 6 – Wetland 2 Flooded Portion Facing South - 5/17/2023

Photo 7 – Wetland 2 Flooded Portion Facing North - 5/17/2023

Photo 8 – Wetland 3 From Center Facing Upstream - 5/17/2023

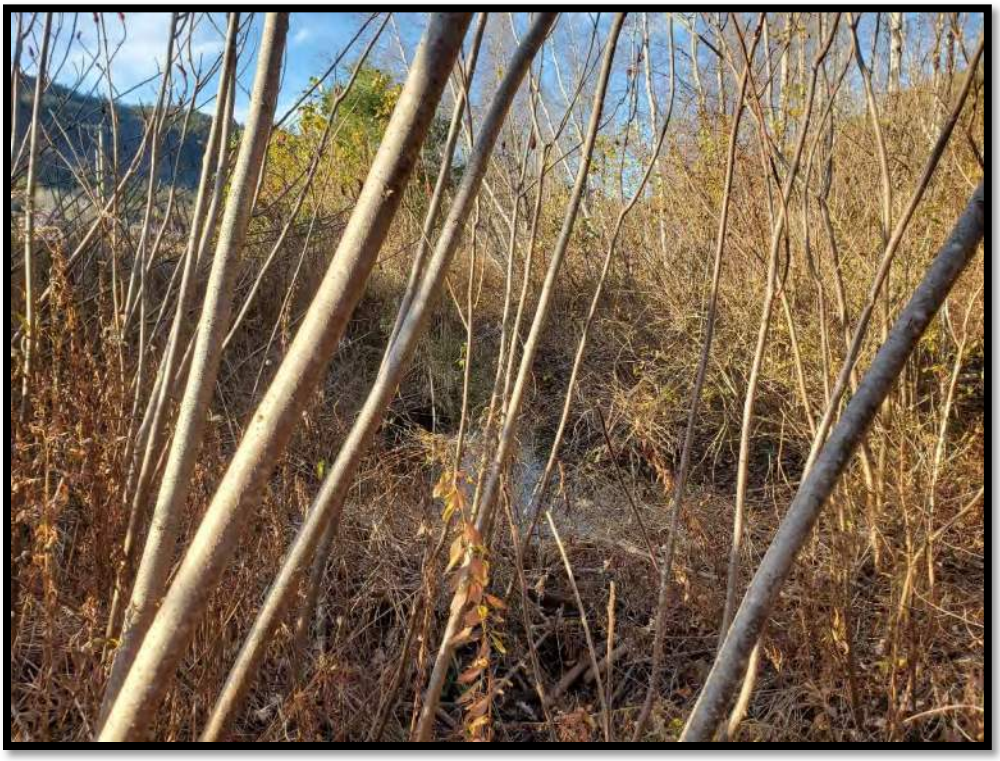


Photo 9 – Wetland 4 Facing North View of Flooding– 11/2/2022

Photo 10– Wetland 5 From East Side Facing East – 11/3/2022

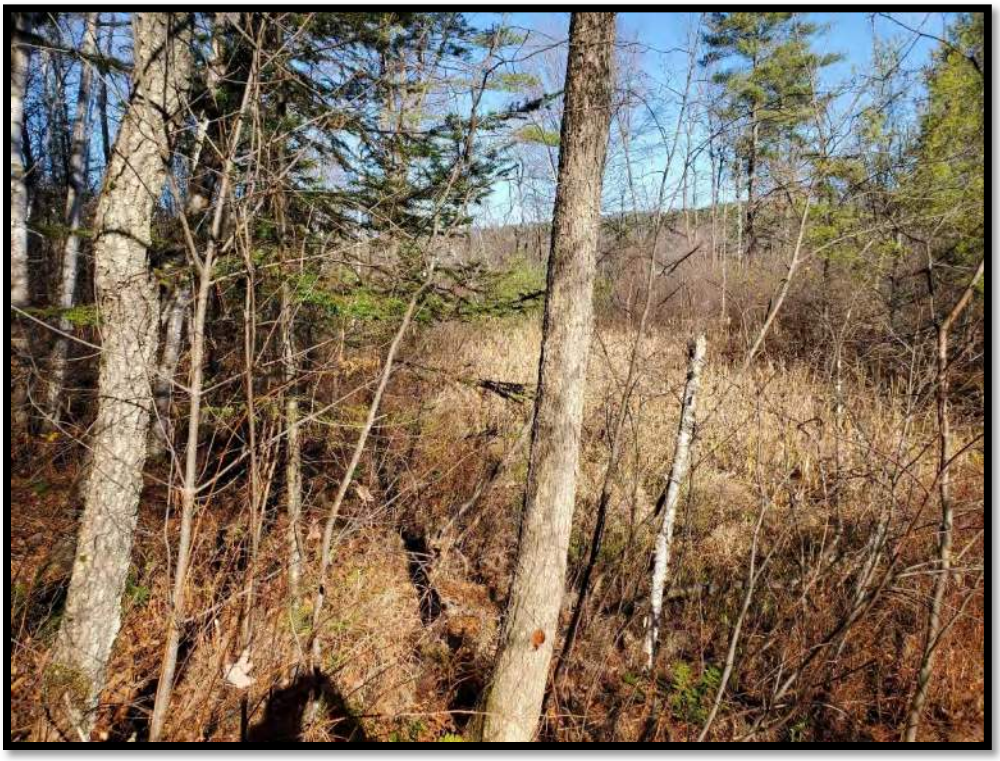


Photo 11 – Wetland 6 from Southeast Corner of Ammonoosuc Rail Trail – 11/3/2022

Photo 12– Wetland 7 Facing North – 11/3/2022

Photo 13 – Wetland 7/Stream 4 Facing Downstream/Northwest – 11/3/2022

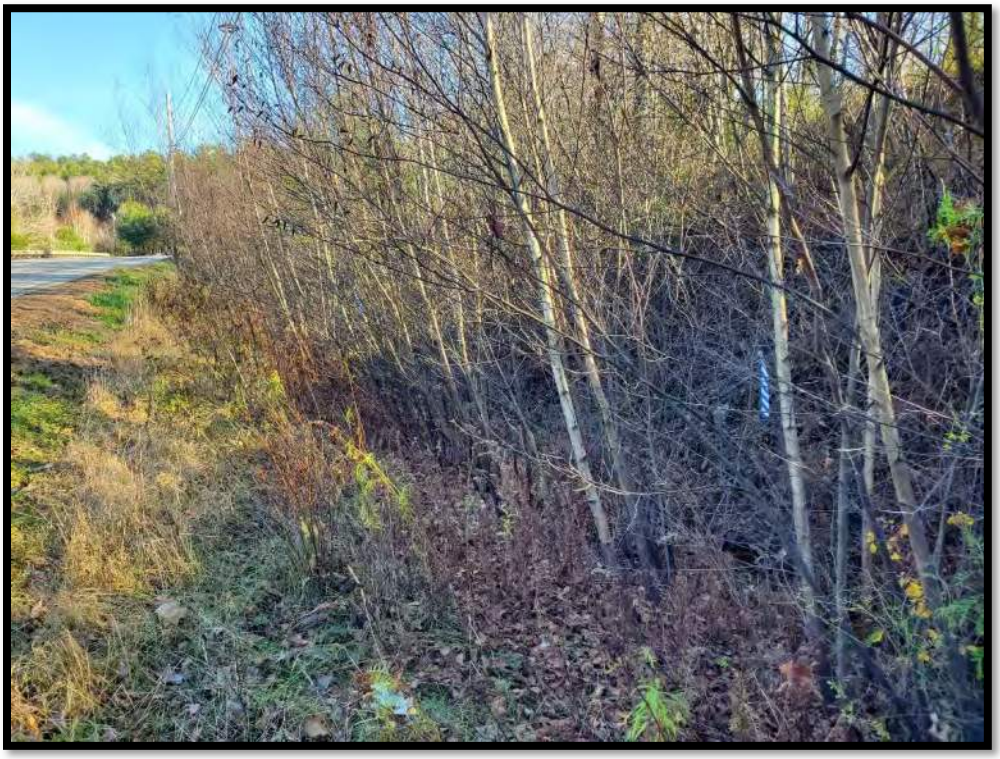


Photo 14– Stream 2 Facing Upstream/Southeast from Industrial Park Road – 11/3/2022

Photo 15 – Stream 3 View of Two Headwalls Facing East – 11/3/2022

Photo 16– Ammonoosuc South Bank Between NB and SB Bridges Facing Northwest – 11/3/2022

Photo 17– Ammonoosuc South Bank Between NB and SB Bridges Facing Northeast – 11/3/2022

Photo 18 – Ammonoosuc South Bank From Under SB Bridge Facing West – 11/3/2022

Photo 19 – Wetland 8 from Road Slope Facing West/Upslope - 5/17/2023

Appendix E: Wetland Functions and Values Assessment

WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management
Wetlands Bureau

Check the Status of your Application

RSA/Rule: RSA 482-A / Env-Wt 311.03(b)(10); Env-Wt 311.10

APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation

As required by Env-Wt 311.03(b)(10), an application for a standard permit for minor and major projects must include a functional assessment of all wetlands on the project site as specified in Env-Wt 311.10. This worksheet will help you compile data for the functional assessment needed to meet federal (US Army Corps of Engineers (USACE); if applicable) and NHDES requirements. Additional requirements are needed for projects in tidal area; please refer to the Coastal Area Worksheet (NHDES-W-06-079) for more information.

Both a desktop review and a field examination are needed to accurately determine surrounding land use, hydrology, hydroperiod, hydric soils, vegetation, structural complexity of wetland classes, hydrologic connections between wetlands or stream systems or wetland complex, position in the landscape, and physical characteristics of wetlands and associated surface waters. The results of the evaluation are to be used to select the location of the proposed project having the least impact to wetland functions and values (Env-Wt 311.10). This worksheet can be used in conjunction with the Avoidance and Minimization Written Narrative (NHDES-W-06-089) and the Avoidance and Minimization Checklist (NHDES-W-06-050) to address Env-Wt 313.03 (Avoidance and Minimization). If more than one wetland/ stream resource is identified, multiple worksheets can be attached to the application. All wetland, vernal pools, and stream identification (ID) numbers are to be displayed and located on the wetlands delineation of the subject property.

SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)	
ADJACENT LAND USE: **Residential/Industrial**	
CONTIGUOUS UNDEVELOPED BUFFER ZONE PRESENT? ☐ Yes ☒ No	
DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT (in feet): **<25' to Interstate 93 NB & SB**	
SECTION 2 - DELINEATION (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)	
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: **Joanne Theriault, CWS #305**	
DATE(S) OF SITE VISIT(S): **11/2-3/2022 and 5/17/2023**	DELINEATION PER ENV-WT 406 COMPLETED? ☒ Yes ☐ No
CONFIRM THAT THE EVALUATION IS BASED ON: ☒ Office and ☒ Field examination.	
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"): ☒ USACE Highway Methodology. ☐ Other scientifically supported method (enter name/ title):	

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)	
WETLAND ID: **Wetland 1**	LOCATION: (LAT/ LONG) **44.305280/-71.796182**
WETLAND AREA: **2,100 SF (Within Project Area)**	DOMINANT WETLAND SYSTEMS PRESENT: **Near Perennial Stream**
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? **None**	COWARDIN CLASS: **PSS1E**
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☒ No if not, where does the wetland lie in the drainage basin? **Low - just above large perennial stream**	IS THE WETLAND PART OF: ☒ A wildlife corridor or ☐ A habitat island? IS THE WETLAND HUMAN-MADE? ☐ Yes ☒ No
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☒ Yes ☐ No	ARE VERNAL POOLS PRESENT? ☐ Yes ☒ No (If yes, complete the Vernal Pool Table)
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? ☒ Yes ☐ No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? ☒ Yes ☐ No
PROPOSED WETLAND IMPACT TYPE: **Bridge Rehabilitation**	PROPOSED WETLAND IMPACT AREA: **TBD – See Wetland Impact Plans**

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

The following table can be used to compile data on wetlands functions and values. The reference numbers indicated in the "Functions/ Values" column refer to the following functions and values:

1. Ecological Integrity (from RSA 482-A:2, XI)
2. Educational Potential (from USACE Highway Methodology: Educational/Scientific Value)
3. Fish & Aquatic Life Habitat (from USACE Highway Methodology: Fish & Shellfish Habitat)
4. Flood Storage (from USACE Highway Methodology: Floodflow Alteration)
5. Groundwater Recharge (from USACE Highway Methodology: Groundwater Recharge/Discharge)
6. Noteworthiness (from USACE Highway Methodology: Threatened or Endangered Species Habitat)
7. Nutrient Trapping/Retention & Transformation (from USACE Highway Methodology: Nutrient Removal)
8. Production Export (Nutrient) (from USACE Highway Methodology)
9. Scenic Quality (from USACE Highway Methodology: Visual Quality/Aesthetics)
10. Sediment Trapping (from USACE Highway Methodology: Sediment /Toxicant Retention)
11. Shoreline Anchoring (from USACE Highway Methodology: Sediment/Shoreline Stabilization)
12. Uniqueness/Heritage (from USACE Highway Methodology)
13. Wetland-based Recreation (from USACE Highway Methodology: Recreation)
14. Wetland-dependent Wildlife Habitat (from USACE Highway Methodology: Wildlife Habitat)

First, determine if a wetland is suitable for a particular function and value ("Suitability" column) and indicate the rationale behind your determination ("Rationale" column). Please use the rationale reference numbers listed in Appendix A of USACE *The Highway Methodology Workbook Supplement*. Second, indicate which functions and values are principal ("Principal Function/value?" column). As described in *The Highway Methodology Workbook Supplement*, "functions and values can be principal if they are an important physical component of a wetland ecosystem (function only) and/or are considered of special value to society, from a local, regional, and/or national perspective". "Important Notes" are to include characteristics the evaluator used to determine the principal function and value of the wetland.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☐ Yes ☒ No	N/A	☐ Yes ☒ No	N/A
2	☐ Yes ☒ No	9,10,11	☐ Yes ☒ No	Wetland 1 is unsuitable for this function.
3	☐ Yes ☒ No	1	☐ Yes ☒ No	Close to perennial stream but no surface water connection. Wetland 1 does not contain enough water to support fish populations.
4	☒ Yes ☐ No	3,4,5,6,8,9,10	☒ Yes ☐ No	Wetland 1 has the opportunity, size, and capacity to provide this function principally.
5	☒ Yes ☐ No	5,15	☐ Yes ☒ No	Wetland 1 does not serve this function principally at the project site
6	☐ Yes ☒ No		☐ Yes ☒ No	N/A
7	☐ Yes ☒ No	4	☐ Yes ☒ No	Adjacent land use likely results in excess nutrients, but the size and water regime of Wetland 1 does not indicate that this is a principal function.
8	☐ Yes ☒ No	1,12	☐ Yes ☒ No	The size, hydrology, and lack of vegetative diversity of Wetland 1 indicate that this function is not served principally.
9	☐ Yes ☒ No		☐ Yes ☒ No	Wetland 1 lacks the aesthetic quality to have this value.
10	☐ Yes ☒ No	1,2	☐ Yes ☒ No	Adjacent land use likely results in excess sediment and toxicants, but the water regime of Wetland 1 does not indicate that this is a principal function.
11	☐ Yes ☒ No	3	☐ Yes ☒ No	Wetland 1 lacks opportunity to serve this function due to its size and distance from the Ammonoosuc
12	☐ Yes ☒ No	2,8,11,14,22,31	☐ Yes ☒ No	Wetland 1 lacks unique features required to have this value.
13	☐ Yes ☒ No	12	☐ Yes ☒ No	Wetland 1 has little recreational potential due to its hydrology and location.

14	☒ Yes ☐ No	8	☐ Yes ☒ No	Wetland 1 is only moderately suitable for this function.

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

WETLAND ID: **Wetland 2**	LOCATION: (LAT/ LONG) **44.306362/-71.796442**
WETLAND AREA: **110,000 SF (Within Project Area)**	DOMINANT WETLAND SYSTEMS PRESENT: **Phragmites wetland**
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? **0**	COWARDIN CLASS: **PEM1/5E**
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☒ No if not, where does the wetland lie in the drainage basin? **Low - just above large perennial stream**	IS THE WETLAND PART OF: ☒ A wildlife corridor or ☐ A habitat island? IS THE WETLAND HUMAN-MADE? ☐ Yes ☒ No ***Human-Altered**
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☒ Yes ☐ No	ARE VERNAL POOLS PRESENT? ☐ Yes ☒ No (If yes, compluete the Vernal Pool Table)
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? ☒ Yes ☐ No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? ☒ Yes ☐ No
PROPOSED WETLAND IMPACT TYPE: **Bridge Rehabilitation**	PROPOSED WETLAND IMPACT AREA: **TBD – See Wetland Impact Plans**

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☐ Yes ☒ No	N/A	☐ Yes ☒ No	N/A
2	☐ Yes ☒ No	9,10,11	☐ Yes ☒ No	Wetland 2 is moderately suitable for this function but lacks direct access
3	☐ Yes ☒ No		☐ Yes ☒ No	Wetland 2 is close to a perennial stream but has no surface water connection. It has a long hydroperiod but lacks the permanence to support fish populations.
4	☒ Yes ☐ No	1,4,5,6,7,8,9,10,11,13,17	☒ Yes ☐ No	Wetland 2 has the opportunity, size, and capacity to provide this function principally.
5	☒ Yes ☐ No	1,2,5,15	☒ Yes ☐ No	Wetland 2 is likely present due to perennial connections with groundwater in addition to stream floodwaters.

6	☐ Yes ☒ No		☐ Yes ☒ No	N/A
7	☒ Yes ☐ No	1,2,3,4,5,6,7,8,9,10,11	☒ Yes ☐ No	Adjacent land use likely results in excess nutrients, and Wetland 2 contains the size, substrate, and hydroperiod to serve this function principally.
8	☐ Yes ☒ No	12	☐ Yes ☒ No	Wetland 2 is suitable for production export but does not appear to be providing this function principally.
9	☐ Yes ☒ No	2,10	☐ Yes ☒ No	Wetland 2 lacks the aesthetic quality to have this value.
10	☒ Yes ☐ No	1,2,3,4,5,6,10,15,16	☒ Yes ☐ No	Adjacent land use likely results in excess sediment and toxicants, and Wetland 2 contains the size, substrate, and hydroperiod to serve this function principally.
11	☐ Yes ☒ No	3,14,15	☐ Yes ☒ No	Wetland 2 has the potential to serve this function but lacks a channelized waterbody flowing through its center
12	☒ Yes ☐ No	2,3,5,8,11,12,14,22,31	☐ Yes ☒ No	Wetland 2 contains many of the aesthetic characteristics for this value but lacks many of the unique features required to serve the value principally.
13	☐ Yes ☒ No	12	☐ Yes ☒ No	Wetland 2 has little recreational potential due to its hydrology and location.
14	☒ Yes ☐ No	7,8,10,11,13,18,19,20	☐ Yes ☒ No	Wetland 2 has suitable resources but lacks a wildlife-friendly supporting landscape and diversity of vegetation.

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

WETLAND ID: **Wetland 3**	LOCATION: (LAT/ LONG) **44.305385/-71.795402**
WETLAND AREA: **1,425 SF**	DOMINANT WETLAND SYSTEMS PRESENT: **Perennial Stream**
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? **1**	COWARDIN CLASS: **PEM1E**
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☒ No	IS THE WETLAND PART OF: ☒ A wildlife corridor or ☐ A habitat island?
if not, where does the wetland lie in the drainage basin? **Low - just above large perennial stream**	IS THE WETLAND HUMAN-MADE? ☐ Yes ☒ No

IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☒ Yes ☐ No	ARE VERNAL POOLS PRESENT? ☐ Yes ☒ No (If yes, complete the Vernal Pool Table)
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? ☒ Yes ☐ No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? ☒ Yes ☐ No
PROPOSED WETLAND IMPACT TYPE: **Bridge Rehabilitation**	PROPOSED WETLAND IMPACT AREA: **TBD – See Wetland Impact Plans**

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☐ Yes ☒ No	N/A	☐ Yes ☒ No	N/A
2	☐ Yes ☒ No	9,10,11	☐ Yes ☒ No	Wetland 3 is unsuitable for this function.
3	☒ Yes ☐ No	4,7,8,14,16,17	☐ Yes ☒ No	Wetland 3 likely provides this function temporarily when flooded but is unlikely to have the hydrology for fish during most of the year.
4	☒ Yes ☐ No	4,5,6,7,8,9,10,11,13	☒ Yes ☐ No	Wetland 3's effectiveness for this function is limited by its size, but still provides the function principally.
5	☒ Yes ☐ No	1,2,4,5,7,9,15	☐ Yes ☒ No	Wetland 3 is likely present due primarily to stream floodwaters.
6	☒ Yes ☐ No		☐ Yes ☒ No	N/A
7	☐ Yes ☒ No	1,2,3,4,5,6,7,8,9,10,11	☐ Yes ☒ No	Adjacent land use likely results in excess nutrients, but the size and water regime of Wetland 3 does not indicate that this is a principal function.
8	☒ Yes ☐ No	1,2,7,9,12	☐ Yes ☒ No	The size, hydrology, and lack of vegetative diversity of Wetland 8 indicate that this function is not served principally.
9	☐ Yes ☒ No	10	☐ Yes ☒ No	Wetland 3 lacks the aesthetic quality to have this value.
10	☐Yes ☒ No	1,2,6,10	☐ Yes ☒ No	Adjacent land use likely results in excess sediment and toxicants, but the water regime

				of Wetland 3 does not indicate that this is a principal function.
11	☒ Yes ☐ No	1,3,4,6,7,9,12,14	☒ Yes ☐ No	Wetland 3 serves this function principally.
12	☐ Yes ☒ No	2,3,7,8,11,14,22,31	☐ Yes ☒ No	Wetland 3 lacks unique features required to have this value.
13	☐ Yes ☒ No	8,9,12	☐ Yes ☒ No	Wetland 3 has little recreational potential due to its hydrology and location.
14	☐ Yes ☒ No	6,7,8	☐ Yes ☒ No	The size of Wetland 3 makes it only moderately suitable for this function.

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

WETLAND ID: **Wetland 4**	LOCATION: (LAT/ LONG) **44.304683/-71.797408**
WETLAND AREA: **686 SF (Within Project Area)**	DOMINANT WETLAND SYSTEMS PRESENT: **FW Marsh, Perennial Stream**
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? **1**	COWARDIN CLASS: **PSS1E**
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☒ No if not, where does the wetland lie in the drainage basin? **Low - just above large perennial stream**	IS THE WETLAND PART OF: ☒ A wildlife corridor or ☐ A habitat island? IS THE WETLAND HUMAN-MADE? ☐ Yes ☒ No ***Human-Altered**
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☒ Yes ☐ No	ARE VERNAL POOLS PRESENT? ☐ Yes ☒ No (If yes, complete the Vernal Pool Table)
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? ☒ Yes ☐ No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? ☒ Yes ☐ No
PROPOSED WETLAND IMPACT TYPE: **Bridge Rehabilitation**	PROPOSED WETLAND IMPACT AREA: **TBD – See Wetland Impact Plans**

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☒ Yes ☐ No	N/A	☐ Yes ☒ No	N/A
2	☒ Yes ☐ No	3,5,8,9,10,11	☐ Yes ☒ No	Wetland 4 is suitable for this function but lacks direct access

3	☒ Yes ☐ No	3,4,5,9,10,14,15,16,17	☐ Yes ☒ No	Wetland 4 likely provides this function when the entire wetland is considered (not just the finger within the project area)
4	☒ Yes ☐ No	1,3,4,5,6,7,8,9,10,11,13,14,15,16,17,18	☒ Yes ☐ No	Wetland 4 has the opportunity, size, and capacity to provide this function principally.
5	☒ Yes ☐ No	1,2,5,7,9,13,15	☒ Yes ☐ No	Wetland 4 is part of a major freshwater system with a highly functional interaction with the aquifer
6	☒ Yes ☐ No		☐ Yes ☒ No	N/A
7	☒ Yes ☐ No	1,2,3,4,5,6,7,8,9,10,11,12,13,14	☒ Yes ☐ No	Adjacent land use likely results in excess nutrients, and Wetland 4 contains the size, substrate, and hydroperiod to serve this function principally.
8	☒ Yes ☐ No	1,2,6,7,8,9,10,11,12,13	☐ Yes ☒ No	The size, hydrology, and lack of vegetative diversity of Wetland 4 indicate that this function is not served principally.
9	☒ Yes ☐ No	1,2,3,4,6,8,9,12	☒ Yes ☐ No	Wetland 4 has this value principally.
10	☒ Yes ☐ No	1,2,3,4,5,6,7,9,10,11,12,14,15,16	☒ Yes ☐ No	Adjacent land use likely results in excess sediment and toxicants, and Wetland 4 contains the size, substrate, and hydroperiod to serve this function principally.
11	☒ Yes ☐ No	3,4,6,7,9,10,12,14	☒ Yes ☐ No	Wetland 4 serves this function principally.
12	☒ Yes ☐ No	2,3,4,5,6,8,9,11,12,13,14,15,17,22,27,31	☐ Yes ☒ No	Wetland 4 contains many of the aesthetic characteristics for this value but lacks many of the unique features required to serve the value principally.
13	☒ Yes ☐ No	2,5,12	☐ Yes ☒ No	Wetland 4 is on land owned by the Town of Littleton, but no recreational access opportunities were noted
14	☒ Yes ☐ No	6,7,8,9,10,11,13,14,15,18,19,20,21	☒ Yes ☐ No	Wetland 4 contains food sources, vegetative structural diversity and deepwater habitat.
SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)				

WETLAND ID: **Wetland 5**	LOCATION: (LAT/ LONG) **44.304658/-71.795523**
WETLAND AREA: **3,000 SF**	DOMINANT WETLAND SYSTEMS PRESENT: **Perennial Stream**
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? **None**	COWARDIN CLASS: **PFO1E**
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☒ No if not, where does the wetland lie in the drainage basin? **Low - just above large perennial stream**	IS THE WETLAND PART OF: ☒ A wildlife corridor or ☐ A habitat island? IS THE WETLAND HUMAN-MADE? ☐ Yes ☒ No
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☒ Yes ☐ No	ARE VERNAL POOLS PRESENT? ☐ Yes ☒ No (If yes, complete the Vernal Pool Table)
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? ☒ Yes ☐ No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? ☒ Yes ☐ No
PROPOSED WETLAND IMPACT TYPE: **Bridge Rehabilitation**	PROPOSED WETLAND IMPACT AREA: **TBD – See Wetland Impact Plans**

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☐ Yes ☒ No	N/A	☐ Yes ☒ No	N/A
2	☐ Yes ☒ No	9,10,11	☐ Yes ☒ No	Wetland 5 is unsuitable for this function.
3	☒ Yes ☐ No	1,4,6,7,11,14,17	☐ Yes ☒ No	Wetland 5 does not contain enough water to support fish populations independently.
4	☒ Yes ☐ No	4,5,6,7,8,10,13	☒ Yes ☐ No	Wetland 5 has the opportunity, size, and capacity to provide this function principally.
5	☒ Yes ☐ No	1,2,5,7,15	☐ Yes ☒ No	Wetland 5 is likely present due primarily to stream floodwaters.
6	☐ Yes ☒ No		☐ Yes ☒ No	N/A
7	☐ Yes ☒ No	4	☐ Yes ☒ No	Adjacent land use likely results in excess nutrients, but the size and water regime of Wetland 5 does not indicate that this is a principal function.

8	☐ Yes ☒ No	1,12	☐ Yes ☒ No	The size, hydrology, and lack of vegetative diversity of Wetland 5 indicate that this function is not served principally.
9	☐ Yes ☒ No		☐ Yes ☒ No	Wetland 5 lacks the aesthetic quality to have this value.
10	☐ Yes ☒ No	1,2,10	☐ Yes ☒ No	Adjacent land use likely results in excess sediment and toxicants, but the water regime of Wetland 5 does not indicate that this is a principal function.
11	☒ Yes ☐ No	2,3,4,7,9	☐ Yes ☒ No	Wetland 5 is positioned in the floodplain of the Ammonoosuc, but its size prevents it from having more than a negligible effect on the overall shoreline.
12	☐ Yes ☒ No	2,8,11,14,22,31	☐ Yes ☒ No	Wetland 5 lacks unique features required to have this value.
13	☐ Yes ☒ No	12	☐ Yes ☒ No	Wetland 5 has little recreational potential due to its hydrology and location.
14	☒ Yes ☐ No	6,8	☐ Yes ☒ No	The size of Wetland 5 makes it only moderately suitable for this function.

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

WETLAND ID: **Wetland 6**	LOCATION: (LAT/ LONG) **44.304117/-71.794950**
WETLAND AREA: **8,500 SF**	DOMINANT WETLAND SYSTEMS PRESENT: **Perennial Stream**
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? **None**	COWARDIN CLASS: **PFO1/4E & PEM1E**
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☒ No if not, where does the wetland lie in the drainage basin? **Low - just above large perennial stream**	IS THE WETLAND PART OF: ☐ A wildlife corridor or ☒ A habitat island? IS THE WETLAND HUMAN-MADE? ☐ Yes ☒ No
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☒ Yes ☐ No	ARE VERNAL POOLS PRESENT? ☐ Yes ☒ No (If yes, complete the Vernal Pool Table)
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? ☒ Yes ☐ No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? ☒ Yes ☐ No
PROPOSED WETLAND IMPACT TYPE: **Bridge Rehabilitation**	PROPOSED WETLAND IMPACT AREA: **TBD – See Wetland Impact Plans**

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☒ Yes ☐ No	N/A	☐ Yes ☒ No	N/A
2	☒ Yes ☐ No	3,9,10,11	☐ Yes ☒ No	Wetland 6 is suitable for this function but lacks direct access
3	☐ Yes ☒ No	1	☐ Yes ☒ No	Wetland 6 does not contain enough water to support fish populations independently.
4	☒ Yes ☐ No	1,3,4,5,6,7,8,9,10,13	☒ Yes ☐ No	Wetland 6 has the opportunity, size, and capacity to provide this function principally.
5	☒ Yes ☐ No	5,7,15	☒ Yes ☐ No	Wetland 6 is likely present due to perennial connections with groundwater in addition to stream floodwaters.
6	☐ Yes ☒ No		☐ Yes ☒ No	N/A
7	☒ Yes ☐ No	3,4,5,6,7,9,10,13,14	☒ Yes ☐ No	Adjacent land use likely results in excess nutrients, and Wetland 6 contains the size, substrate, and hydroperiod to serve this function principally.
8	☒ Yes ☐ No	1,2,7,8,12,14	☐ Yes ☒ No	Wetland 6 is suitable for production export but does not appear to be providing this function principally.
9	☒ Yes ☐ No	1,3,4,12	☐ Yes ☒ No	Wetland 6 is suitable but lacks visibility from an easily accessible viewing area.
10	☒ Yes ☐ No	1,2,4,5,7,10,11,12,13,14,15	☒ Yes ☐ No	Adjacent land use likely results in excess sediment and toxicants, and Wetland 6 contains the size, substrate, and hydroperiod to serve this function principally.
11	☒ Yes ☐ No	1,2,3,4,9	☐ Yes ☒ No	Wetland 6 has the potential to serve this function but lacks a channelized waterbody flowing through its center
12	☐ Yes ☒ No	2,4,8,11,15,22,31	☐ Yes ☒ No	Wetland 6 lacks unique features required to have this value.

13	☐ Yes ☒ No	12	☐ Yes ☒ No	Wetland 6 has little recreational potential due to its hydrology and location.
14	☒ Yes ☐ No	6,7,8,9,11,13,14,15,18,19,20,21	☒ Yes ☐ No	Wetland 6 contains food sources and vegetative structural diversity and acts as a corridor to the Ammonoosuc in an otherwise built environment

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

WETLAND ID: **Wetland 7**	LOCATION: (LAT/ LONG) **44.303984/-71.796874**
WETLAND AREA: **10,200 SF**	DOMINANT WETLAND SYSTEMS PRESENT: **Perennial Stream, Intermittent Stream**
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? **1**	COWARDIN CLASS: **PFO1/4E**
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☒ No if not, where does the wetland lie in the drainage basin? **Low - just above large perennial stream**	IS THE WETLAND PART OF: ☒ A wildlife corridor or ☐ A habitat island? IS THE WETLAND HUMAN-MADE? ☒ Yes ☐ No
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☒ Yes ☐ No	ARE VERNAL POOLS PRESENT? ☐ Yes ☒ No (If yes, complete the Vernal Pool Table)
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? ☒ Yes ☐ No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? ☒ Yes ☐ No
PROPOSED WETLAND IMPACT TYPE: **Bridge Rehabilitation**	PROPOSED WETLAND IMPACT AREA: **TBD – See Wetland Impact Plans**

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☐ Yes ☒ No	N/A	☐ Yes ☒ No	N/A
2	☒ Yes ☐ No	9,10,11	☐ Yes ☒ No	Wetland 7 is unsuitable for this function.
3	☐ Yes ☒ No	8	☐ Yes ☒ No	Wetland 7 does not contain enough water to support fish populations independently.
4	☒ Yes ☐ No	3,4,5,7,8,9,10,11,14	☒ Yes ☐ No	Wetland 7 has the opportunity, size, and capacity to provide this function principally.
5	☒ Yes ☐ No	1,2,4,6,7,15	☐ Yes ☒ No	Wetland 7 is likely present due primarily to stream floodwaters.

6	☐ Yes ☒ No		☐ Yes ☒ No	N/A
7	☒ Yes ☐ No	3,4,6,7,10	☐ Yes ☒ No	Adjacent land use likely results in excess nutrients, but the size and water regime of Wetland 7 does not indicate that this is a principal function.
8	☐ Yes ☒ No	1	☐ Yes ☒ No	The size, hydrology, and lack of vegetative diversity of Wetland 7 indicate that this function is not served principally.
9	☐ Yes ☒ No		☐ Yes ☒ No	Wetland 7 lacks the aesthetic quality to have this value.
10	☐ Yes ☒ No	1,2,10	☐ Yes ☒ No	Adjacent land use likely results in excess sediment and toxicants, but the size and water regime of Wetland 7 does not indicate that this is a principal function.
11	☒ Yes ☐ No	1,2,3,4,6,7,8,9,12,14	☒ Yes ☐ No	Wetland 7 borders a highly disturbed stream with major erosive forces during periods of high flow. It also forms an area of dense shrubs along the bank of the Ammonoosuc.
12	☐ Yes ☒ No	2,8,11,22,31	☐ Yes ☒ No	Wetland 7 lacks unique features required to have this value.
13	☐ Yes ☒ No	12	☐ Yes ☒ No	Wetland 7 has little recreational potential due to its hydrology and location.
14	☒ Yes ☐ No	6,7,8,20	☐ Yes ☒ No	Wetland 7 contains food sources in the floodplain of the Ammonoosuc but its size and local disturbance limits its ability to serve this function principally

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)	
WETLAND ID: **Wetland 8**	LOCATION: (LAT/ LONG) **44.303401/-71.795960**
WETLAND AREA: **947 SF**	DOMINANT WETLAND SYSTEMS PRESENT: **N/A**
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? **0**	COWARDIN CLASS: **PEM1E**
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☒ No if not, where does the wetland lie in the drainage basin? **Low - just above large perennial stream**	IS THE WETLAND PART OF: ☒ A wildlife corridor or ☐ A habitat island? IS THE WETLAND HUMAN-MADE? ☒ Yes ☐ No

IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☒ Yes ☐ No	ARE VERNAL POOLS PRESENT? ☐ Yes ☒ No (If yes, complete the Vernal Pool Table)
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? ☐ Yes ☒ No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? ☒ Yes ☐ No
PROPOSED WETLAND IMPACT TYPE: **Bridge Rehabilitation**	PROPOSED WETLAND IMPACT AREA: **TBD – See Wetland Impact Plans**

SECTION 4 - WETLANDS FUNCTIONS AND VALUES (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☐ Yes ☒ No	N/A	☐ Yes ☒ No	
2	☐ Yes ☒ No	9,10	☐ Yes ☒ No	Wetland 8 is unsuitable for this function.
3	☐ Yes ☒ No		☐ Yes ☒ No	Wetland 8 does not contain enough water to support fish populations independently.
4	☒ Yes ☐ No	3,4,5,7,8,9	☒ Yes ☐ No	Wetland 8's effectiveness for this function is limited by its size, but still provides the function principally.
5	☒ Yes ☐ No	1,2,5,15	☐ Yes ☒ No	Wetland 8 is likely present due primarily to precipitation run off from nearby impervious surfaces.
6	☐ Yes ☒ No		☐ Yes ☒ No	N/A
7	☐ Yes ☒ No	4,10	☐ Yes ☒ No	Adjacent land use likely results in excess nutrients, but the size and water regime of Wetland 8 does not indicate that this is a principal function.
8	☐ Yes ☒ No	12	☐ Yes ☒ No	The size, hydrology, and lack of vegetative diversity of Wetland 8 indicate that this function is not served principally.
9	☐ Yes ☒ No		☐ Yes ☒ No	Wetland 8 lacks the aesthetic quality to have this value.
10	☐ Yes ☒ No	1,2,6,10	☐ Yes ☒ No	Adjacent land use likely results in excess sediment and toxicants, but the water regime of Wetland 8 does not indicate that this is a principal function.

11	☐ Yes ☒ No	1,2,3	☐ Yes ☒ No	Wetland 8 lacks landscape position and size/capacity to serve this function.
12	☐ Yes ☒ No	2,8,31	☐ Yes ☒ No	Wetland 8 lacks unique features required to have this value.
13	☐ Yes ☒ No	12	☐ Yes ☒ No	Wetland 8 has little recreational potential due to its hydrology and location.
14	☐ Yes ☒ No	7,8	☐ Yes ☒ No	The size of Wetland 8 makes it only moderately suitable for this function.

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10) – N/A NO VERNAL POOLS ON SITE

SECTION 6 - STREAM RESOURCES SUMMARY

DESCRIPTION OF STREAM: **The Ammonoosuc River**	STREAM TYPE (ROSGEN): **TBD – See Stream Crossing Worksheet**
HAVE FISHERIES BEEN DOCUMENTED? ☒ Yes ☐ No	DOES THE STREAM SYSTEM APPEAR STABLE? ☒ Yes ☐ No

OTHER KEY ON-SITE FUNCTIONS OF NOTE: **N/A**

The following table can be used to compile data on stream resources. “Important Notes” are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☒ Yes ☐ No	N/A	☐ Yes ☒ No	N/A
2	☒ Yes ☐ No	1,5,8,9,10,11	☐ Yes ☒ No	The Ammonoosuc is suitable for this function but lacks a natural setting within the project area
3	☒ Yes ☐ No	1,3,4,5,6,7,8,9,10,12,14,15,16,17	☒ Yes ☐ No	The Ammonoosuc provides this function principally
4	☒ Yes ☐ No	1,4,7,8,9,10,11	☒ Yes ☐ No	The Ammonoosuc has the opportunity, size, and capacity to provide this function principally.
5	☒ Yes ☐ No	1,2,4,6,7,15	☐ Yes ☒ No	The Ammonoosuc does not serve this function principally at the project site
6	☒ Yes ☐ No		☐ Yes ☒ No	N/A
7	☒ Yes ☐ No	1,2,4,5,10	☐ Yes ☒ No	Adjacent land use likely results in excess nutrients, but the

				Ammonoosuc does not serve this function principally.
8	☒ Yes ☐ No	1,3,4,6,10,12,13	☐ Yes ☒ No	The Ammonoosuc is suitable for production export but does not appear to be providing this function principally.
9	☒ Yes ☐ No	1,4,5,6,8,9,12	☒ Yes ☐ No	The Ammonoosuc has this value principally
10	☐ Yes ☒ No	1,2,5,6,8,10	☐ Yes ☒ No	Adjacent land use likely results in excess sediment and toxicants, but the flows in the Ammonoosuc likely prevent retention of sediment and toxicants.
11	☒ Yes ☐ No	1,2,3,4,8,9,10,11	☐ Yes ☒ No	The Ammonoosuc does not serve this function principally
12	☒ Yes ☐ No	2,7,8,9,11,16,17,19,22,27,31	☐ Yes ☒ No	The Ammonoosuc contains many of the aesthetic characteristics for this value but lacks many of the unique features required to serve the value principally.
13	☒ Yes ☐ No	2,5,7,8,9,12	☐ Yes ☒ No	The Ammonoosuc provides fishing opportunity
14	☒ Yes ☐ No	6,7,8,19,21	☒ Yes ☐ No	The Ammonoosuc is an important important surface water source and connection for wildlife. Human disturbance within the project area disrupt the function locally.

SECTION 6 - STREAM RESOURCES SUMMARY

DESCRIPTION OF STREAM: **Streams 2 & 3**	STREAM TYPE (ROSGEN): **TBD – See Stream Crossing Worksheet**
HAVE FISHERIES BEEN DOCUMENTED? ☐ Yes ☒ No – **Not within the project site.**	DOES THE STREAM SYSTEM APPEAR STABLE? ☒ Yes ☐ No
OTHER KEY ON-SITE FUNCTIONS OF NOTE: **N/A**	

The following table can be used to compile data on stream resources. “Important Notes” are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES

1	☐ Yes ☒ No	N/A	☐ Yes ☒ No	Streams 2 & 3 are unsuitable for this function.
2	☐ Yes ☒ No	9,10,11	☐ Yes ☒ No	Streams 2 & 3 do not contain enough water to support fish populations independently.
3	☐ Yes ☒ No		☐ Yes ☒ No	Streams 2 & 3 have the opportunity, size, and capacity to provide this function principally.
4	☒ Yes ☐ No	4,7,8,9,11	☒ Yes ☐ No	Streams 2 & 3 is likely present due primarily to stormwater runoff.
5	☐ Yes ☒ No	1,2,5,7,15	☐ Yes ☒ No	N/A
6	☐ Yes ☒ No		☐ Yes ☒ No	Adjacent land use likely results in excess nutrients, but the size and water regime of Streams 2 & 3 does not indicate that this is a principal function.
7	☐ Yes ☒ No	4	☐ Yes ☒ No	The size, hydrology, and lack of vegetative diversity of Streams 2 & 3 indicate that this function is not served principally.
8	☐ Yes ☒ No	1	☐ Yes ☒ No	Streams 2 & 3 lack the aesthetic quality to have this value.
9	☐ Yes ☒ No		☐ Yes ☒ No	Adjacent land use likely results in excess sediment and toxicants, but the water regime of Streams 2 & 3 does not indicate that this is a principal function.
10	☐ Yes ☒ No	1,2,10	☐ Yes ☒ No	Streams 2 & 3 are not suitable to serve this function.
11	☐ Yes ☒ No	1,3,4,9	☐ Yes ☒ No	Streams 2 & 3 lack unique features required to have this value.
12	☐ Yes ☒ No	2,8,11,31	☐ Yes ☒ No	Streams 2 & 3 have little recreational potential due to their hydrology and location.
13	☐ Yes ☒ No	12	☐ Yes ☒ No	Streams 2 & 3 do not serve this function principally
14	☐ Yes ☒ No	6,7,8	☐ Yes ☒ No	Streams 2 & 3 are unsuitable for this function.

SECTION 6 - STREAM RESOURCES SUMMARY

DESCRIPTION OF STREAM: **Stream 4**	STREAM TYPE (ROSGEN): **TBD – See Stream Crossing Worksheet**

HAVE FISHERIES BEEN DOCUMENTED? ☐ Yes ☒ No	DOES THE STREAM SYSTEM APPEAR STABLE? ☒ Yes ☐ No

OTHER KEY ON-SITE FUNCTIONS OF NOTE: **N/A**

The following table can be used to compile data on stream resources. "Important Notes" are to include characteristics the evaluator used to determine principal function and value of each stream. The functions and values reference number are defined in Section 4.

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☐ Yes ☒ No	N/A	☐ Yes ☒ No	N/A
2	☐ Yes ☒ No	9,10,11	☐ Yes ☒ No	Stream 4 is unsuitable for this function.
3	☐ Yes ☒ No	8	☐ Yes ☒ No	Stream 4 does not contain enough water to support fish populations independently.
4	☒ Yes ☐ No	4,7,8,9,10,11	☒ Yes ☐ No	Stream 4 has the opportunity, size, and capacity to provide this function principally.
5	☒ Yes ☐ No	1,2,4,6,7,15	☐ Yes ☒ No	Stream 4 is likely present due primarily to stormwater runoff.
6	☐ Yes ☒ No		☐ Yes ☒ No	N/A
7	☐ Yes ☒ No	4	☐ Yes ☒ No	Adjacent land use likely results in excess nutrients, but the size and water regime of Stream 4 does not indicate that this is a principal function.
8	☐ Yes ☒ No	1	☐ Yes ☒ No	The size, hydrology, and lack of vegetative diversity of Stream 4 indicate that this function is not served principally.
9	☐ Yes ☒ No		☐ Yes ☒ No	Stream 4 lacks the aesthetic quality to have this value.
10	☐ Yes ☒ No	1,2,10	☐ Yes ☒ No	Adjacent land use likely results in excess sediment and toxicants, but the water regime of Stream 4 does not indicate that this is a principal function.
11	☐ Yes ☒ No	1,2,3,4,8,9	☐ Yes ☒ No	Stream 4 is not suitable to serve this function.
12	☐ Yes ☒ No	2,8,11,22,31	☐ Yes ☒ No	Stream 4 lacks unique features required to have this value.

13	☐ Yes ☒ No	12	☐ Yes ☒ No	Stream 4 has little recreational potential due to its hydrology and location.
14	☒ Yes ☐ No	6,7,8,10	☐ Yes ☒ No	Stream 4 does not serve this function principally

SECTION 7 - ATTACHMENTS (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)

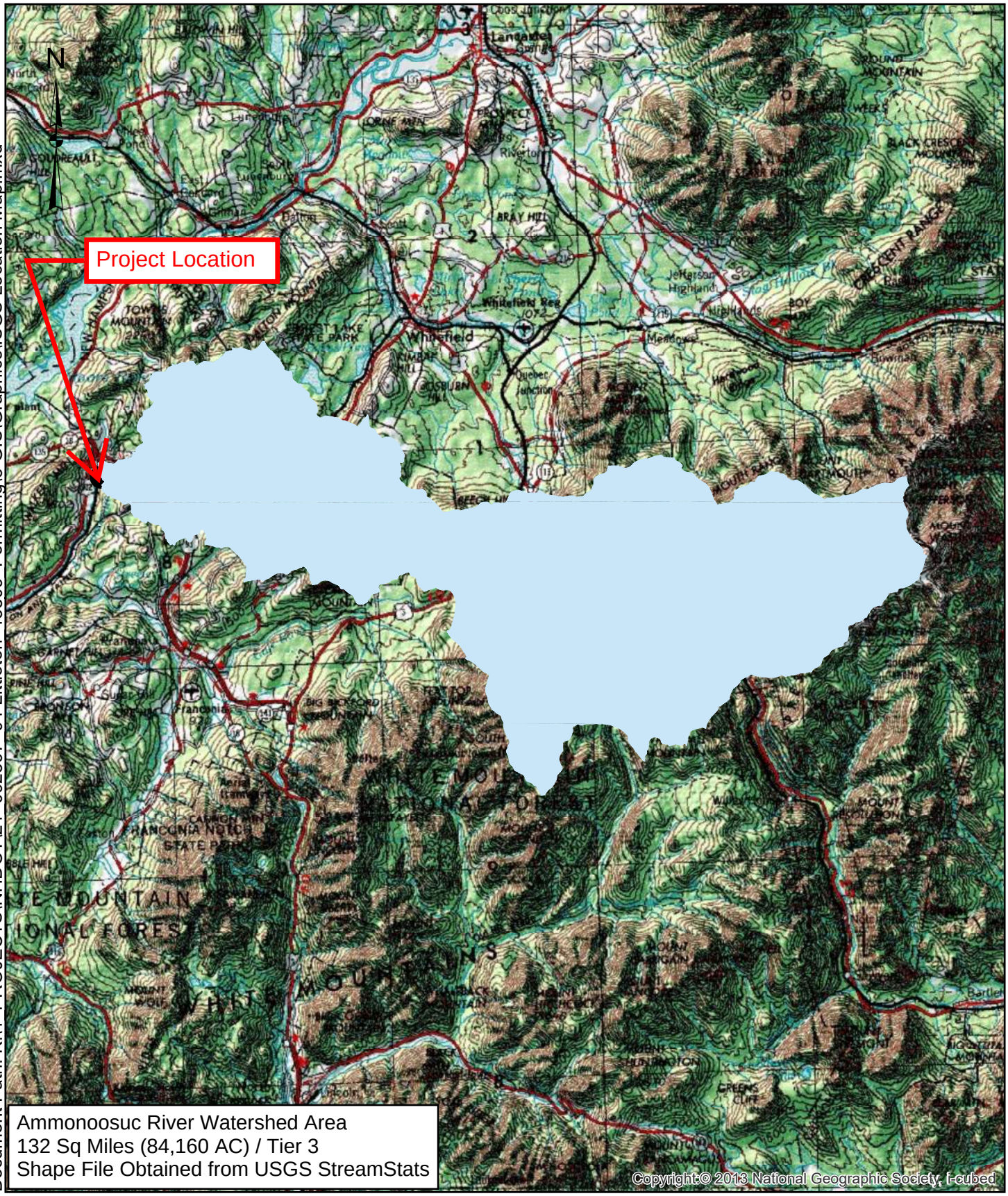
☒ Wildlife and vegetation diversity/abundance list. **– See Wetland Delineation Report Vegetation Descriptions**

☒ Photograph of wetland. **– See Appendix D**

☒ Wetland delineation plans showing wetlands, vernal pools, and streams in relation to the impact area and surrounding landscape. Wetland IDs, vernal pool IDs, and stream IDs must be indicated on the plans.

☐ For projects in tidal areas only: additional information required by Env-Wt 603.03/603.04. Please refer to the Coastal Area Worksheet (NHDES-W-06-079) for more information. **– N/A**

USGS Watershed Boundary Map



Document Path: K:\1 PROJECTS\NHDOT\21 092597 04-Littleton 43809 Permitting\3-GIS\Graphics\ISGS Location Map.mxd

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LITTLETON #43809
BRIDGE #188/060, I-93 NB OVER THE AMMONOOSUC RIVER
BRIDGE #187/060, I-93 SB OVER THE AMMONOOSUC RIVER
BRIDGE #189/058, I-93 SB OVER INDUSTRIAL PARK ROAD, NHRR (ABD)
BRIDGE #190/058, I-93 NB OVER INDUSTRIAL PARK ROAD, NHRR (ABD)

WATERSHED MAP

DR. BY	DATE	SCALE
dcoon	5/30/2023	1 inch = 20,833 feet

Stream Crossing Worksheet

WETLANDS PERMIT APPLICATION
STREAM CROSSING WORKSHEET
Water Division/Land Resources Management
Wetlands Bureau

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

This worksheet can be used to accompany Wetlands Permit Applications when proposing stream crossings.

SECTION 1 - TIER CLASSIFICATIONS

Determine the contributing watershed size at USGS StreamStats.

Note: Plans for tier 2 and 3 crossings shall be designed and stamped by a professional engineer who is licensed under RSA 310-A to practice in New Hampshire.

Size of contributing watershed at the crossing location: 84,211 acres

☐ **Tier 1**: A tier 1 stream crossing is a crossing located on a watercourse where the contributing watershed size is less than or equal to 200 acres.

☐ **Tier 2**: A tier 2 stream crossing is a crossing located on a watercourse where the contributing watershed size is greater than 200 acres and less than 640 acres.

☒ **Tier 3**: A tier 3 stream crossing is a crossing that meets **any** of the following criteria:

- ☒ On a watercourse where the contributing watershed is more than 640 acres.
- ☒ Within a designated river corridor unless:
  a. The crossing would be a tier 1 stream based on contributing watershed size, or
  b. The structure does not create a direct surface water connection to the designated river as depicted on the national hydrography dataset as found on GRANIT.
- ☒ Within a 100-year floodplain (see Section 2 below).
- ☐ In a jurisdictional area having any protected species or habitat (NHB DataCheck).
- ☐ In a prime wetland or within a duly-established 100-foot buffer, unless a waiver has been granted pursuant to RSA 482-A:11, IV(b) and Env-Wt 706. Review the Wetlands Permit Planning Tool (WPPT) for town prime wetland and prime wetland buffer maps to determine if your project is within these areas.

☐ **Tier 4**: A tier 4 stream crossing is a crossing located on a tidal watercourse.

SECTION 2 - 100-YEAR FLOODPLAIN

Use the FEMA Map Service Center to determine if the crossing is located within a 100-year floodplain. Please answer the questions below:

☐ **No**: The proposed stream crossing *is not* within the FEMA 100-year floodplain.

☒ **Yes**: The proposed project *is* within the FEMA 100-year floodplain. Zone = AE

Elevation of the 100-year floodplain at the inlet: 726 feet (FEMA El. or Modeled El.)

SECTION 3 - CALCULATING PEAK DISCHARGE	
Existing 100-year peak discharge (Q) calculated in cubic feet per second (CFS): CFS	Calculation method:
Estimated bankfull discharge at the crossing location: CFS	Calculation method:

Note: If tier 1, then skip to Section 10

SECTION 4 - PREDICTED CHANNEL GEOMETRY BASED ON REGIONAL HYDRAULIC CURVES *For **tier 2**, **tier 3** and **tier 4** crossings only.*	
Bankfull Width: 135.69 feet	Mean Bankfull Depth: 4.71 feet
Bankfull Cross Sectional Area: 638.53 square feet (SF)	

SECTION 5 - CROSS SECTIONAL CHANNEL GEOMETRY: MEASUREMENTS OF THE EXISTING STREAM WITHIN A REFERENCE REACH

*For **tier 2**, **tier 3** and **tier 4** crossings only.*

Describe the reference reach location: Cross sections extending ~1,400 ft upstream

Reference reach watershed size: 84,211 acres

Parameter	Cross Section 1 Describe bed form **Riffle** (*e.g. pool, riffle, glide*)	Cross Section 2 Describe bed form **Run** (*e.g. pool, riffle, glide*)	Cross Section 3 Describe bed form **Riffle** (*e.g. pool, riffle, glide*)	Range
Bankfull Width	75.64 feet	118.57 feet	148.88 feet	73.24 feet
Bankfull Cross Sectional Area	50 SF	172.8 SF	43.7 SF	122.8 SF
Mean Bankfull Depth	3.85 feet	8.23 feet	2.08 feet	6.15 feet
Width to Depth Ratio	19.67	14.41	71.54	57.13
Max Bankfull Depth	5.2 feet	10.2 feet	4.7 feet	5.5 feet
Flood Prone Width	568 feet	680 feet	615 feet	112 feet
Entrenchment Ratio	7.51	5.74	4.13	3.38

*Use **Figure 1** below to determine the measurements of the Reference Reach Attributes*

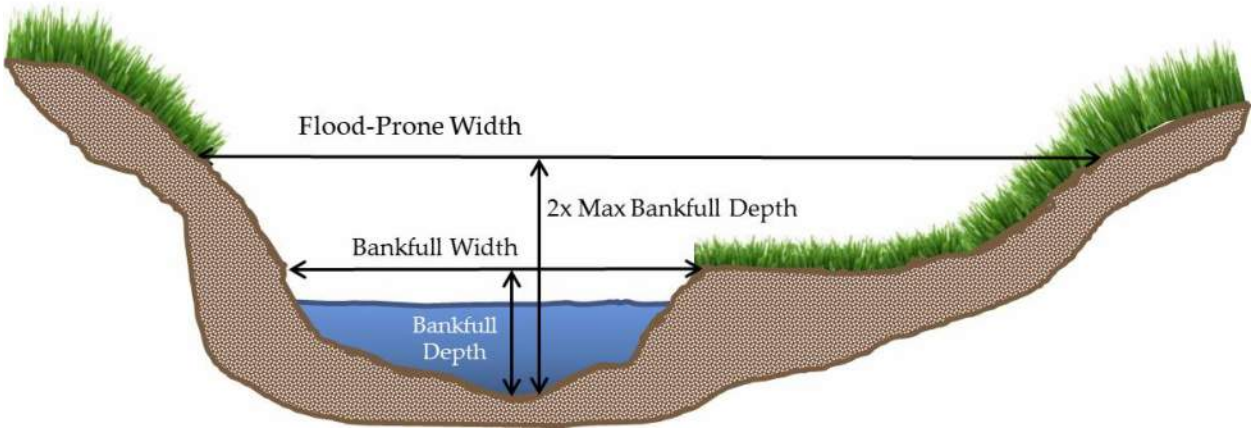

Figure 1: Determining the Reference Reach Attributes.

SECTION 6 - LONGITUDINAL PARAMETERS OF THE REFERENCE REACH AND CROSSING LOCATION *For **tier 2**, **tier 3** and **tier 4** crossings only.*
Average Channel Slope of the Reference Reach: 1%
Average Channel Slope at the Crossing Location: -1%

SECTION 7 - PLAN VIEW GEOMETRY Note: Sinuosity is measured a distance of at least 20 times bankfull width, or 2 meander belt widths. *For **tier 2, tier 3** and **tier 4** crossings only.*	
Sinuosity of the Reference Reach: 1.08	
Sinuosity of the Crossing Location: 1.07	
SECTION 8 - SUBSTRATE CLASSIFICATION BASED ON FIELD OBSERVATIONS *For **tier 2, tier 3** and **tier 4** crossings only.*	
% of reach that is bedrock:	**0** %
% of reach that is boulder:	**11.6** %
% of reach that is cobble:	**51.7** %
% of reach that is gravel:	**16.7** %
% of reach that is sand:	**20** %
% of reach that is silt:	**0** %
SECTION 9 - STREAM TYPE OF REFERENCE REACH *For **tier 2, tier 3** and **tier 4** crossings only.*	
Stream Type of Reference Reach:	C3

*Refer to Rosgen Classification Chart (**Figure 2**) below:*

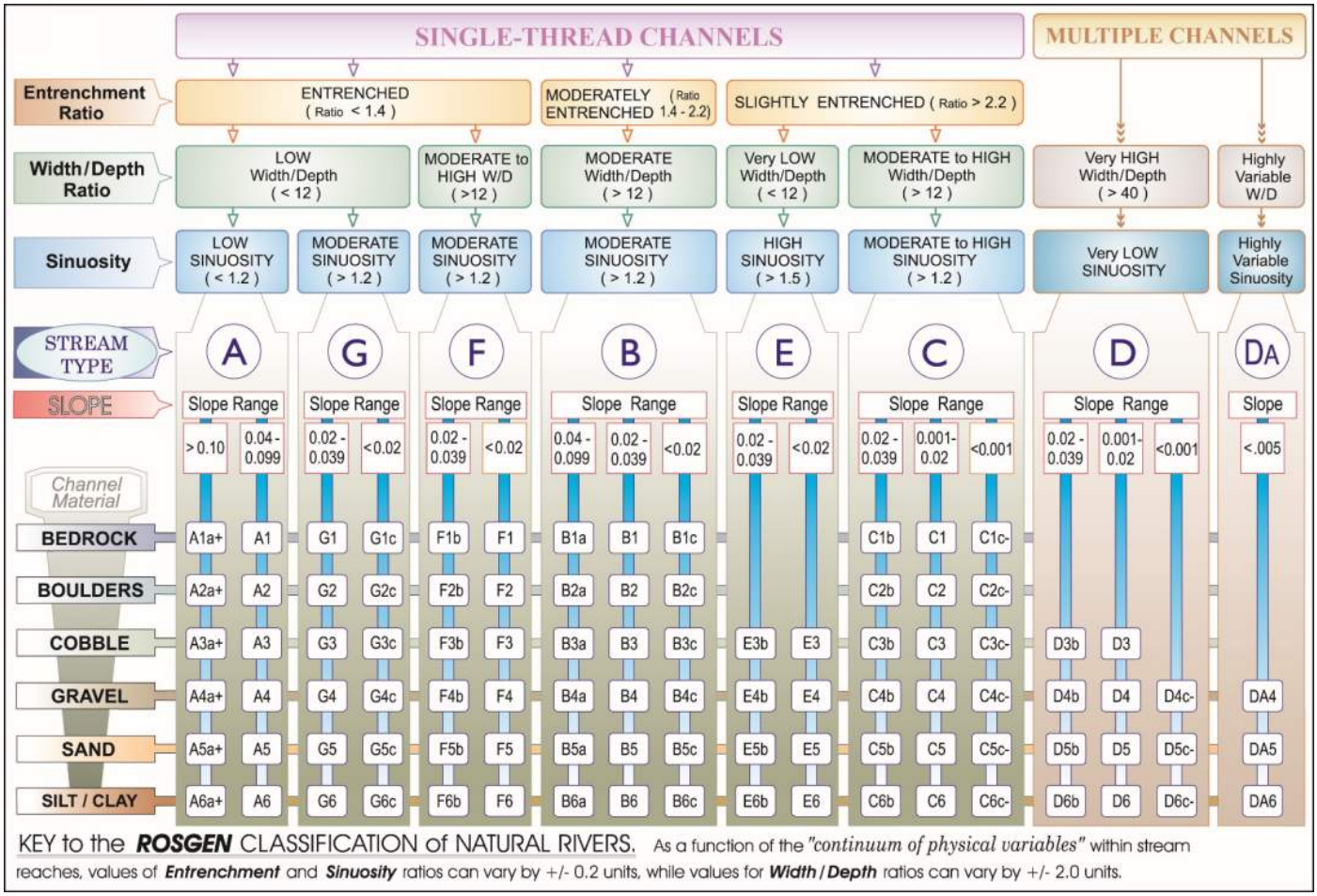

Figure 2: Reference from Applied River Morphology, Rosgen, 1996.

SECTION 10 - CROSSING STRUCTURE METRICS

Existing Conditions

Existing Structure Type:
- ☒ Bridge span
- ☐ Pipe arch
- ☐ Open-bottom culvert
- ☐ Closed-bottom culvert
- ☐ Closed-bottom culvert with stream simulation
- ☐ Other:

Existing Crossing Span: *(perpendicular to flow)* 282 feet	**Culvert Diameter:** feet **Inlet Elevation:** El. feet
Existing Crossing Length: *(parallel to flow)* 42.83 feet	**Outlet Elevation:** El. feet **Culvert Slope:**

Proposed Conditions

Proposed Structure Type: N/A – Repair Project	**Tier 1**	**Tier 2**	**Tier 3**	**Alternative Design**
Bridge Span	☐	☐	☐	☐
Pipe Arch	☐	☐		☐
Closed-bottom Culvert	☐	☐		☐
Open-bottom Culvert	☐	☐	☐	☐
Closed-bottom Culvert with stream simulation	☐	☐	☐	☐

Proposed Structure Span: feet *(perpendicular to flow)*	**Culvert Diameter:** feet **Inlet Elevation:** El. feet
Proposed Structure Length: feet *(parallel to flow)*	**Outlet Elevation:** El. feet **Culvert Slope:**

Proposed Entrenchment Ratio:*

*For **Tier 2**, **Tier 3** and **Tier 4** Crossings Only. To accommodate the entrenchment ratio, floodplain drainage structures may be utilized.*

** Note: Proposed Entrenchment Ratio must meet the minimum ratio for each stream type listed in **Figure 3**, otherwise the applicant must address the Alternative Design criteria listed in Env-Wt 904.10.*

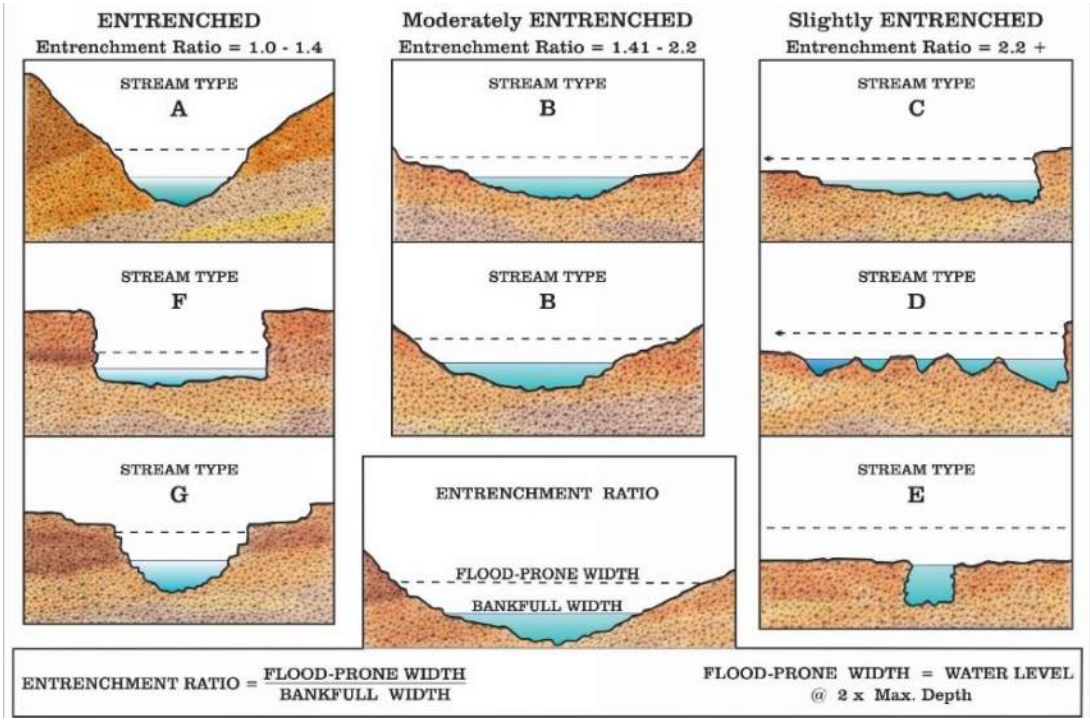

Figure 3: Reference from Applied River Morphology, Rosgen, 1996.

SECTION 11 - CROSSING STRUCTURE HYDRAULICS		
N/A – Repair Project Hydraulics will be unchanged	**Existing**	**Proposed**
100 year flood stage elevation at inlet:		
Flow velocity at outlet in feet per second (FPS):		
Calculated 100 year peak discharge (Q) for the *proposed* structure in CFS:		
Calculated 50 year peak discharge (Q) for the *proposed* structure in CFS:		

SECTION 12 - CROSSING STRUCTURE OPENNESS RATIO

*For **tier 2**, **tier 3** and **tier 4** crossings only.*

Crossing Structure Openness Ratio* = N/A

* Openness box culvert = (height x width)/length
  Openness round culvert = (3.14 x radius^2)/length

SECTION 13 - GENERAL DESIGN CONSIDERATIONS

Env-Wt 904.01 requires all stream crossings to be designed and constructed according to the following requirements. Check each box if the project meets these general design considerations.

All stream crossings shall be designed and constructed so as to:

☒ Not be a barrier to sediment transport.

☒ Prevent the restriction of high flows and maintain existing low flows.

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

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

☒ Maintain or enhance geomorphic compatibility by:

a. Minimizing the potential for inlet obstruction by sediment, wood, or debris, and

b. Preserving the natural alignment of the stream channel.

☒ Preserve watercourse connectivity where it currently exists.

☐ Restore watercourse connectivity where:

a. Connectivity previously was disrupted as a result of human activity(ies), and

b. Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both.

☒ Not cause erosion, aggradation, or scouring upstream or downstream of the crossing.

☒ Not cause water quality degradation.

SECTION 14 - TIER-SPECIFIC DESIGN CRITERIA

Stream crossings must be designed in accordance with the tier specific design criteria listed in Part Env-Wt 904.

☒ The proposed project meets the tier specific design criteria listed in Part Env-Wt 904 and each requirement has been addressed in the plans and as part of the wetland application.

SECTION 15 - ALTERNATIVE DESIGN

NOTE: If the proposed crossing does not meet all of the general design considerations, the tier specific design criteria, or the minimum entrenchment ratio for each given stream type listed in **Figure 3**, then an alternative design plan and associated requirements must be addressed pursuant to Env-Wt 904.10.

☐ I have submitted an alternative design and addressed each requirement listed in Env-Wt 904.10.

Hydrologic and Hydraulic Analysis

HYDROLOGIC & HYDRAULIC ANALYSIS
for the
LITTLETON 43809 BRIDGE PRESERVATION
over the
AMMONOOSUC RIVER
in
LITTLETON, NEW HAMPSHIRE

Prepared for the:
New Hampshire Department of Transportation

December 9, 2022

Prepared by:
HEB Engineers, Inc.

HEB Project #2021-154

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HYDROLOGIC & HYDRAULIC ANALYSIS
for
LITTLETON 43809 BRIDGE PRESERVATION
over the
AMMONOOSCUC RIVER
in
LITTLETON, NEW HAMPSHIRE

I. INTRODUCTION

A. Scope

HEB Engineers, Inc. (HEB) has been contracted by the New Hampshire Department of Transportation (NHDOT) to provide an analysis of potential flood elevations at the I-93 northbound and southbound bridges over the Ammonoosuc River in Littleton, New Hampshire (see USGS Map in Appendix A). NHDOT intends to carry out preservation work on the bridges which will require the construction of temporary access roads and staging areas under both bridges and on each side of the Ammonoosuc River. This temporary infrastructure should accommodate the 10-year storm per the NHDOT Bridge Design Manual Section 2.7.5C.

Using data gathered at the site and from other relevant resources, HEB developed a hydrologic-hydraulic model to simulate theoretical conditions at the project site for a range of storm events. This report summarizes HEB's hydrologic and hydraulic analysis to determine water surface elevations and other hydraulic conditions relevant to the construction of the temporary access facilities.

B. Study Area Description

The study area involves the area surrounding the I-93 northbound and southbound bridges over the Ammonoosuc River in Littleton, New Hampshire. The Ammonoosuc River flows from the northeast to the southwest through the project site. The I-93 northbound bridge crosses the Ammonoosuc River upstream of the I-93 southbound bridge. Both are supported by concrete piers, at each river bank, that require rehabilitation. The piers appear to be situated such that they do not impede normal flows of the Ammonoosuc River. Steep riprap slopes are in place uphill of each pier, making the inside (river side) face of the piers the most feasible for temporary access construction.

II. WATERSHED AND REACH CHARACTERISTICS

The watershed contributing to the study area is approximately 132 square miles. The communities of Littleton and Bethlehem exist in the watershed's valley floor, while the Ammonoosuc headwaters are situated in the White Mountain National Forest. The headwaters consist of steep, forested mountain drainages. The lower reaches of the Ammonoosuc River flow over moderate grades and have established floodplains as they approach the river's confluence with the Connecticut River at the New Hampshire-Vermont border.

In the study area, the Ammonoosuc River appears to be a Rosgen Type C stream with a 0.5 – 1 percent bed slope and sediment consisting mainly of cobbles with some large boulders. Most likely, the channel has been straightened through the Town of Littleton. This is evidenced by the lack of meanders typical of a Type C stream which exist on either end of the developed reach. The estimated bankfull width of the channel in its modified condition is 100 feet. The natural bankfull width may be closer to 125 feet.

III. MODEL DEVELOPMENT

A. Field Survey and Data Collection

The study area was surveyed by HEB over the course of multiple days in 2022. Multiple observation and inspection visits were also carried out by HEB staff to gather information pertinent to the structural components of the project and to take photos of the site. HEB Engineers then compiled available LiDAR data which were determined to be sufficient for incorporation with topographic survey data in a hydraulic model. Topographic survey largely informed characteristics and dimensions of the bridges and bathymetric data not captured by the surrounding LiDAR topography. Several river cross-sections were captured by HEB surveyors and stitched together with LiDAR data depicting the Ammoonoosuc River floodplain.

B. Model Geometry and Simulations

A 1-dimensional (1D) hydraulic model was created in the Hydraulic Engineering Center River Analysis System (HEC-RAS) to simulate a range of storm flows as they interact with existing conditions at the site. Several cross-sections were defined along with bank stations and flow paths. A full view of the existing conditions model geometry and underlying terrain is shown in Figure 1. Figure 2 displays the existing terrain conditions in the bridge's direct vicinity with bridge piers shown as black polygons. A second model was created to analyze the effects of temporary access roads on hydraulic conditions and to demonstrate their accommodation of the 10-year storm. An iterative process was necessary to determine appropriate elevations for the access roads given their effect on channel hydraulics. Access roads were incorporated as 15-foot offsets from the face of the piers with a 1.5:1 slope from their edge to the bed of the river channel (Figure 3). A third model assessed a phased approach to rehabilitation work in which just one temporary access road is in place at a time (Figure 4). Simulations of the 10-year and 100-year storms were carried out for all three models.

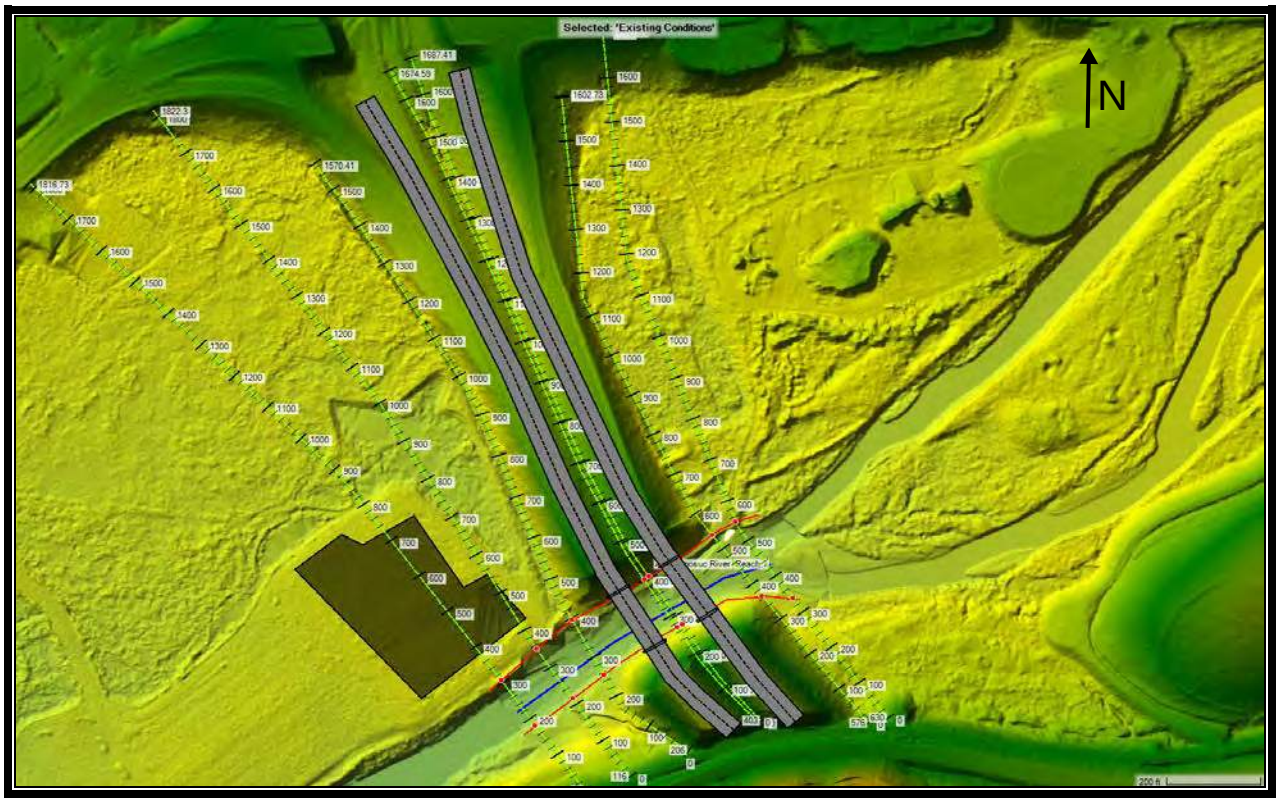


Figure 1: Plan of existing conditions HEC-RAS model geometry.

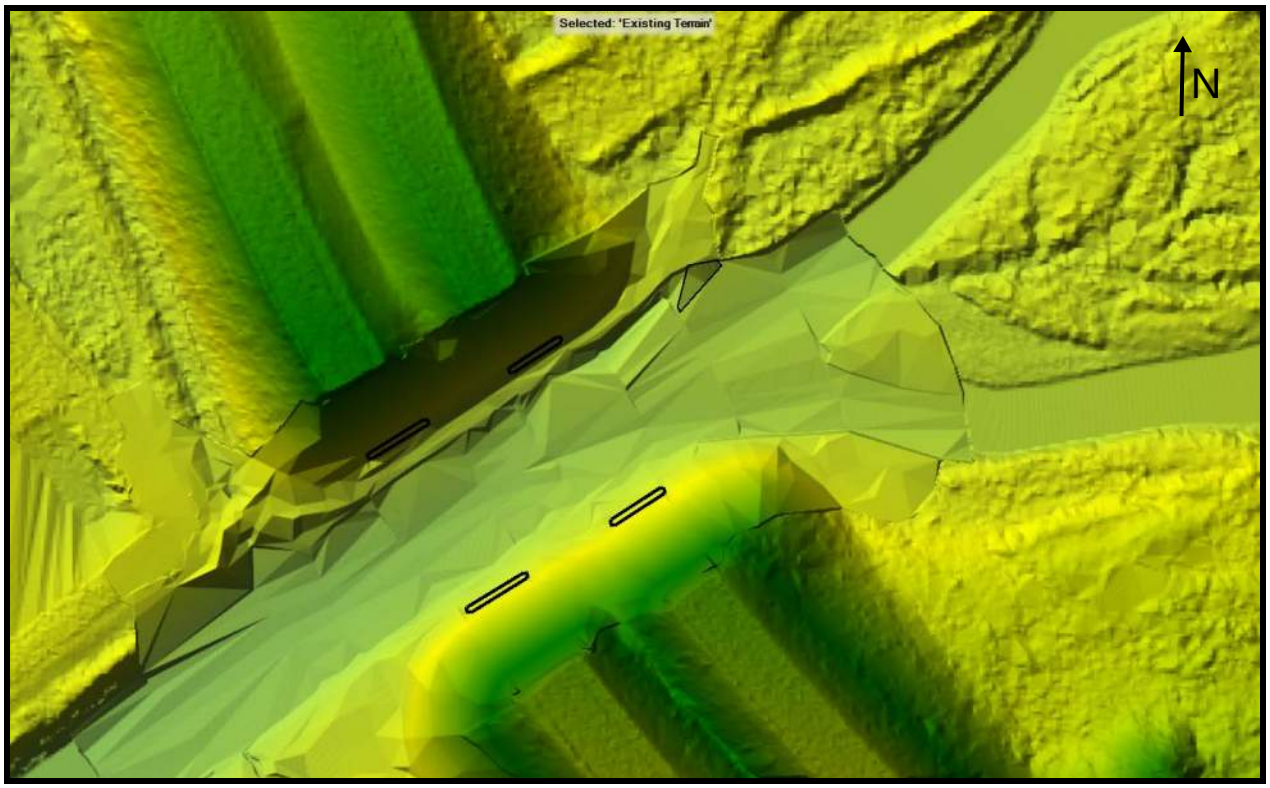


Figure 2: Plan of existing conditions terrain in HEC-RAS.

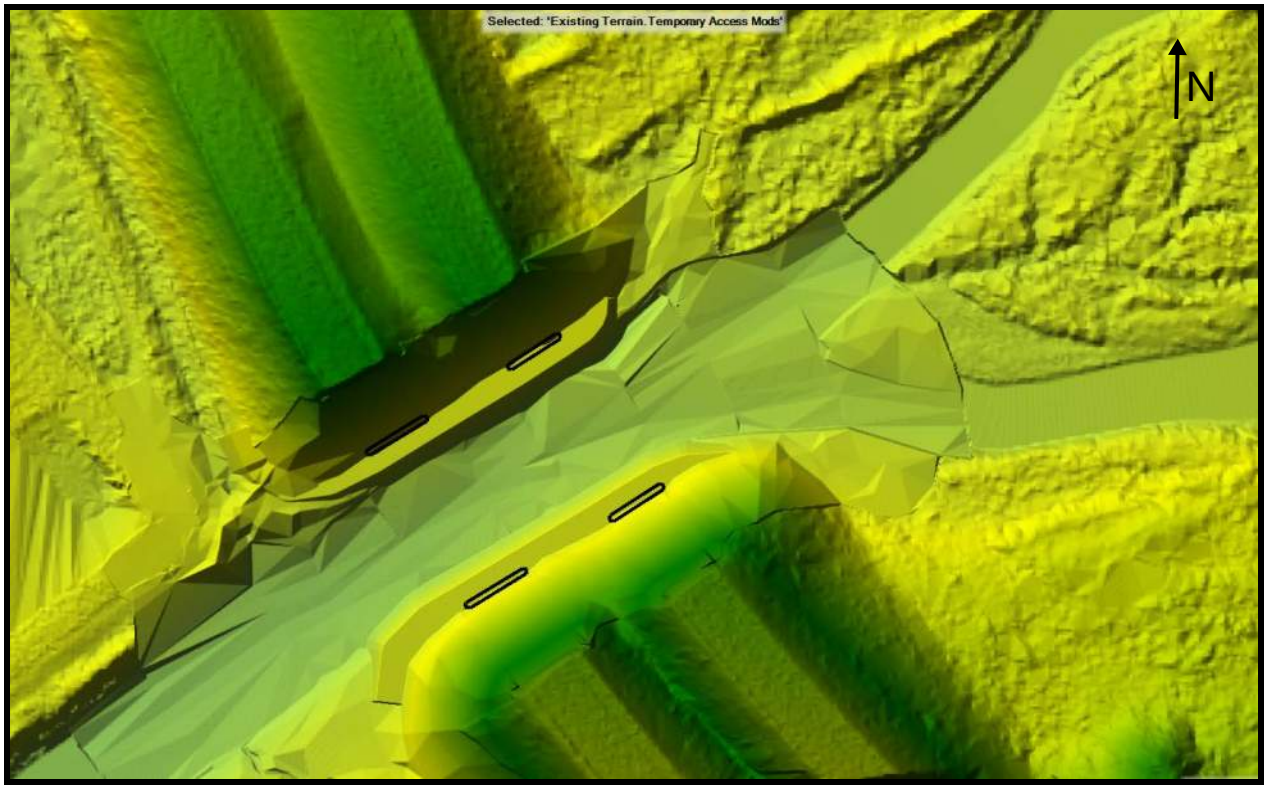


Figure 3: Plan of modified terrain with conceptual temporary access roads.

C. Hydrologic Data

HEB calculated peak flow rates for the study area's 10-year, 25-year, 50-year, and 100-year storms. Three calculation methods were employed to evaluate consistency in resultant flow estimates. Hydrologic calculations are included in Appendix B. Calculation methods included:

- USGS StreamStats
- New England Hill and Lowlands (NEHL) and Adirondack White Mountains (AWM) Method
- FHWA Runoff Estimates for Small Rural Watersheds

The following table summarizes the results of the hydrologic analyses:

Table 1 – Ammonoosuc River Peak Flow Rate Calculations (cfs)

Method	10-Yr	25-Yr	50-Yr	100-Yr
USGS StreamStats	8,040	10,100	11,800	13,800
NEHL-AWM Method	9,000		16,900	
FHWA Runoff Estimates	9,522		17,225	20,450

As shown, the USGS StreamStats estimates for the 50-year and 100-year storm are significantly lower than those of the NEHL-AWM and FHWA methods. HEB referenced the upstream USGS stream gage at Bethlehem Junction (Site 01137500), which incorporates collected data to estimate the 100-year storm flow at 13,200 cfs for the site's respective 88.4 square mile watershed. Based on this estimate, it became clear that the StreamStats estimates listed above are either erroneous or are in some way accounting for regulation at the Apthorp Dam, a hydropower facility upstream of the Littleton bridges.

HEB inquired with the USGS New England Water Science Center (NEWSC) for insight into possible factors in the apparent discrepancy. Ultimately, NEWSC personnel were unable to determine the cause of the proportionally small flow estimates produced by StreamStats. As such, HEB proceeded with hydraulic modeling using the FHWA flow estimates. Based on the 100-year storm estimate calculated at the Bethlehem Junction gage and watershed proportion at the Littleton bridges site (about 1.5 times larger than at Bethlehem gage) a flow of 20,450 (1.55 times larger than reported at Bethlehem gage) appears reasonable. Further, the NEHL-AWM estimate for the 50-year flow at the Littleton bridges aligns well with that of the FHWA method. Finally, since the FHWA estimates are the greatest of the three calculation methods, they will provide the most conservative hydraulic conditions around which to design temporary access infrastructure.

IV. MODEL RESULTS

For this analysis, the most significant data generated by the HEC-RAS model are those for water surface elevation and velocity in the vicinity of the proposed preservation work. These data provide flood elevations relevant to temporary access road construction and aid in assessing the temporary infrastructure's impact on in-stream hydraulic conditions.

Inundation boundaries for the 10-year storm are shown for all modeled conditions in Figure 4. Figure 5 best depicts the increase in peak water surface elevation that would be expected during the 10-year storm. At the northbound bridge inlet, the temporary access roads appear to result in an increase in peak water surface elevation during the 10-year storm from 721.73 feet to 723.52 feet. Water surface elevations for the 10-year storm appear to equalize at the outlet of the southbound bridge. The hydraulic model indicates that the temporary access roads, built above 723.50 in the vicinity of the upstream pier and above 721.00 feet in the vicinity of the downstream pier, would accommodate the 10-year storm. Increases to water surface elevation could be mitigated through a phased approach to rehabilitation work. The third model, with one temporary access road in place along the southern piers, reports a peak water surface elevation during the 10-year storm of 722.59 feet at the northbound bridge inlet.

The temporary access roads would also result in increased peak velocities through the bridges during the 10-year storm. As a result of the moderate constriction enacted by the temporary access roads, some additional backwatering occurs and results in lower velocities upstream of the northbound bridge. Velocities in the channel appear to equalize under both scenarios just downstream of the southbound bridge. A full hydraulic output table comparing results for the two models is included in Appendix C.

The 100-year inundation map for the existing conditions model was compared and found to align well with Federal Emergency Management Agency (FEMA) 100-year floodplain boundaries, corroborating the model's general accuracy.

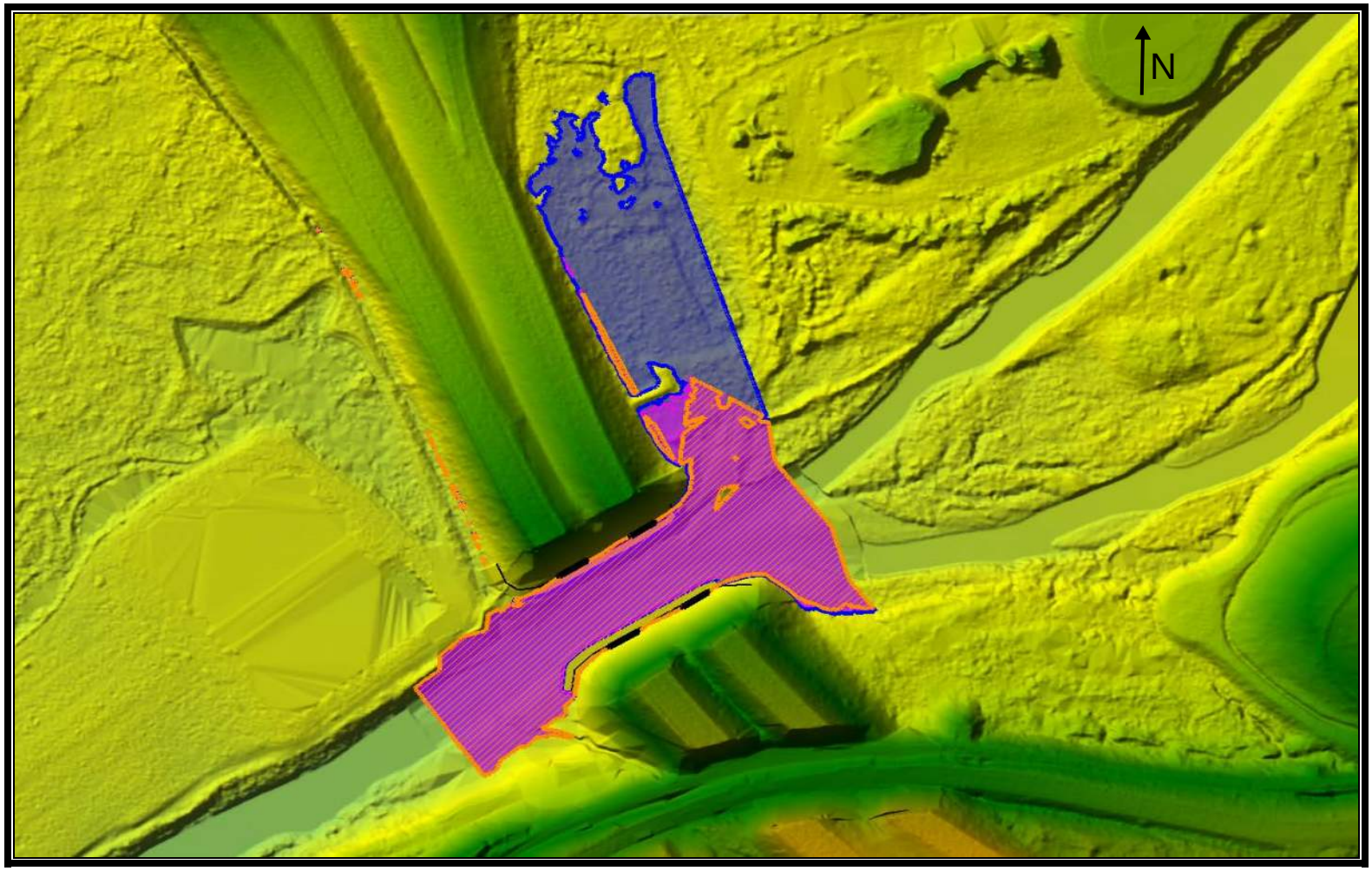


Figure 4: 10-year peak inundation map for existing conditions (orange stripes), temporary access conditions (blue fill), and phased temporary access conditions (pink fill).

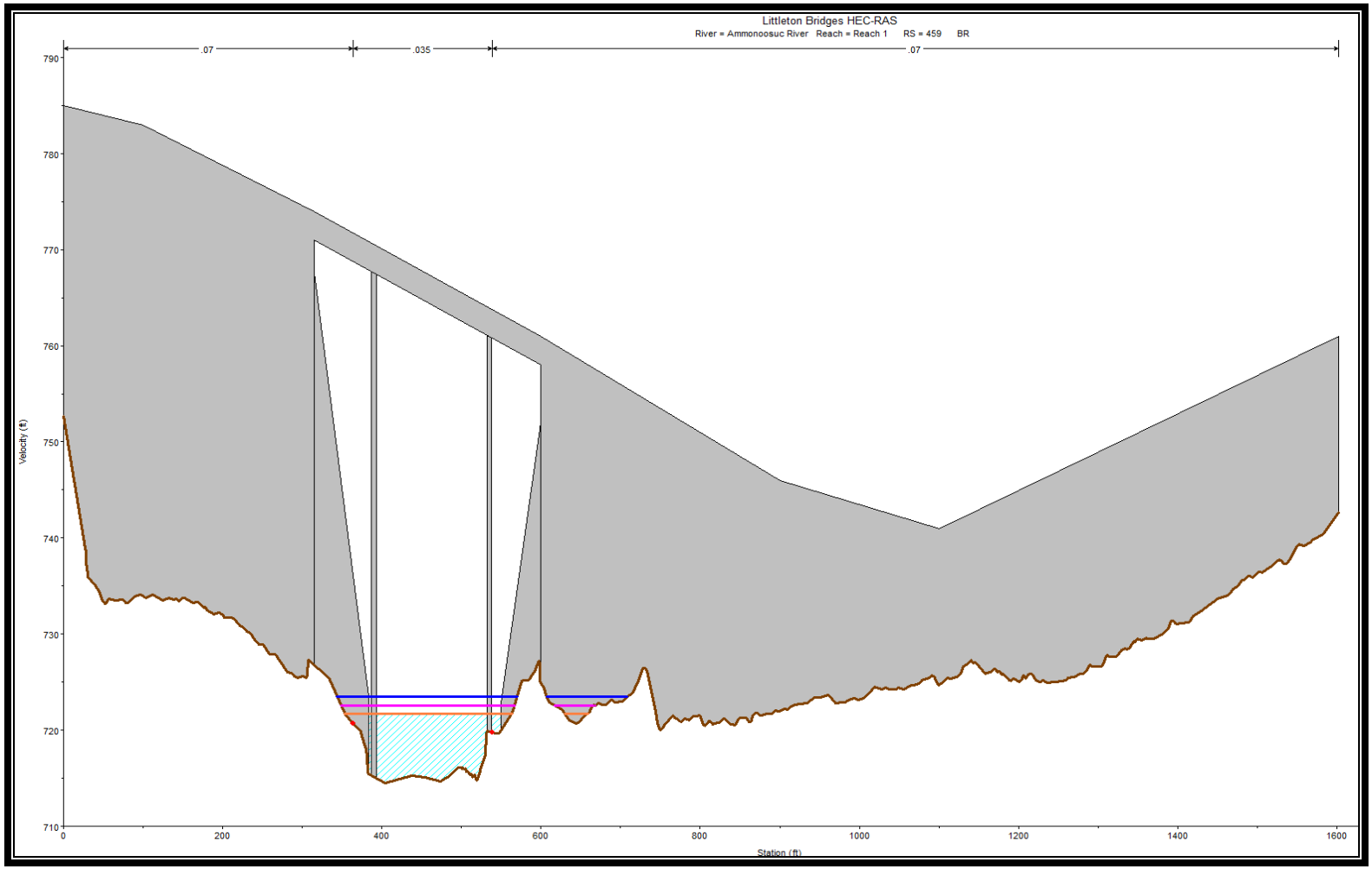


Figure 5: Peak water surface elevations for existing conditions (orange), temporary access conditions (blue), and phased temporary access conditions during 10-year storm at inlet of northbound bridge (pink)

V. DISCUSSION AND CONCLUSION

Modeling at this stage of the project was focused on determining water surface elevations during the 10-year storm and associated elevations at which to construct proposed temporary access infrastructure. Further, HEB considered the potential impacts of temporary access infrastructure on in-stream hydraulic conditions, primarily velocity. For model validation, HEB also compared existing conditions model flood elevations and inundation boundary for the 100-year storm to those already mapped by FEMA.

Hydraulic model results incorporating both temporary access roads reported a 10-year peak water surface elevation of 723.52 feet at the inlet of the northbound bridge and 721.21 feet (equal to existing conditions) at the outlet of the southbound bridge. Hydraulic model results for a phased temporary access approach reported a 10-year peak water surface elevation of 722.59 feet at the inlet of the northbound bridge and 721.21 feet (equal to existing conditions) at the outlet of the southbound bridge.

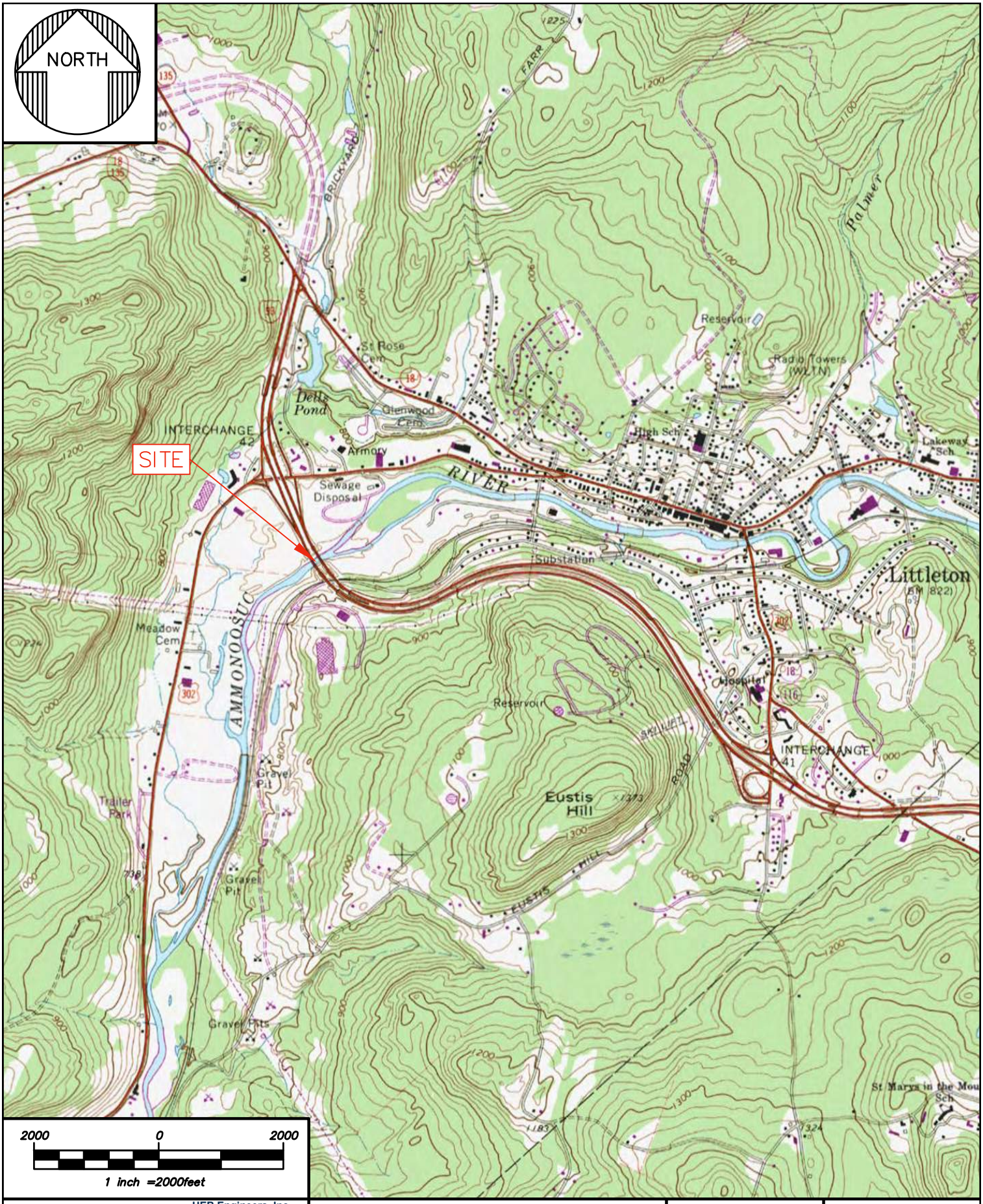
The maximum peak velocity during the 10-year storm for temporary access conditions was reported by the model to be 14.36 feet per second. The maximum peak velocity during the 10-year storm for phased temporary access conditions was reported by the model to be 13.71 feet per second. Embankments for the temporary access infrastructure should be designed and constructed to withstand velocities of this magnitude. Velocities for temporary access conditions appear to equalize with existing conditions just downstream of the southbound bridge outlet.

A hydraulic output table comparing results for the modeled geometries and storm flows is included for reference in Appendix C.

P:\Jobs\2021\2021-154 NHDOT - Littleton 43809\Reports\H&H Report\Littleton 43809 Bridge Preservation Hydrologic-Hydraulic Analysis 12-09-22.doc

APPENDIX A

USGS MAP



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Vicinity Map
for the
Littleton Bridge Preservation 43809
over the
Ammonoosuc River
prepared for
NHDOT

Figure 1	PROJECT 2021–154
DESIGNED BY –	REVISION –
DRAWN BY TSR	DATE 11/30/2021
CHECKED BY CRF	SCALE 1"=2,000'

APPENDIX B

HYDROLOGIC CALCULATIONS

HEB Engineers
CIVIL • STRUCTURAL • SURVEY

HEB Engineers, Inc.
hebengineers.com

NH Office (603) 356-6936
ME Office (207) 803-0265

Client NHDOT
Project Littleton 43809
Calculated By JDS

Proj. No. 2021 – 154
Date 10 – 18 – 2022

Checked by JMM.

Determination of peak flow rates - Ammonoosuc River

Objective: Calculate and check, using mutliple methods, peak flow rates for the Ammonoosuc River for 10-year, 25-year, 50-year, & 100-year recurrance interavls.

Watershed/Drainage Basin Characeristics

1). A delineated watershed/drainage basin for the Ammonoosuc River is included in Attachment A of these calculations.

2). A summary of NOAA Atlas 14 precipitation intervals is included as Attachment B.

Checked by JMM.

Calculation Method 1: USGS StreamStats

Streamstats summary information is included in Attachment A.

$StreamStats3Q_{10} := 8040$ *CFS*

$StreamStats3Q_{25} := 10100$ *CFS*

$StreamStats3Q_{50} := 11800$ *CFS*

$StreamStats3Q_{100} := 13800$ *CFS*

Check Method 1: New England Hill + LowLand, Adirondack, White Mountain + Maine Woods (NEHL-AWM Method)

NEHL-AWM Information provided in Attachment C

$Watershed_{area} := 84224\ acre = 131.6\ mile^2$

Precipitation index: 1.63

Storage Idnex:

$Wetland_{area} := 42096000\ ft^2 = 966.3912\ acre$

$K := \frac{Wetland_{area}}{Watershed_{area}} = 1.1474\ \%$ ≤4.5%

From Chart: $NEHLAWMQ_{10} := 9000$ *CFS*

$NEHLAWMQ_{50} := 16900$ *CFS*

Check Method 2: FHWA Runoff Estimates for Small Rural Watersheds and Development of a Sound Method

FHWA Information provided in Attachment D

Hydrophysiographic Zone = 9

$A := 131.6$ *square miles*

$R := 79$

$DH := 5299$ *feet*

$L := 36.8$ *miles*

$P_{60} := 1.57$ *inches*

Is Storage % less than 4%? Correction needed if >4%.

Storage is <4%.

$$FHWAQ_{10} := 7.7165 \cdot A^{0.5814} \cdot R^{0.0547} \cdot DH^{0.3865} \cdot L^{0.0990} \cdot P_{60}^{0.8217} = 9522.4032 \text{ CFS}$$

$$FHWAQ_{50} := 1.45962 \cdot FHWAQ_{10}^{1.02342} = 17225.3722 \text{ CFS}$$

$$FHWAQ_{100} := 1.64380 \cdot FHWAQ_{10}^{1.02918} = 20450.0967 \text{ CFS}$$

Checked by JMM.

Summary:

Discharge	Calculation Method 1 (CFS)	Check Method 1 (CFS)	Check Method 2 (CFS)
Q_{10}	$StreamStats3Q_{10} = 8040$	$NEHLAWMQ_{10} = 9000$	$FHWAQ_{10} = 9522$
Q_{25}	$StreamStats3Q_{25} = 10100$	X	X
Q_{50}	$StreamStats3Q_{50} = 11800$	$NEHLAWMQ_{50} = 16900$	$FHWAQ_{50} = 17225$
Q_{100}	$StreamStats3Q_{100} = 13800$	X	$FHWAQ_{100} = 20450$

Conclusion

The USGS StreamStats estimates for the 50-year and 100-year storm are significantly lower than those of the NEHL-AWM and FHWA methods. HEB referenced the upstream USGS stream gage at Bethlehem Junction (Site 01137500), which incorporates collected data to estimate the 100-year storm flow at 13,200 cfs for the site's respective 88.4 square mile watershed. Based on this estimate, it became clear that the StreamStats estimates listed above are either erroneous or are in some way accounting for regulation at the Apthorp Dam, a hydropower facility shortly upstream of the Littleton bridges.

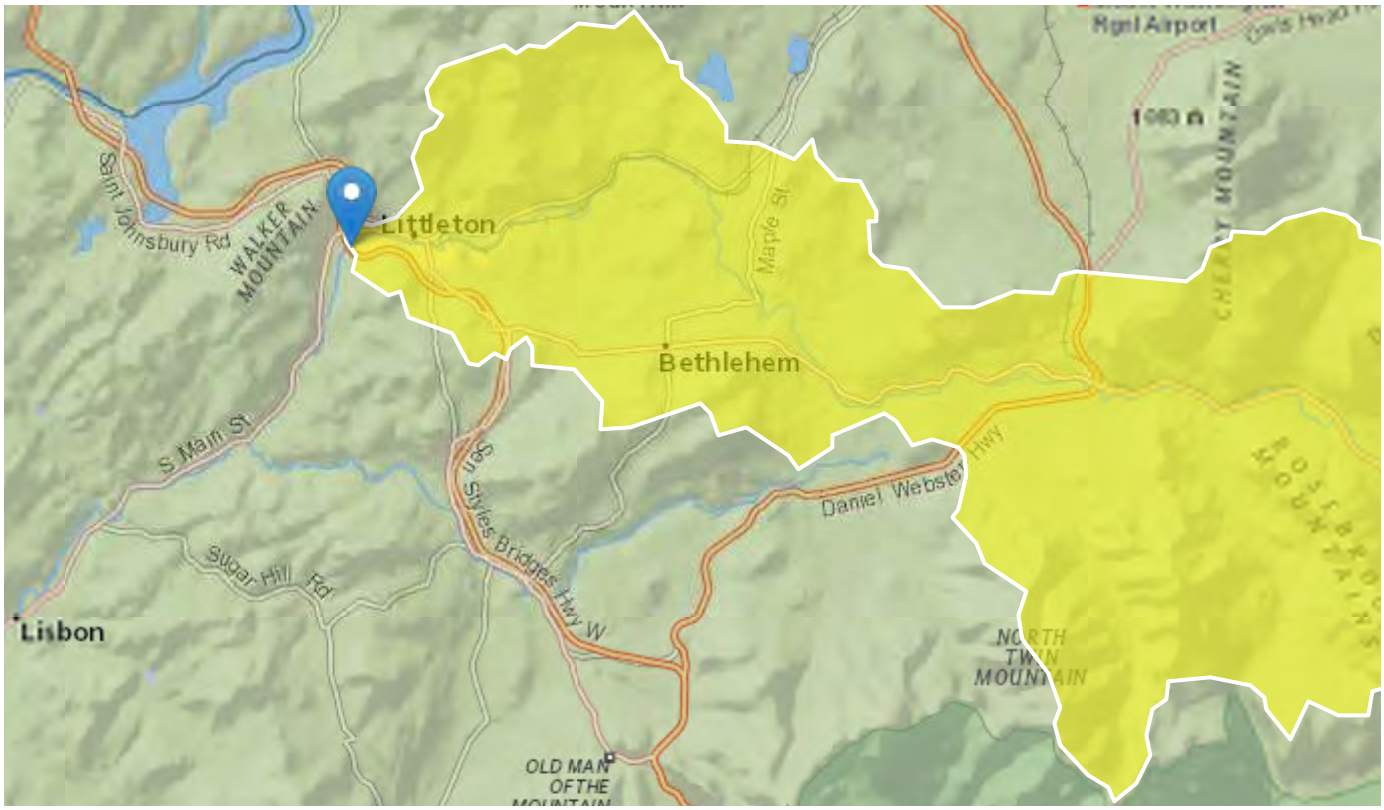
HEB inquired with the USGS New England Water Science Center (NEWSC) for insight into possible factors in the apparent discrepancy. Ultimately, NEWSC personnel were unable to determine the cause of the proportionally small flow estimates produced by StreamStats. As such, HEB proceeded with hydraulic modeling using the FHWA flow estimates. Based on the 100-year storm estimate calculated at the Bethlehem Junction gage and watershed proportion at the Littleton bridges site (about 1.5 times larger than at Bethlehem gage) a flow of 20,450 (1.55 times larger than reported at Bethlehem gage) appears reasonable. Further, the NEHL-AWM estimate for the 50-year flow at the Littleton bridges aligns well with that of the FHWA method. Finally, since the FHWA estimates are the greatest of the three calculation methods, they will provide the most conservative hydraulic conditions around which to design temporary access infrastructure.

HYDROLOGIC CALCULATIONS
Attachment A

StreamStats Report

Littleton Bridges StreamStats

Region ID: NH
Workspace ID: NH20220915181139496000
Clicked Point (Latitude, Longitude): 44.30483, -71.79615
Time: 2022-09-15 14:12:02 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
APRAVPRE	Mean April Precipitation	3.856	inches
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	40.6	feet per mi
DRNAREA	Area that drains to a point on a stream	131.58	square miles
WETLAND	Percentage of Wetlands	1.155	percent

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Peak Flow Statewide SIR2008 5206]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	131.58	square miles	0.7	1290
APRAVPRE	Mean April Precipitation	3.856	inches	2.79	6.23
WETLAND	Percent Wetlands	1.155	percent	0	21.8
CSL10_85	Stream Slope 10 and 85 Method	40.6	feet per mi	5.43	543

Peak-Flow Statistics Flow Report [Peak Flow Statewide SIR2008 5206]

PIl: Prediction Interval-Lower, PIu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PIl	PIu	ASEp	Equiv. Yrs.
50-percent AEP flood	4220	ft^3/s	2610	6830	30.1	3.2
20-percent AEP flood	6350	ft^3/s	3880	10400	31.1	4.7
10-percent AEP flood	8040	ft^3/s	4820	13400	32.3	6.2
4-percent AEP flood	10100	ft^3/s	5870	17400	34.3	8
2-percent AEP flood	11800	ft^3/s	6660	20900	36.4	9
1-percent AEP flood	13800	ft^3/s	7540	25300	38.6	9.8
0.2-percent AEP flood	18300	ft^3/s	9240	36200	44.1	11

Peak-Flow Statistics Citations

Olson, S.A.,2009, Estimation of flood discharges at selected recurrence intervals for streams in New Hampshire: U.S.Geological Survey Scientific Investigations Report 2008-5206, 57 p. (http://pubs.usgs.gov/sir/2008/5206/)

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Application Version: 4.10.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

HYDROLOGIC CALCULATIONS
Attachment B

NOAA Atlas 14 Precipitation Estimates

NOAA Atlas 14, Volume 10, Version 3
Location name: Littleton, New Hampshire, USA*
Latitude: 44.3048°, Longitude: -71.7965°
Elevation: 713.54 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.284** (0.226-0.357)	**0.330** (0.262-0.414)	**0.405** (0.320-0.510)	**0.466** (0.367-0.590)	**0.551** (0.418-0.726)	**0.616** (0.456-0.828)	**0.682** (0.487-0.948)	**0.753** (0.511-1.08)	**0.852** (0.555-1.26)	**0.931** (0.589-1.41)
10-min	**0.403** (0.320-0.505)	**0.467** (0.371-0.587)	**0.572** (0.453-0.721)	**0.660** (0.519-0.836)	**0.781** (0.592-1.03)	**0.872** (0.646-1.17)	**0.966** (0.690-1.34)	**1.07** (0.724-1.53)	**1.21** (0.785-1.79)	**1.32** (0.835-1.99)
15-min	**0.474** (0.377-0.595)	**0.550** (0.437-0.690)	**0.674** (0.533-0.849)	**0.777** (0.611-0.983)	**0.918** (0.696-1.21)	**1.03** (0.760-1.38)	**1.14** (0.812-1.58)	**1.26** (0.852-1.80)	**1.42** (0.924-2.10)	**1.55** (0.982-2.35)
30-min	**0.644** (0.512-0.808)	**0.748** (0.594-0.939)	**0.918** (0.727-1.16)	**1.06** (0.833-1.34)	**1.25** (0.948-1.65)	**1.40** (1.03-1.88)	**1.55** (1.11-2.15)	**1.71** (1.16-2.44)	**1.92** (1.25-2.85)	**2.09** (1.32-3.16)
60-min	**0.814** (0.647-1.02)	**0.946** (0.751-1.19)	**1.16** (0.919-1.46)	**1.34** (1.05-1.70)	**1.59** (1.20-2.09)	**1.78** (1.31-2.38)	**1.97** (1.40-2.72)	**2.16** (1.47-3.09)	**2.42** (1.58-3.59)	**2.63** (1.66-3.97)
2-hr	**0.995** (0.796-1.24)	**1.17** (0.933-1.46)	**1.45** (1.16-1.82)	**1.69** (1.33-2.12)	**2.01** (1.53-2.63)	**2.25** (1.68-3.01)	**2.51** (1.80-3.47)	**2.79** (1.90-3.96)	**3.18** (2.08-4.68)	**3.51** (2.23-5.26)
3-hr	**1.12** (0.895-1.38)	**1.31** (1.05-1.63)	**1.64** (1.31-2.05)	**1.91** (1.52-2.40)	**2.28** (1.75-2.99)	**2.56** (1.92-3.43)	**2.86** (2.07-3.96)	**3.19** (2.18-4.52)	**3.68** (2.40-5.39)	**4.08** (2.60-6.09)
6-hr	**1.36** (1.09-1.67)	**1.60** (1.29-1.98)	**2.01** (1.61-2.49)	**2.34** (1.87-2.92)	**2.80** (2.16-3.65)	**3.15** (2.37-4.19)	**3.51** (2.56-4.86)	**3.94** (2.70-5.54)	**4.57** (3.00-6.65)	**5.10** (3.26-7.57)
12-hr	**1.65** (1.34-2.02)	**1.94** (1.58-2.38)	**2.43** (1.96-2.99)	**2.83** (2.27-3.50)	**3.38** (2.62-4.37)	**3.80** (2.87-5.01)	**4.23** (3.10-5.80)	**4.74** (3.26-6.62)	**5.49** (3.62-7.92)	**6.12** (3.92-9.00)
24-hr	**1.96** (1.60-2.39)	**2.31** (1.88-2.81)	**2.87** (2.34-3.51)	**3.34** (2.70-4.11)	**3.99** (3.10-5.11)	**4.47** (3.40-5.85)	**4.98** (3.66-6.76)	**5.56** (3.84-7.70)	**6.39** (4.22-9.15)	**7.08** (4.55-10.3)
2-day	**2.29** (1.88-2.77)	**2.68** (2.20-3.25)	**3.32** (2.72-4.04)	**3.85** (3.13-4.71)	**4.58** (3.58-5.83)	**5.14** (3.92-6.66)	**5.71** (4.20-7.66)	**6.34** (4.40-8.71)	**7.23** (4.80-10.3)	**7.94** (5.12-11.5)
3-day	**2.53** (2.09-3.05)	**2.94** (2.43-3.55)	**3.62** (2.97-4.38)	**4.17** (3.40-5.08)	**4.94** (3.87-6.25)	**5.53** (4.22-7.12)	**6.13** (4.51-8.16)	**6.77** (4.71-9.26)	**7.67** (5.10-10.8)	**8.39** (5.42-12.1)
4-day	**2.75** (2.27-3.30)	**3.17** (2.62-3.82)	**3.87** (3.18-4.67)	**4.44** (3.63-5.39)	**5.23** (4.11-6.59)	**5.84** (4.47-7.50)	**6.46** (4.75-8.56)	**7.11** (4.96-9.69)	**8.02** (5.35-11.3)	**8.74** (5.66-12.6)
7-day	**3.33** (2.77-3.99)	**3.79** (3.15-4.54)	**4.54** (3.75-5.45)	**5.16** (4.24-6.23)	**6.02** (4.74-7.53)	**6.67** (5.12-8.50)	**7.34** (5.41-9.63)	**8.02** (5.62-10.9)	**8.95** (5.99-12.5)	**9.67** (6.28-13.8)
10-day	**3.89** (3.25-4.64)	**4.38** (3.65-5.23)	**5.18** (4.30-6.20)	**5.85** (4.82-7.03)	**6.76** (5.34-8.41)	**7.46** (5.74-9.46)	**8.17** (6.03-10.7)	**8.88** (6.24-12.0)	**9.83** (6.59-13.7)	**10.5** (6.86-15.0)
20-day	**5.59** (4.69-6.62)	**6.17** (5.17-7.31)	**7.12** (5.94-8.46)	**7.90** (6.55-9.44)	**8.98** (7.14-11.1)	**9.82** (7.59-12.3)	**10.6** (7.87-13.7)	**11.4** (8.07-15.3)	**12.4** (8.38-17.2)	**13.2** (8.59-18.6)
30-day	**7.00** (5.90-8.26)	**7.65** (6.43-9.03)	**8.71** (7.30-10.3)	**9.60** (7.98-11.4)	**10.8** (8.62-13.3)	**11.8** (9.11-14.7)	**12.7** (9.39-16.2)	**13.5** (9.58-18.0)	**14.6** (9.85-20.0)	**15.3** (10.0-21.5)
45-day	**8.75** (7.40-10.3)	**9.49** (8.01-11.2)	**10.7** (8.98-12.6)	**11.7** (9.75-13.9)	**13.1** (10.4-15.9)	**14.1** (11.0-17.5)	**15.2** (11.3-19.3)	**16.1** (11.4-21.3)	**17.2** (11.7-23.5)	**17.9** (11.8-25.0)
60-day	**10.2** (8.66-12.0)	**11.0** (9.32-12.9)	**12.3** (10.4-14.5)	**13.4** (11.2-15.9)	**14.9** (12.0-18.1)	**16.1** (12.5-19.9)	**17.2** (12.8-21.8)	**18.2** (13.0-24.0)	**19.4** (13.2-26.4)	**20.1** (13.2-28.0)

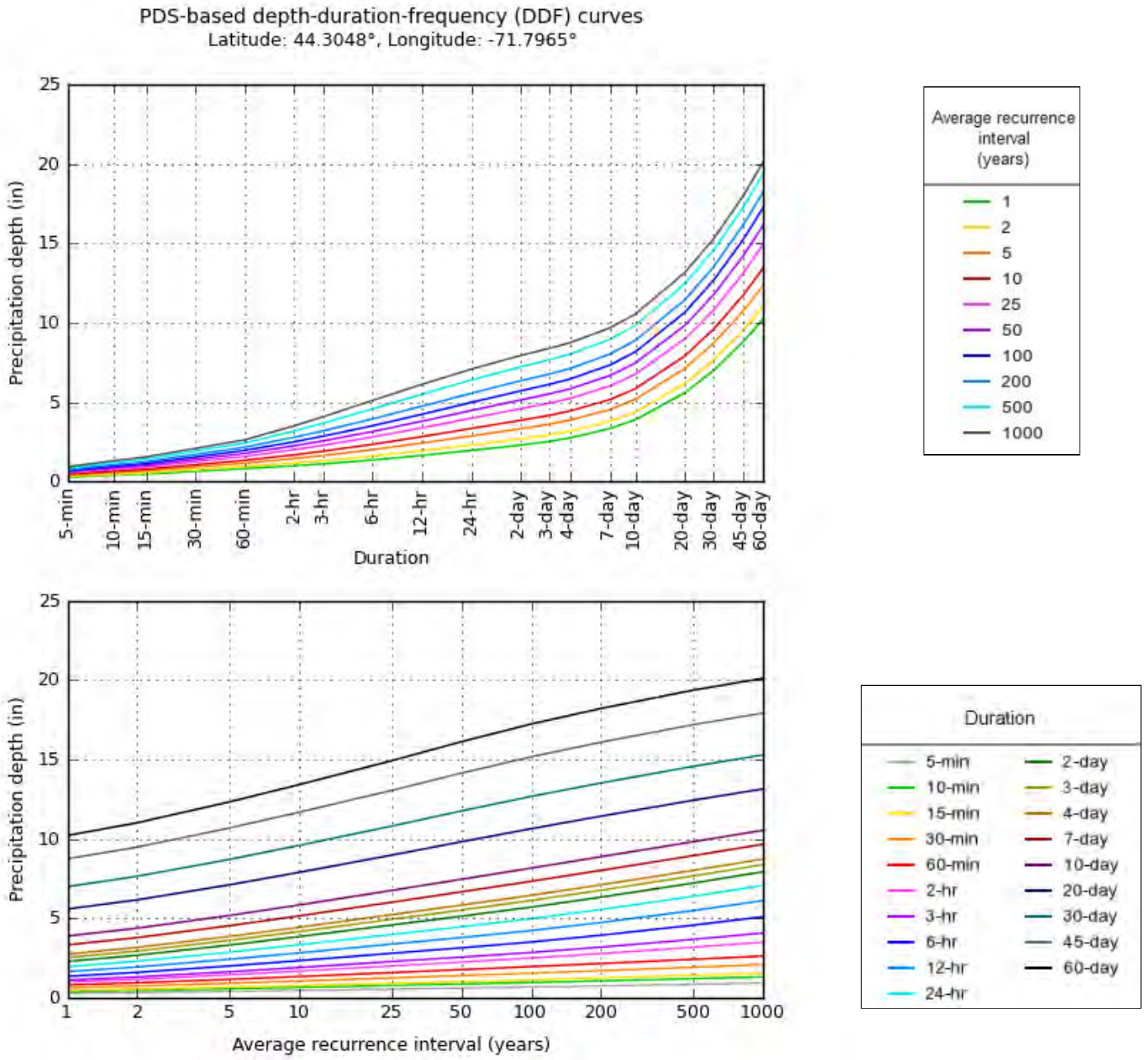
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical



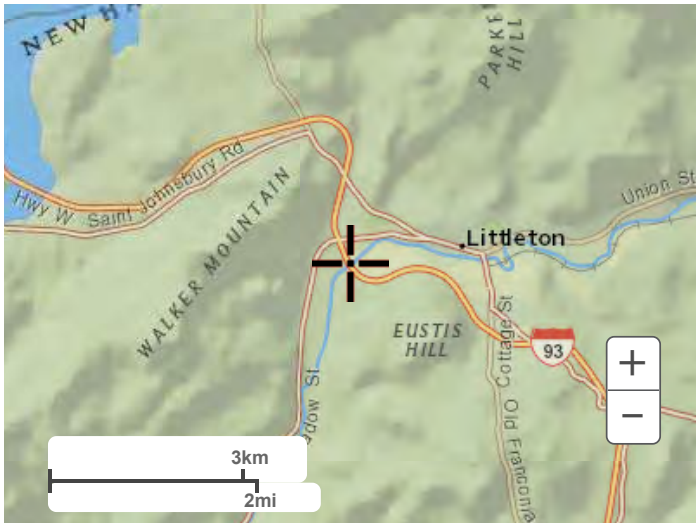
NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Tue Oct 18 18:28:55 2022

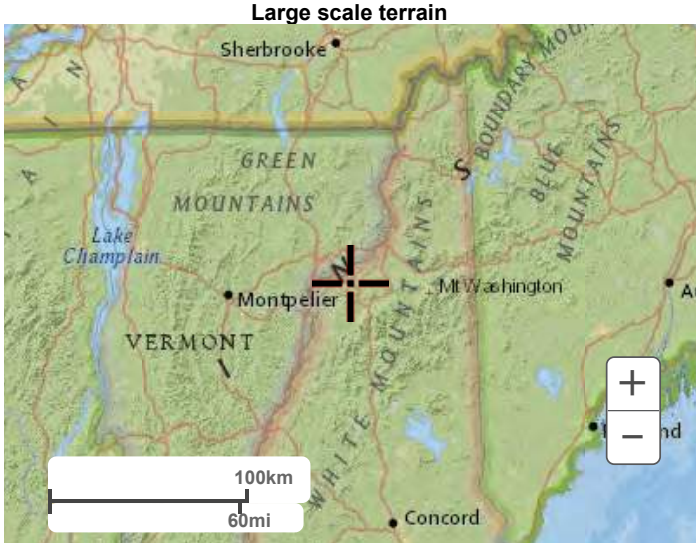
Back to Top

Maps & aerials

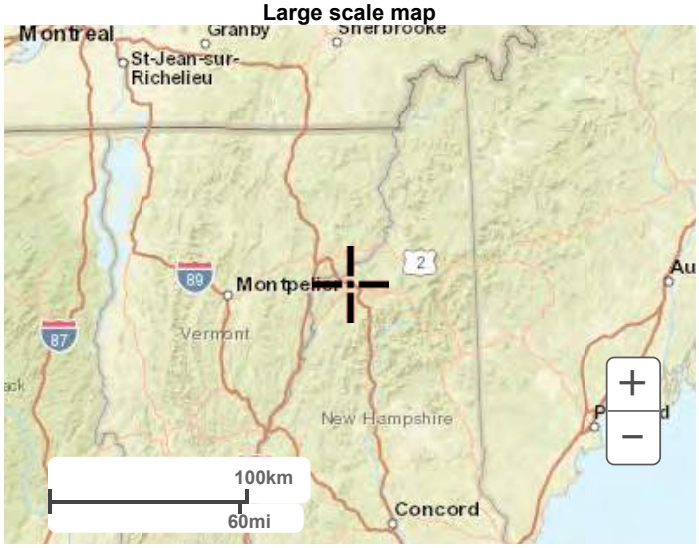
Small scale terrain



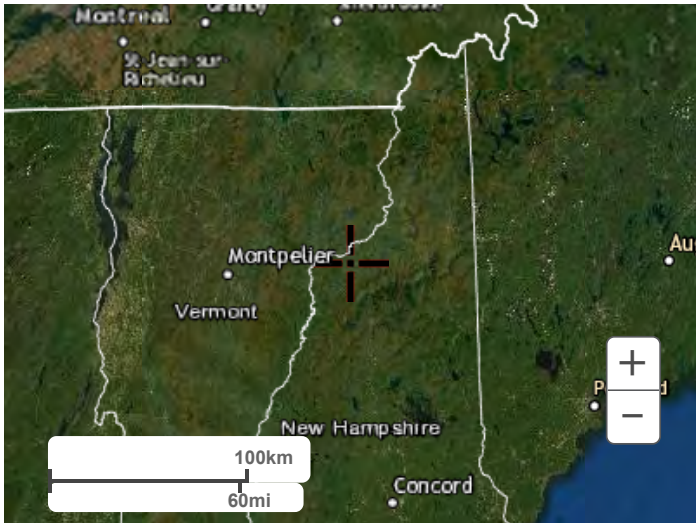
Large scale terrain



Large scale map



Large scale aerial



Back to Top

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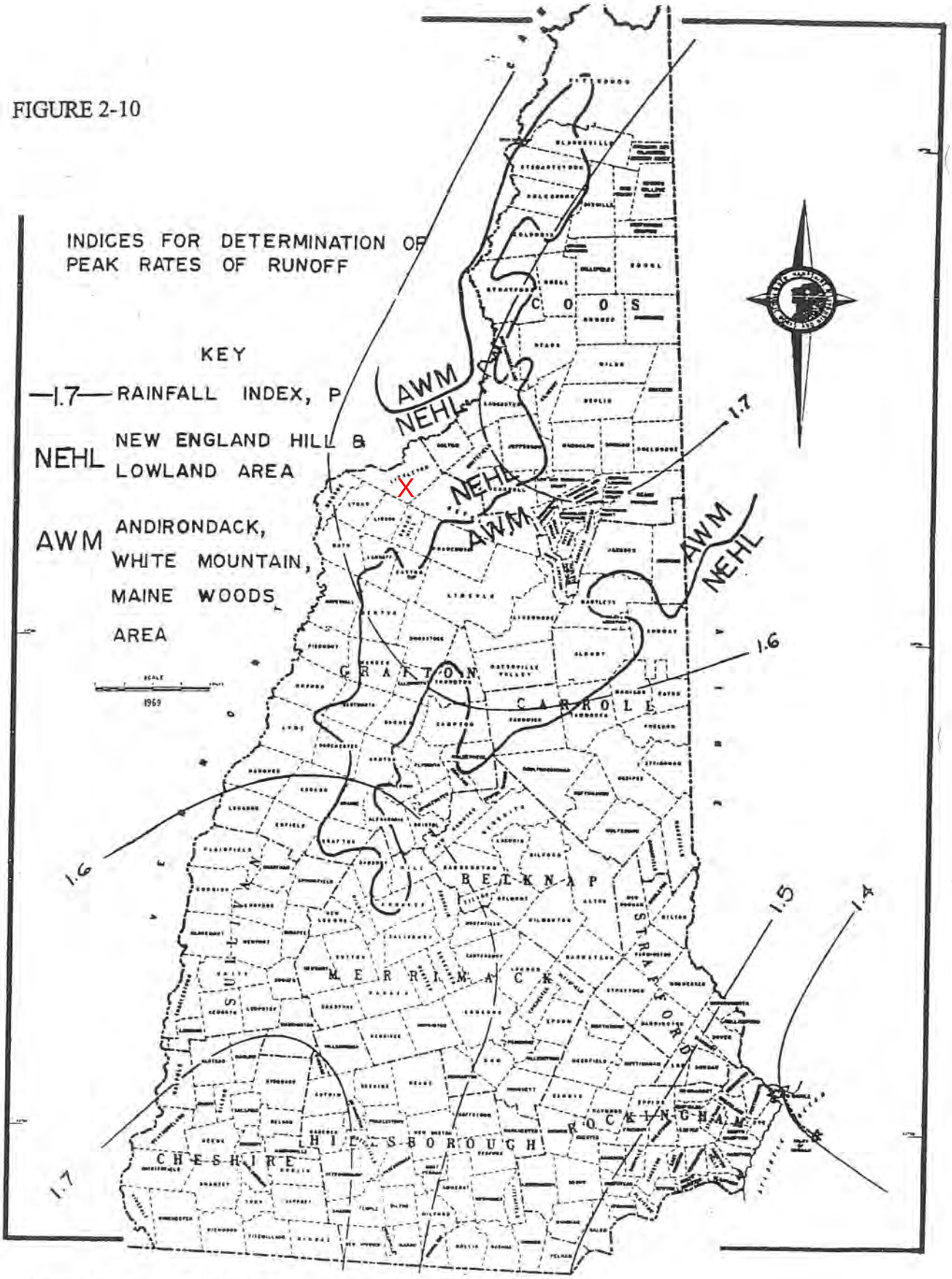
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

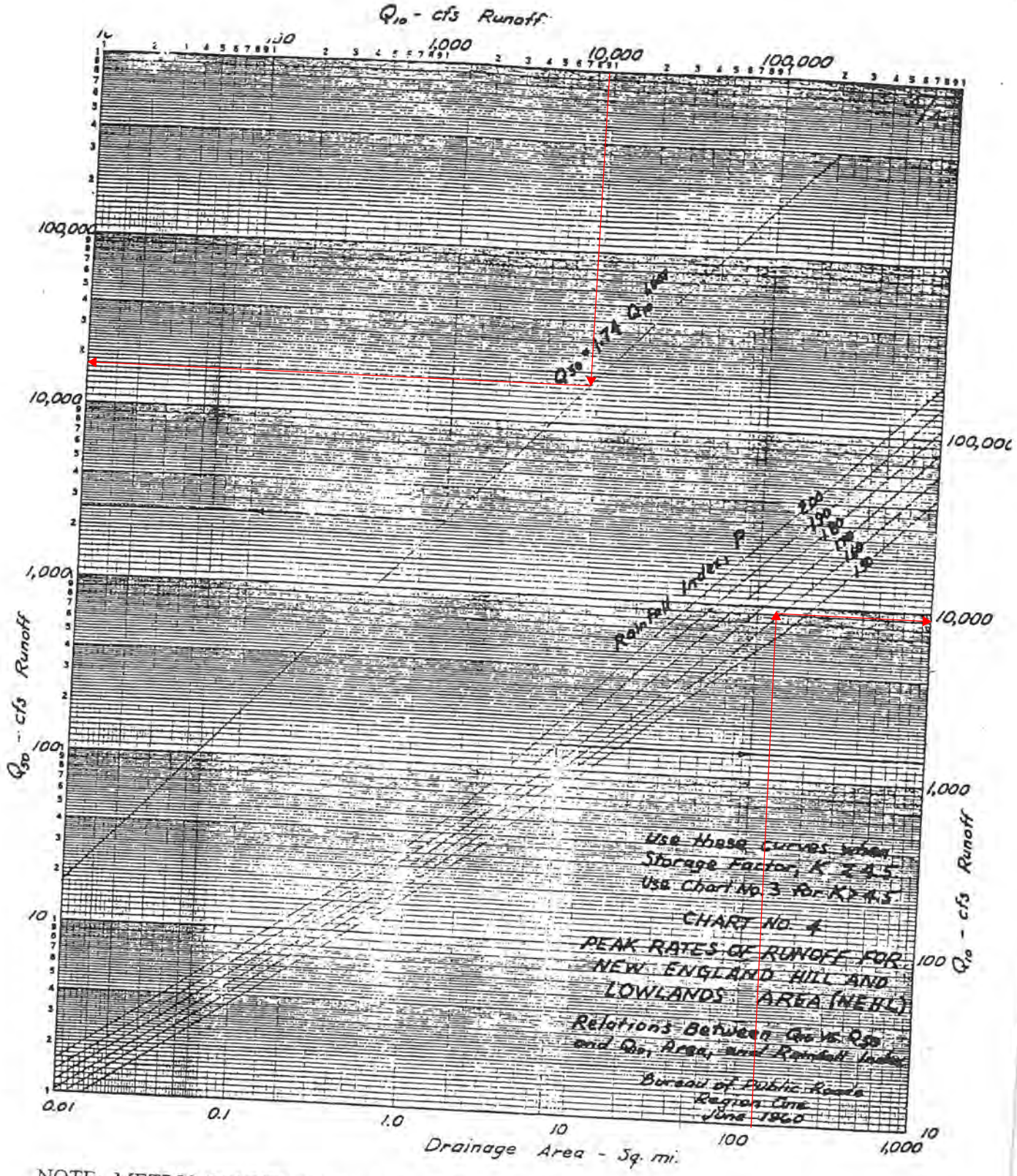
HYDROLOGIC CALCULATIONS
Attachment C

New England Hill and Lowlands (NEHL) and
Adirondack White Mountains (AWM) Method

FIGURE 2-10



NOTE: METRIC CONVERSION: 1 INCH = 25.4 mm
1mm = 0.0394 IN.



NOTE: METRIC CONVERSION 1 in. = 25.4 mm
1 ft. = 0.3048 m

Q10 = 9,000 cfs
Q50 = 16,900 cfs

FIGURE 2-9

HYDROLOGIC CALCULATIONS
Attachment D

FHWA Runoff Estimates for Small Rural Watersheds and Development of a Sound Method

Table 1-C. The 5-parameter regression equations for each of the 24 hydrophysiographic zones of the United States and Puerto Rico. (See also Appendix H, Table H-2.)

Zone	Equation
All Zone	$\hat{q}_{10} = 1.5102\ A^{0.6707}\ R^{0.8556}\ DH^{0.1718}\ L^{0.1764}\ P_{60}^{0.3476}$
1	$\hat{q}_{10} = 0.31006\ A^{0.1672}\ R^{0.1378}\ DH^{0.6261}\ L^{1.1489}\ P_{60}^{3.3884}$
2	$\hat{q}_{10} = 22.5512\ A^{0.8067}\ R^{0.8364}\ DH^{0.2703}\ L^{-0.4967}\ P_{60}^{-0.7737}$
3	$\hat{q}_{10} = 13954\ A^{0.9374}\ R^{-0.5160}\ DH^{0.5672}\ L^{-0.7057}\ P_{60}^{-1.6664}$
4	$\hat{q}_{10} = 43.1724\ A^{0.6948}\ R^{0.1581}\ DH^{0.0565}\ L^{-0.1062}\ P_{60}^{1.1192}$
5	$\hat{q}_{10} = 1.6364\ A^{1.0337}\ R^{0.6437}\ DH^{0.1850}\ L^{-0.4034}\ P_{60}^{0.2926}$
6	$\hat{q}_{10} = 10^{-6.2116}\ A^{1.0853}\ R^{5.0977}\ DH^{0.7255}\ L^{-1.2867}\ P_{60}^{-12.5327}$
7	$\hat{q}_{10} = 324.432\ A^{0.9306}\ R^{-0.3690}\ DH^{0.1133}\ L^{-0.3603}\ P_{60}^{0.7463}$
8	$\hat{q}_{10} = 53.0874\ A^{0.2196}\ R^{0.1945}\ DH^{0.1319}\ L^{0.0958}\ P_{60}^{0.2225}$
9	$\hat{q}_{10} = 7.7165\ A^{0.5814}\ R^{0.0647}\ DH^{0.3885}\ L^{0.0990}\ P_{60}^{0.8217}$
10	$\hat{q}_{10} = 35.8044\ A^{1.6863}\ R^{0.4101}\ DH^{-0.6609}\ L^{-0.6125}\ P_{60}^{3.6323}$
11	$\hat{q}_{10} = 5518.33\ A^{0.8668}\ R^{-1.4337}\ DH^{0.7315}\ L^{-0.4144}\ P_{60}^{2.3248}$
12	$\hat{q}_{10} = 0.00404\ A^{0.1267}\ R^{2.0116}\ DH^{0.2913}\ L^{1.0946}\ P_{60}^{0.2881}$
13	$\hat{q}_{10} = 19.0892\ A^{0.7919}\ R^{0.5163}\ DH^{0.2065}\ L^{-0.3461}\ P_{60}^{0.9829}$
14	$\hat{q}_{10} = 10^{-3.0471}\ A^{0.9235}\ R^{1.0140}\ DH^{1.0534}\ L^{-1.1668}\ P_{60}^{0.3637}$
15	$\hat{q}_{10} = 227.5250\ A^{1.0024}\ R^{-0.3697}\ DH^{-0.1703}\ L^{-0.0009}\ P_{60}^{-0.4591}$
16	$\hat{q}_{10} = 53.9760\ A^{0.2406}\ R^{0.7142}\ DH^{0.3647}\ L^{0.9690}\ P_{60}^{1.4027}$
17	$\hat{q}_{10} = 18.0037\ A^{0.8562}\ R^{1.1695}\ DH^{0.5977}\ L^{0.1832}\ P_{60}^{-1.3285}$
18	$\hat{q}_{10} = 713.6839\ A^{0.4249}\ R^{0.7032}\ DH^{-0.4949}\ L^{0.6953}\ P_{60}^{-2.8543}$
19	$\hat{q}_{10} = 0.7227\ A^{0.4635}\ R^{1.2180}\ DH^{0.2589}\ L^{-0.0658}\ P_{60}^{0.2060}$
20	$\hat{q}_{10} = 1.9367\ A^{0.9351}\ R^{0.8322}\ DH^{0.1042}\ L^{0.08042}\ P_{60}^{1.1836}$
21	$\hat{q}_{10} = 15.8713\ A^{0.7682}\ R^{0.3037}\ DH^{0.0516}\ L^{0.3632}\ P_{60}^{0.6480}$
22	$\hat{q}_{10} = 2.3789\ A^{0.5215}\ R^{0.7453}\ DH^{0.0614}\ L^{0.4754}\ P_{60}^{0.4184}$
23	Insufficient observations for deriving a 5-parameter equation
24	$\hat{q}_{10} = 1.4209\ A^{0.6925}\ R^{2.0837}\ DH^{0.6376}\ L^{0.5560}\ P_{60}^{-1.7726}$

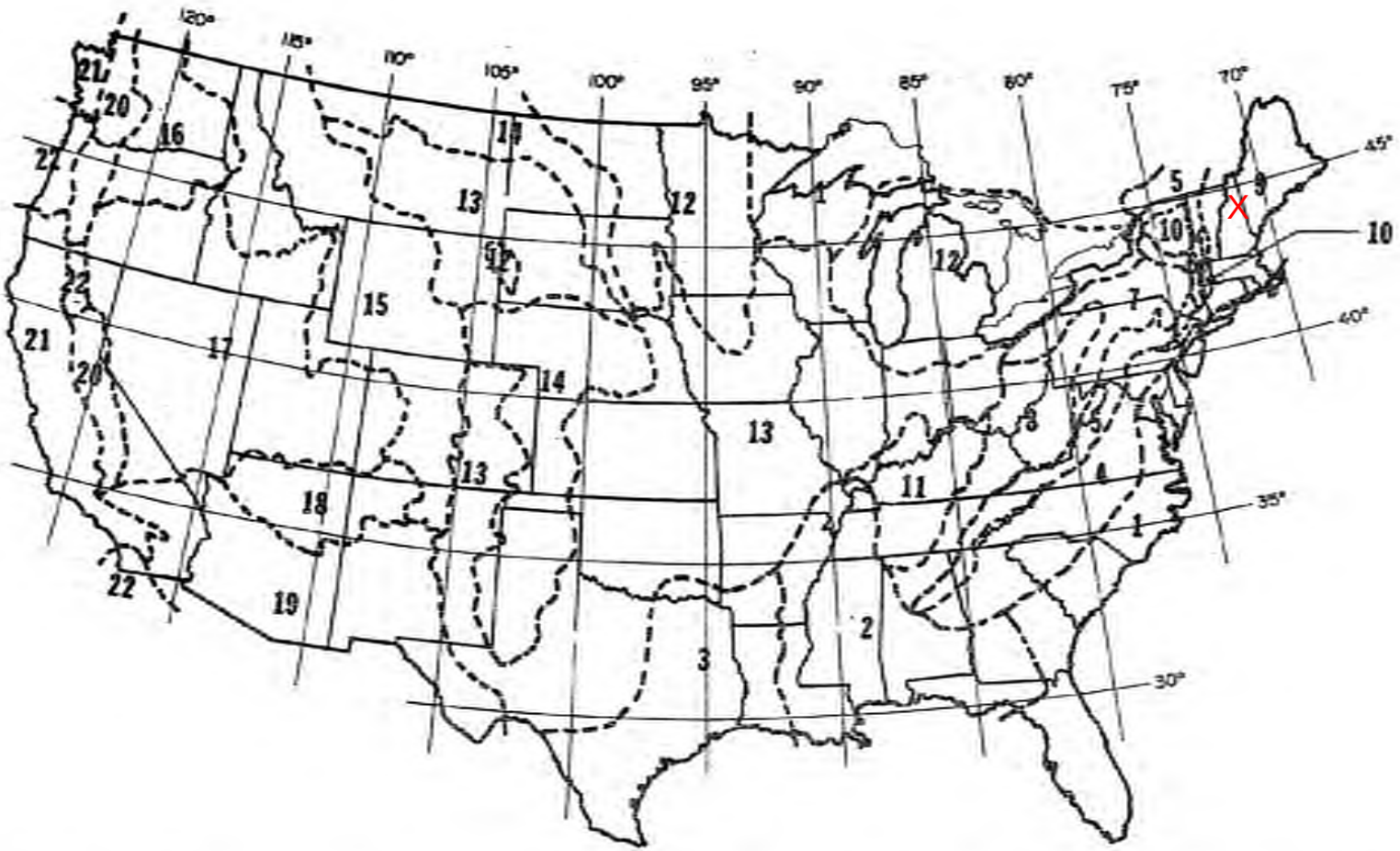
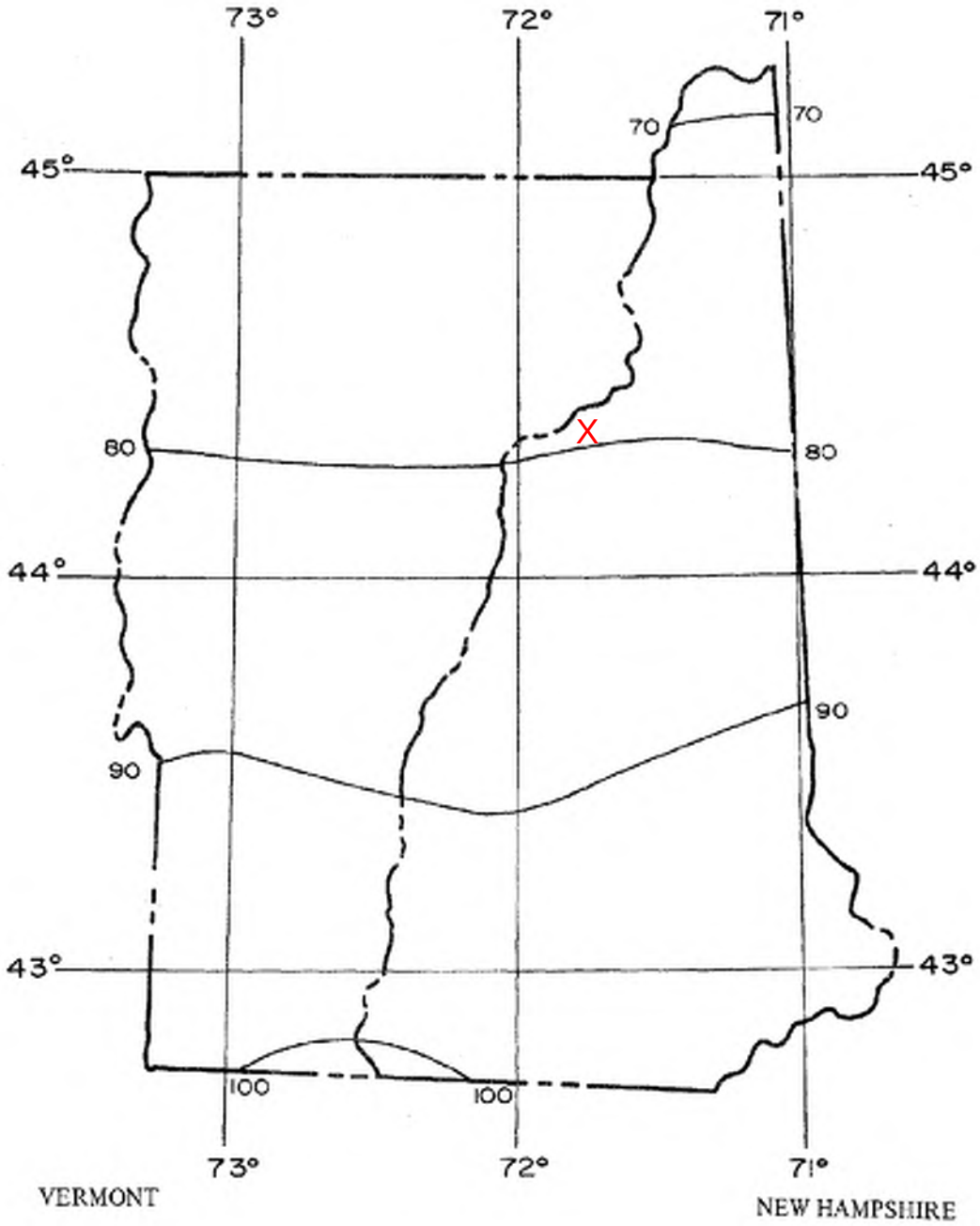
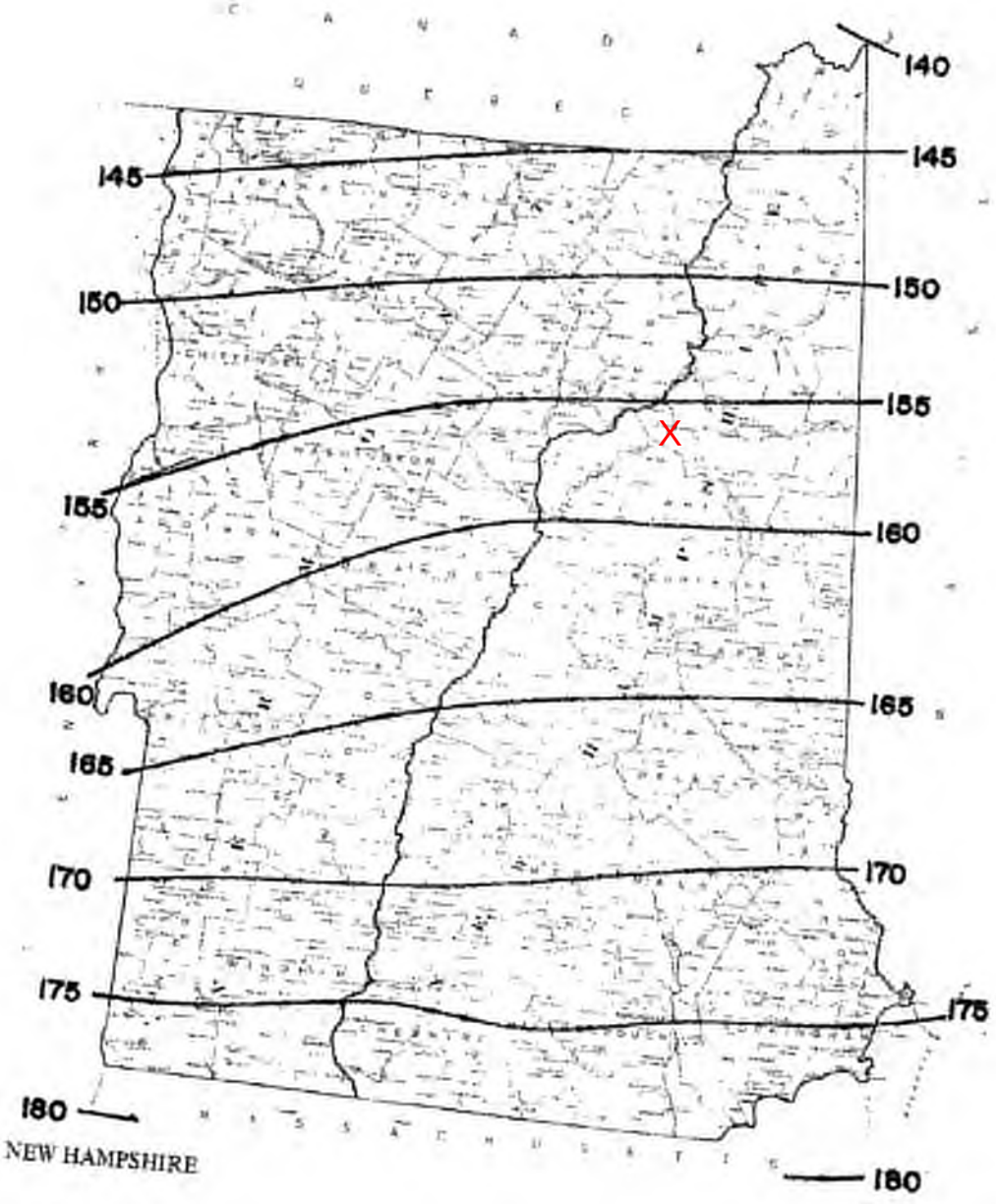


Figure 3. Hydrophysiographic zone map for the contiguous United States. Prepared from an analysis of the physiographic sections of the United States defined by Fenneman and Johnson (ref. 3). (See Figure 38 of Volume I, Research Report.)



Appendix C-33. Isoerodent, R, map of New Hampshire.
Appendix C-50. Isoerodent, R, map of Vermont.



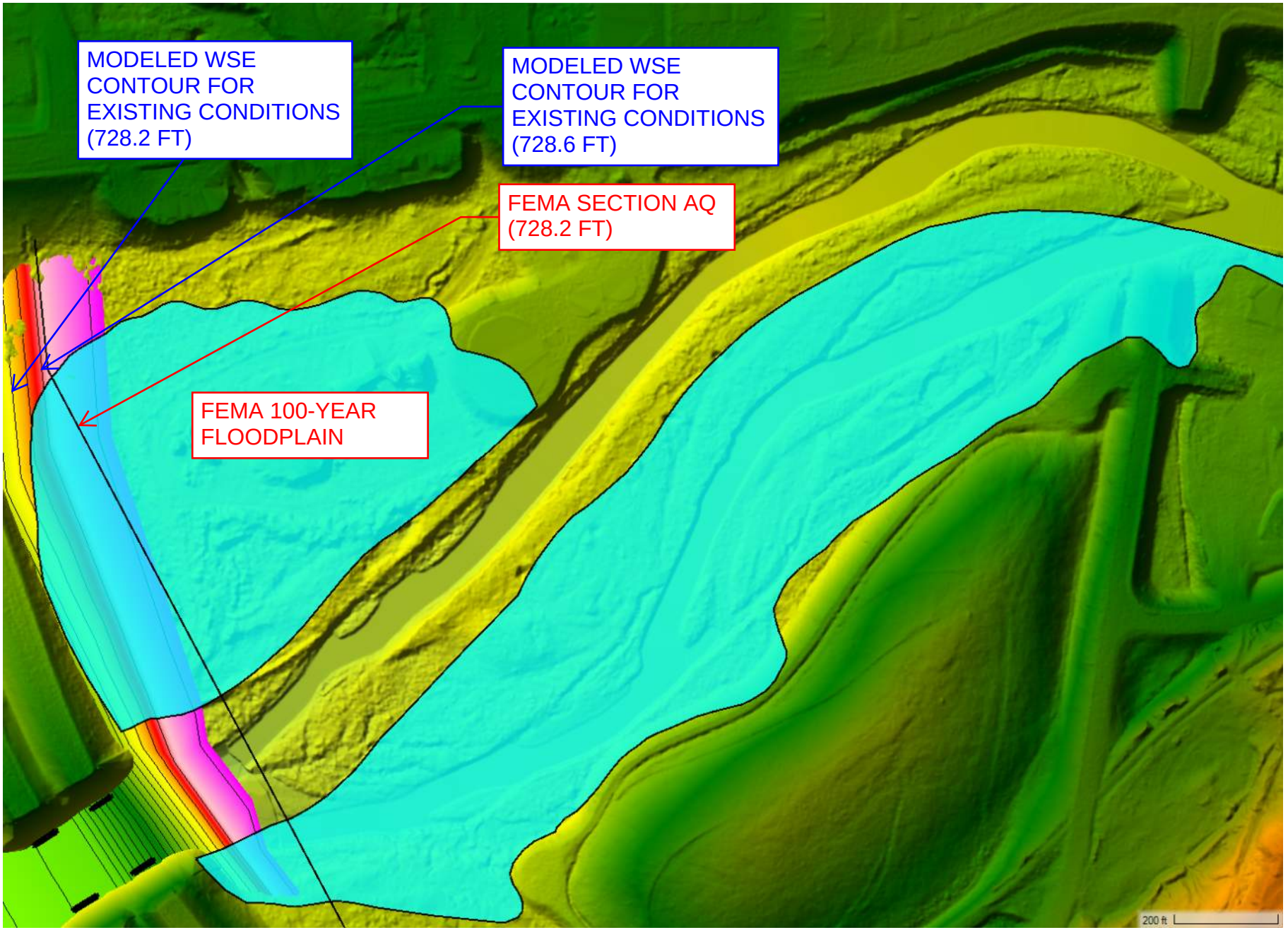
Appendix D-33. Isohyetal map of 10-year 1-hour rainfall for New Hampshire.
Appendix D-50. Isohyetal map of 10-year 1-hour rainfall for Vermont.

APPENDIX C

HYDRAULIC DATA

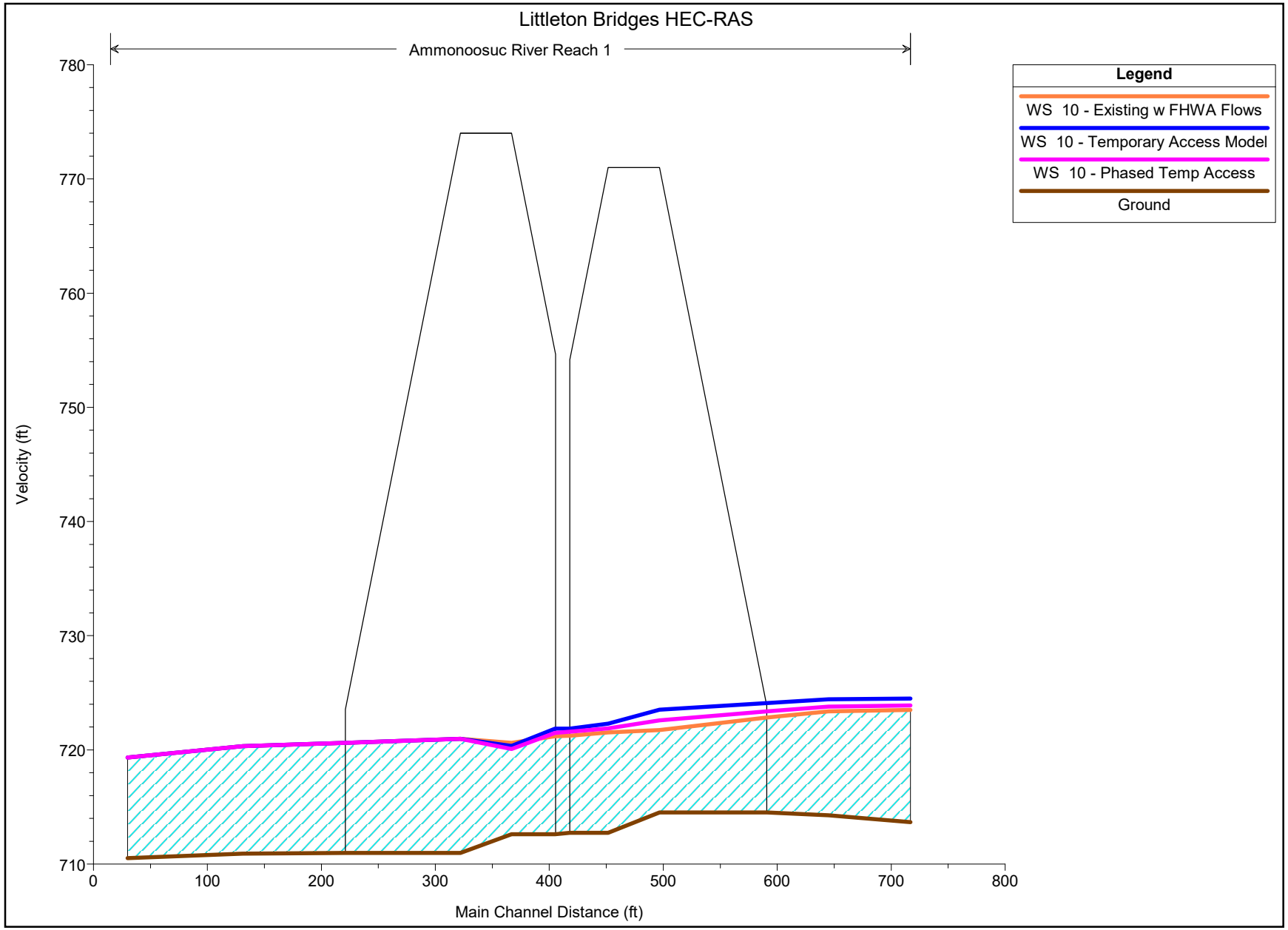
HYDRAULIC DATA
Attachment A

100-Year Inundation Comparison


MODELED WSE CONTOUR FOR EXISTING CONDITIONS (728.2 FT)
MODELED WSE CONTOUR FOR EXISTING CONDITIONS (728.6 FT)
FEMA SECTION AQ (728.2 FT)
FEMA 100-YEAR FLOODPLAIN
200 ft

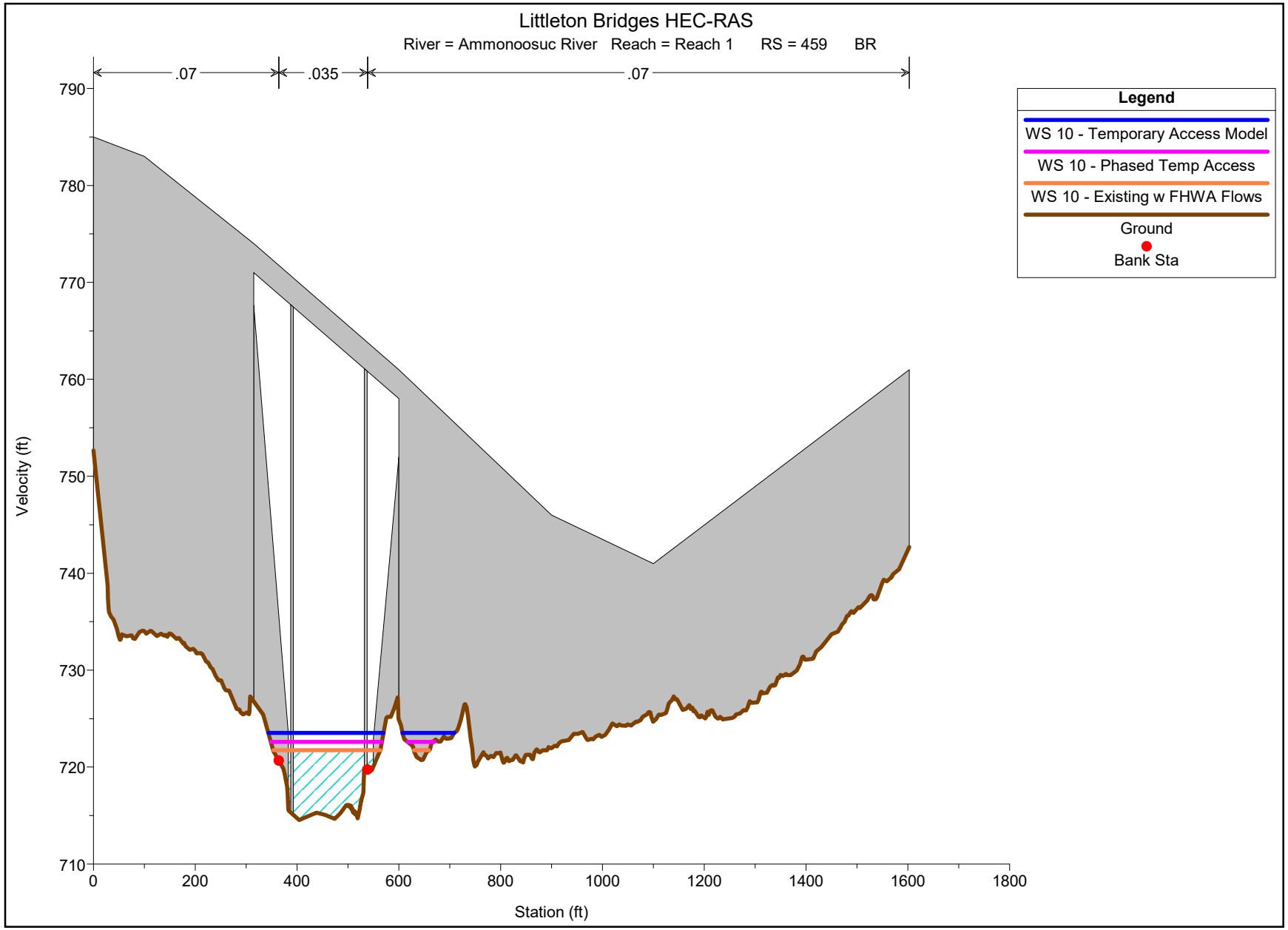
HYDRAULIC DATA
Attachment B

Flood Profiles


Littleton Bridges HEC-RAS
Ammonoosuc River Reach 1
Legend
WS 10 - Existing w FHWA Flows
WS 10 - Temporary Access Model
WS 10 - Phased Temp Access
Ground
Velocity (ft)
780
770
760
750
740
730
720
710
0
100
200
300
400
500
600
700
800
Main Channel Distance (ft)

HYDRAULIC DATA
Attachment C

Upstream Bridge Section


Littleton Bridges HEC-RAS
River = Ammonoosuc River Reach = Reach 1 RS = 459 BR
.07
.035
.07
Legend
WS 10 - Temporary Access Model
WS 10 - Phased Temp Access
WS 10 - Existing w FHWA Flows
Ground
Bank Sta
Velocity (ft)
790
780
770
760
750
740
730
720
710
0
200
400
600
800
1000
1200
1400
1600
1800
Station (ft)

HYDRAULIC DATA
Attachment D

Cross-Section Comparison Table

HEC-RAS River: Ammonoosuc River Reach: Reach 1 Profile: 10

Reach	River Sta	Profile	Plan	E.G. Elev	W.S. Elev	Crit W.S.	Frctn Loss	C & E Loss	Top Width	Q Left	Q Channel	Q Right	Vel Chnl
				(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/s)
Reach 1	630	10	Existing w FHWA Flows	723.89	723.37	720.18	0.10	0.04	457.99	147.57	8949.46	424.97	5.94
Reach 1	630	10	Temporary Access Model	724.79	724.44	720.18	0.06	0.03	942.26	233.97	8628.82	659.20	4.99
Reach 1	630	10	Phased Temp Access	724.24	723.80	720.18	0.08	0.03	470.76	183.47	8831.78	506.75	5.54
Reach 1	576	10	Existing w FHWA Flows	723.75	722.84	720.38	0.35	0.07	220.13	27.03	9380.92	114.05	7.71
Reach 1	576	10	Temporary Access Model	724.71	724.10	720.38	0.18	0.04	620.42	58.97	9135.30	327.73	6.36
Reach 1	576	10	Phased Temp Access	724.13	723.38	720.38	0.25	0.05	324.36	39.86	9240.15	241.99	7.05
Reach 1	459 Bridge 1 US BR U	10	Existing w FHWA Flows	723.33	721.73	720.46	0.22	0.01	156.00		9468.87	53.13	10.16
Reach 1	459 Bridge 1 US BR U	10	Temporary Access Model	724.49	723.52	720.46	0.16	0.10	157.35		9426.21	95.79	7.92
Reach 1	459 Bridge 1 US BR U	10	Phased Temp Access	723.83	722.59	720.46	0.19	0.05	156.00		9445.84	76.16	8.95
Reach 1	459 Bridge 1 US BR D	10	Existing w FHWA Flows	723.10	721.53	719.93	0.15	0.01	139.80	137.62	9367.74	16.64	10.12
Reach 1	459 Bridge 1 US BR D	10	Temporary Access Model	724.23	722.29	720.51	0.17	0.02	109.44		9522.00		11.17
Reach 1	459 Bridge 1 US BR D	10	Phased Temp Access	723.59	721.88	720.11	0.15	0.01	123.51		9501.90	20.10	10.51
Reach 1	403	10	Existing w FHWA Flows	722.94	721.24		0.06	0.01	146.81	135.22	9348.72	38.06	10.52
Reach 1	403	10	Temporary Access Model	724.03	721.87		0.07	0.02	107.95		9522.00		11.81
Reach 1	403	10	Phased Temp Access	723.43	721.59		0.07	0.00	128.02		9468.07	53.93	10.88
Reach 1	390	10	Existing w FHWA Flows	722.87	721.20	719.78	0.20	0.03	144.23	133.35	9365.69	22.96	10.45
Reach 1	390	10	Temporary Access Model	723.94	721.85	720.34	0.27	0.11	108.22		9522.00		11.59
Reach 1	390	10	Phased Temp Access	723.36	721.48	720.06	0.27	0.10	126.34		9488.83	33.17	11.02
Reach 1	329 Bridge 2 DS BR U	10	Existing w FHWA Flows	722.64	720.62	719.78	0.19	0.23	139.50	102.56	9406.80	12.64	11.44
Reach 1	329 Bridge 2 DS BR U	10	Temporary Access Model	723.55	720.35	720.35	0.23	0.59	102.98		9522.00		14.36
Reach 1	329 Bridge 2 DS BR U	10	Phased Temp Access	722.99	720.07	720.07	0.23	0.50	120.71		9516.26	5.75	13.71
Reach 1	329 Bridge 2 DS BR D	10	Existing w FHWA Flows	722.21	720.96	718.45	0.33	0.00	157.26	95.30	9425.64	1.06	9.00
Reach 1	329 Bridge 2 DS BR D	10	Temporary Access Model	722.21	720.97	718.46	0.33	0.00	157.39	95.76	9425.06	1.19	8.99
Reach 1	329 Bridge 2 DS BR D	10	Phased Temp Access	722.21	720.97	718.46	0.33	0.00	157.39	95.79	9425.12	1.09	8.99
Reach 1	206	10	Existing w FHWA Flows	721.88	720.61	718.44	0.30	0.01	193.59	200.44	9321.37	0.19	9.12
Reach 1	206	10	Temporary Access Model	721.88	720.61	718.46	0.30	0.01	190.90	187.66	9334.12	0.22	9.14
Reach 1	206	10	Phased Temp Access	721.88	720.61	718.47	0.30	0.01	190.81	188.24	9333.58	0.18	9.14
Reach 1	116	10	Existing w FHWA Flows	721.58	720.33	718.35	0.40	0.05	207.63	356.37	9162.72	2.91	9.12
Reach 1	116	10	Temporary Access Model	721.58	720.33	718.35	0.40	0.05	207.63	356.37	9162.72	2.91	9.12
Reach 1	116	10	Phased Temp Access	721.58	720.33	718.35	0.40	0.05	207.63	356.37	9162.72	2.91	9.12

Natural Heritage Bureau (NHB) Review

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

To: Dillan Schmidt
7 Hazen Drive
Concord, NH 03301

From: NH Natural Heritage Bureau

Date: 9/28/2023 (This letter is valid through 9/28/2024)

Re: Review by NH Natural Heritage Bureau of request dated 9/28/2023

Permit Types: General Permit
Wetland Standard Dredge & Fill - Major
Federal: NEPA Review

NHB ID: NHB23-2873

Applicant: Dillan Schmidt

Location: Littleton
Tax Map: N/A, Tax Lot: N/A
Address: State Right-of-Way

Proj. Description: The proposed project would extend the useful life of multiple structures in the Town of Littleton through bridge preservation activities. The proposed preservation activities would include replacement of the leaking expansion joints, replacement of rusted bearings, and patching of deteriorated substructure concrete. A total of four (4) bridges would receive the preservation treatment: I-93 Northbound & Southbound over Ammonoosuc River and I-93 Northbound & Southbound over Industrial Park Road and the Ammonoosuc Rail Trail

The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

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.

Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

MAP OF PROJECT BOUNDARIES FOR: NHB23-2873

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

US Fish and Wildlife (USF&W) IPaC Results & Correspondence

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: 2023-0086978
Project Name: Littleton #43809

March 07, 2024

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:

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 feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. 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. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through IPaC by completing the same process used to receive the enclosed list.

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. Under sections 7(a)(1) and 7(a)(2) 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 and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological

evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, 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 Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. 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/sites/default/files/documents/endangered-species-consultation-handbook.pdf

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 Migratory Bird Permit | What We Do | U.S. Fish & Wildlife Service (fws.gov).

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

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: 2023-0086978
Project Name: Littleton #43809
Project Type: Bridge - Maintenance
Project Description: The NHDOT is proposing to rehabilitate 4 bridges in Littleton. The project will include: a temporary superstructure support system with temporary scour protection and a temporary roadway and trestle to access the existing piers and abutment, and rehabilitation of the concrete piers for Bridge #187/060 and #188/060 (I93 SB & NB over the Ammonoosuc River); and a temporary superstructure support system and rehabilitation of the concrete piers for Bridge #189/058 and #190/058 (I-93 SB & NB over Industrial Park Road, NHRR (ABD)) . The four bridges will be included into one combined project, which is anticipated to be constructed in 2024, with an anticipated advertisement date of October 2023.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.30512685,-71.79644748827475,14z

Counties: Grafton County, New Hampshire

ENDANGERED SPECIES ACT SPECIES

There is a total of 3 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
Canada Lynx *Lynx canadensis* Population: Wherever Found in Contiguous U.S. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3652	Threatened
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered

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.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

IPAC USER CONTACT INFORMATION

Agency: New Hampshire Department of Transportation
Name: Deb Coon
Address: 150 Dow Street
City: Manchester
State: NH
Zip: 03101
Email dcoon@hoyletanner.com
Phone: 6034605154

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Army Corps of Engineers

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: 2022-0033777
Project Name: Littleton 43809

October 06, 2023

Subject: Consistency letter for the 'Littleton 43809' project under the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (NLEB).

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated October 06, 2023 to verify that the **Littleton 43809** (Proposed Action) may rely on the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action will have no effect on the endangered Indiana bat (*Myotis sodalis*) or the endangered northern long-eared bat (*Myotis septentrionalis*). If the Proposed Action is not modified, **no consultation is required for these two species.** If the Proposed Action is modified, or new information reveals that it may affect the Indiana bat and/or northern long-eared bat in a manner or to an extent not considered in the PBO, further review to conclude the requirements of ESA section 7(a)(2) may be required.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities: If your initial bridge/culvert or structure assessments failed to detect Indiana bats and/or NLEB use or occupancy, yet later detected prior to, or during construction, please submit the Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form (User Guide Appendix E) to this Service Office within 2 working days of the incident. In these instances, potential incidental take of Indiana bats and/or NLEBs may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species and/or designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please advise the lead Federal action agency accordingly.

The following species may occur in your project area and **are not** covered by this determination:

- Canada Lynx *Lynx canadensis* Threatened
- Monarch Butterfly *Danaus plexippus* Candidate

PROJECT DESCRIPTION

The following project name and description was collected in IPaC as part of the endangered species review process.

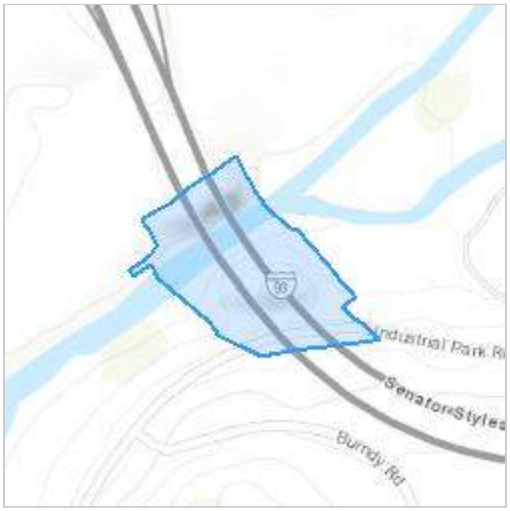
NAME

Littleton 43809

DESCRIPTION

The proposed project would extend the useful life of multiple structures in the Town of Littleton via bridge preservation activities. The proposed preservation activities would include replacement of the leaking expansion joints, replacement of rusted bearings, and patching of deteriorated substructure concrete. A total of four (4) bridges would receive the preservation treatment: I-93 Northbound & Southbound over Ammonoosuc River and I-93 Northbound & Southbound over Industrial Park Rd and the Ammonoosuc Rail Trail. The proposed project has a tentative advertisement date of 10-24-2023.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.30448185,-71.79641533341122,14z



DETERMINATION KEY RESULT

Based on the information you provided, you have determined that the Proposed Action will have no effect on the endangered Indiana bat and/or the endangered northern long-eared bat. Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for these two species.

QUALIFICATION INTERVIEW

1. Is the project within the range of the Indiana bat[1]?

   [1] See Indiana bat species profile

   Automatically answered
   No

2. Is the project within the range of the northern long-eared bat[1]?

   [1] See northern long-eared bat species profile

   Automatically answered
   Yes

3. [Semantic] Does your proposed action intersect an area where Indiana bats and northern long-eared bats are not likely to occur?

   Automatically answered
   Yes

DETERMINATION KEY DESCRIPTION: FHWA, FRA, FTA PROGRAMMATIC CONSULTATION FOR TRANSPORTATION PROJECTS AFFECTING NLEB OR INDIANA BAT

This key was last updated in IPaC on July 27, 2023. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which may require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the endangered **northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects. The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

IPAC USER CONTACT INFORMATION

Agency: New Hampshire Department of Transportation
Name: Dillan Schmidt
Address: 7 Hazen Drive
City: Concord
State: NH
Zip: 03301
Email dillan.c.schmidt@dot.nh.gov
Phone: 6032716799

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Federal Highway Administration

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
https://www.fws.gov/office/new-england-ecological-services

January 16, 2024

Rebecca Martin
Plant and Wildlife Program Manager
NH DOT Bureau of Environment
7 Hazen Drive
Concord, NH 03302

RE: NHDOT Littleton 43809 Bridge Preservation, Littleton, NH (In reply refer to Project Code 2022-0033777)

Dear Rebecca Martin:

This responds to your request, dated October 23, 2023, and received in our office on the same date, for our concurrence with your determination that the New Hampshire Department of Transportation's (NHDOT) proposed Littleton 43809 Project that would preserve four bridges in Littleton, NH (Project) may affect, but is not likely to adversely affect, the federally threatened Canada lynx (*Lynx canadensis*). Your request and our response are made pursuant to section 7 of the Endangered Species Act of 1973, as amended (87 Stat. 884, as amended; 16 U.S.C 1531, et seq.) (ESA). We understand the NHDOT is acting as a non-Federal representative of the Federal Highway Administration (FHWA) for the purpose of consultation under section 7.

Based on our knowledge, expertise, and review of the information and analysis included with your consultation request, we concur with your determination because any effects from the proposed action on the subject species would be insignificant and/or discountable.

The NHDOT addressed potential impacts to the federally endangered northern long-eared bat (*Myotis septentrionalis*) through the FHWA, FRA, FTA Programmatic Consultation for Transportation Projects Affecting NLEB or Indiana Bat Determination Key within the U.S. Fish and Wildlife Service's Information for Planning and Consultation system.

Further consultation under section 7 of the ESA is not required at this time. If any of the criteria at 50 CFR 402.16(a) are met, reinitiation of consultation is required, and the NHDOT should contact us immediately and suspend activities that may affect those species until the appropriate level of consultation is completed with our office. Thank you for your cooperation, and please

contact Eliese Dykstra of this office at 603-568-4652 or Eliese_Dykstra@fws.gov if you have questions or need further assistance.

Sincerely yours,

Audrey Mayer
Supervisor
New England Field Office

cc: Rebecca.A.Martin@dot.nh.gov
Jamie.Sikora@dot.gov
Dillan.C.Schmidt@dot.nh.gov

Section 106 Appendix B - No Adverse Effect Determination

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Activities with Minimal Potential to Cause Effects

Date Reviewed: (Desktop or Field Review Date)	4/1/2022	☐ This Project uses only State funding; however project activities listed below comply with the PA.	
Project Name:	Littleton		
State Number:	43809	**FHWA Number:**	X-A005(203)
Environmental Contact:	Dillan Schmidt	**DOT**	
Email Address:	Dillan.C.Schmidt@dot.nh.gov	**Project Manager:**	David Scott

Project Description: The proposed project would extend the useful life of multiple structures in the Town of Littleton via bridge preservation activities. The proposed preservation activities would include replacement of the leaking expansion joints, replacement of rusted bearings, and patching of deteriorated substructure concrete. A total of four (4) bridges would receive the preservation treatment: I-93 Northbound & Southbound over Ammonoosuc River and I-93 Northbound & Southbound over Industrial Park Rd and the Ammonoosuc Rail Trail.

Please select the applicable activity/activities:

Highway and Roadway Improvements	
☐	1. Modernization and general highway maintenance **that may require additional highway right-of-way or easement**, including: Choose an item. Choose an item.
☐	2. Installation of rumble strips or rumble stripes
☐	3. Installation or replacement of pole-mounted signs
☐	4. Guardrail replacement, provided any extension does not connect to a bridge older than 50 years old (unless it does already), and there is no change in access associated with the extension
Bridge and Culvert Improvements	
☐	5. Culvert replacement (excluding stone box culverts), when the culvert is less than 60" in diameter and excavation for replacement is limited to previously disturbed areas
☒	6. Bridge deck preservation and replacement, as long as no character defining features are impacted
☒	7. Non-historic bridge and culvert maintenance, renovation, or total replacement, **that may require minor additional right-of-way or easement**, including: a. replacement or maintenance of non-historic bridges Choose an item.
☐	8. Historic bridge maintenance activities within the limits of existing right-of-way, including: Choose an item. Choose an item.
☒	9. Stream and/or slope stabilization and restoration activities (including removal of debris or sediment obstructing the natural waterway, or any non-invasive action to restore natural conditions)
Bicycle and Pedestrian Improvements	
☐	10. Construction of pedestrian walkways, sidewalks, sidewalk tip-downs, small passenger shelters, and alterations to facilities or vehicles in order to make them accessible for elderly and handicapped persons
☐	11. Installation of bicycle racks
☐	12. Recreational trail construction
☒	13. Recreational trail maintenance when done on existing alignment
☐	14. Construction of bicycle lanes and shared use paths and facilities within the existing right-of-way
Railroad Improvements	

Appendix B Certification – Activities with Minimal Potential to Cause Effects

☐	15. Modernization, maintenance, and safety improvements of railroad facilities within the existing railroad or highway right-of-way, **provided no historic railroad features are impacted,** including, but not limited to: Choose an item. Choose an item.
☐	16. In-kind replacement of modern railroad features (i.e. those features that are less than 50 years old)
☐	17. Modernization/modification of railroad/roadway crossings provided that all work is undertaken within the limits of the roadway structure (edge of roadway fill to edge of roadway fill) and no associated character defining features are impacted
Other Improvements	
☐	18. Installation of Intelligent Transportation Systems
☐	19. Acquisition or renewal of scenic, conservation, habitat, or other land preservation easements where no construction will occur
☐	20. Rehabilitation or replacement of existing storm drains.
☐	21. Maintenance of stormwater treatment features and related infrastructure

Please describe how this project is applicable under Appendix B of the Programmatic Agreement.

The proposed project was reviewed for impacts to historical, archaeological, and cultural impacts by the NHDOT Bureau of Environment, Cultural Resource Program staff, Jillian Edelmann and Sheila Charles. An EMMIT review of the project areas had identified multiple resources which would be eligible for inclusion in the National Register of Historic Places however, it is not anticipated that the actions of the proposed project would have any impacts on the identified resources. The program expressed concerns with the proposed use of the historic Ammonoosuc Rail Trail during construction however, based upon further review of the project plans and proposed use of the rail trail it was determined that the proposed project would not impact the historic integrity of the rail trail. Additionally, the program had expressed concerns with the potential to encounter resources of archaeological significance during construction therefore, a Phase 1A Archaeological Sensitivity Assessment and Phase 1B Intensive Archaeological Investigation were conducted. The results of the Phase 1A/1B investigations determined that due to the terrain of primarily deep slopes, disturbed subsurface contexts associated with the previous bridge, I-93, the rail trail, industrial road construction and the lack of archaeological deposits, no further archaeological investigations are required. NHDHR has concurred with the results of the archaeological investigations.

Please submit this Certification Form along with the Transportation RPR, including photographs, USGS maps, design plans and as-built plans, if available, for review. Note: The RPR can be waived for in-house projects, please consult Cultural Resources Program Staff.

Coordination Efforts:

Has an RPR been submitted to NHDOT for this project?	No	NHDHR R&C # assigned?	Click here to enter text.
Please identify public outreach effort contacts; method of outreach and date:			

Finding: (To be filled out by NHDOT Cultural Resources Staff)

☐	**No Potential to Cause Effects**	**X**	**No Historic Properties Affected**
This finding serves as the Section 106 Memorandum of Effect. No further coordination is necessary.			

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Activities with Minimal Potential to Cause Effects

☐	**This project does *not* comply with Appendix B. Review will continue under Stipulation VII of the Programmatic Agreement. Please contact NHDOT Cultural Resources Staff to determine next steps.**

NHDOT comments:

Sheila Charles 1/30/2024

NHDOT Cultural Resources Staff Date

Coordination of the Section 106 process should begin as early as possible in the planning phase of the project (undertaking) so as not to cause a delay.

Project sponsors should not predetermine a Section 106 finding under the assumption a project is limited to the activities listed in Appendix B until this form is signed by the NHDOT Bureau of Environment Cultural Resources Program staff.

Every project shall be coordinated with, and reviewed by the NHDOT-BOE Cultural Resources Program in accordance with the *Programmatic Agreement Among the Federal Highway Administration, the New Hampshire State Historic Preservation Office, the Army Corps of Engineers, New England District, the Advisory Council on Historic Preservation, and the New Hampshire Department of Transportation Regarding the Federal Aid Highway Program in New Hampshire*. In accordance with the Advisory Council's regulations, we will continue to consult, as appropriate, as this project proceeds.

NHDOT and the State Historic Preservation Office may use provisions of the Programmatic Agreement to address the applicable requirements of NH RSA 227-C:9 in the location, identification, evaluation and management of historic resources, for projects funded by State funds.

If any portion of the project is not entirely limited to any one or a combination of the activities specified in Appendix B (with, or without the inclusion of any activities listed in Appendix A), please continue discussions with NHDOT Cultural Resources staff.

This No Potential to Cause Effect or No Historic Properties Affected project determination is your Section 106 finding, as defined in the Programmatic Agreement.

Should project plans change, please inform the NHDOT Cultural Resources staff in accordance with Stipulation VII of the Programmatic Agreement.

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?	N/A	
2.7 What is the area of the proposed fill in wetlands?	0 SF	
2.8 What % of the overall project site will be previously and proposed filled wetlands?	N/A	
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?		X
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?		
6.2 Have the impacts to the aquatic resources been avoided and minimized to the greatest extent practicable?		
6.3 Will all aquatic resource function be lost?		
6.4 Does the aquatic resource (s) have regional significance (watershed or ecoregion)?		
6.5 Is there an on-site alternative with less impact?		
6.6 Is there an off-site alternative with less impact?		
6.7 Will there be a loss to a resource dependent species?		
6.8 Are indirect impacts greater than 1 acre within and adjacent to the project area?		
6.9 Does the proposed mitigation replace aquatic resource function for direct, indirect, and cumulative impacts?		

*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.

U.S. Army Corps of Engineers
New Hampshire Programmatic General Permit (PGP)
Required Information and USACE Section 404Checklist
Bridges #187/060 & 188/060, I-93 SB over the Ammonoosuc River and
#189/058 & 190/058, I-93 SB over Industrial Park Road, NHRR (ABD)
Littleton, NH
Explanations for Checklist Answers

1.1 According to the 2020/2022, 305(b)/303(d) list, the Ammonoosuc River is marginally impaired for aquatic life and fish consumption due to mercury. The proposed project will not add to these impairments.

2.1 The project is proposed to preserve and rehabilitate an existing stream crossing. The stream and some associated wetlands will be affected by the project.

2.4 Riparian buffers will be affected by the project as required to gain construction access to the existing bridge; however, these impacts have been minimized to the extent practicable and are temporary. Temporary bank impact areas that include soil disturbance and vegetation removal will be restored.

3.1 The NH Natural Heritage Bureau was contacted regarding the proposed project (see attached letter NHB23-2873, dated 09/28/2023). The database check determined that there are no recorded occurrences for sensitive species near the project area. A copy of the DataCheck Report is included with this application.

An official Federally-listed species list was obtained from the US Fish and Wildlife Service (USFWS) using the Information for Planning and Conservation (IPAC) online tool. The list includes the Federally-endangered Northern Long Eared Bat (*Myotis septentrionalis*; NLEB), Federally-threatened Canada Lynx (*Lynx canadensis*) and the Monarch Butterfly (*Danaus plexippus*) as a candidate species. A copy of the species list is included with this permit application.

The project has been reviewed within the IPaC system utilizing the FHWA, FRA, FTA Programmatic Consultation for Transportation Projects affecting NLEB or Indiana Bat Determination Key. A Consistency Letter was received that the Proposed Action will have no effect on the endangered Indiana bat (*Myotis sodalis*) or the endangered northern long-eared bat (*Myotis septentrionalis*). If the Proposed Action is not modified, no consultation is required for these two species. A copy of this letter is included with this application.

USF&W has reviewed the effects of the proposed project on Canada Lynx (*Lynx canadensis*) and concurred with NHDOT's determination that the project may affect, but is not likely to adversely affect, the federally threatened Canada lynx. A copy of the letter is included with this permit application.

4.1 The bridge preservation/rehabilitation project is located within the 100-year floodplain of the Ammonoosuc River but will not result in a loss of flood storage. The proposed project includes the installation of access roads that will be established with a temporary stone fill over geotextile fabric to minimize disruption of native soils and vegetation. Impacts to flood storage will temporary and negligible given the size of the river and the banks.

5. The proposed project was reviewed for impacts to historical, archaeological, and cultural impacts by the NHDOT Bureau of Environment, Cultural Resource Program staff. An EMMIT review of the project areas had identified multiple resources which would be eligible for inclusion in the National Register of Historic Places however, it is not anticipated that the actions of the proposed project would have any impacts on the identified resources. The program expressed concerns with the proposed use of the historic Ammonoosuc Rail Trail during construction however, based upon further review of the project plans and proposed use of the rail trail it was determined that the proposed project would not impact the historic integrity of the rail trail. Additionally, the program had expressed concerns with the potential to encounter resources of archaeological significance during construction therefore, a Phase 1A Archaeological Sensitivity Assessment and Phase 1B Intensive Archaeological Investigation were conducted. The results of the Phase 1A/1B investigations

determined that due to the terrain of primarily deep slopes, disturbed subsurface contexts associated with the previous bridge, I-93, the rail trail, industrial road construction and the lack of archaeological deposits, no further archaeological investigations are required. NHDHR has concurred with the results of the archaeological investigations.

NHDOT through their Section 106 Programmatic Agreement with FHWA issued an Appendix B Certification, Activities with Minimal Potential to Cause Effects, determination of “No Historic Properties Affected”. A copy of this certification is included with this submission.

Construction Sequence

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES
WETLAND PERMIT APPLICATION
for
Bridges #187/060 & 188/060, I-93 SB over the Ammonoosuc River and
#189/058 & 190/058, I-93 SB over Industrial Park Road, NHRR (ABD)
Littleton, NH
Proposed Construction Sequence

1. Install erosion and sediment control measures prior to any earth moving activity that will influence or affect stormwater runoff.
2. Construct temporary construction entrances/exits.
3. Clear and grub limits of work as applicable.
4. Install access roads one at a time; the access road along the south bank of the Ammonoosuc River shall not be installed concurrently with the access road along the north bank of the Ammonoosuc River.
5. Each access road shall be in place for a single year/construction season only and shall not remain in place for longer than that time period; total time for construction will be two years/construction seasons.
6. Install turbidity barrier for first access road. Turbidity barriers must be installed prior to installation of water diversion structures.
7. Install water diversion structure for first access road.
8. Construct first access road. Establish dewatering pumps and structures.
9. Perform bridge work from first access road, including: substructure repairs, construction of a temporary girder support system, and bearing replacement.
10. Remove first access road, water diversion structure, and turbidity barrier following completion of work.
11. Install turbidity barrier for second access road.
12. Install water diversion structure for second access road.
13. Construct second access road. Establish dewatering pumps and structures.
14. Perform bridge work from second access road, including: substructure repairs, construction of a temporary girder support system, and bearing replacement.
15. Remove second access road, water diversion structure, and turbidity barrier following completion of work.
16. Complete restoration of the areas temporarily impacted by construction as shown on the attached plans including loam, seed and mulching in disturbed areas and installation of plants per the planting plan.
17. Once all contributing, upslope areas have been permanently stabilized and vegetated, remove all temporary sediment control devices.

Project Plans

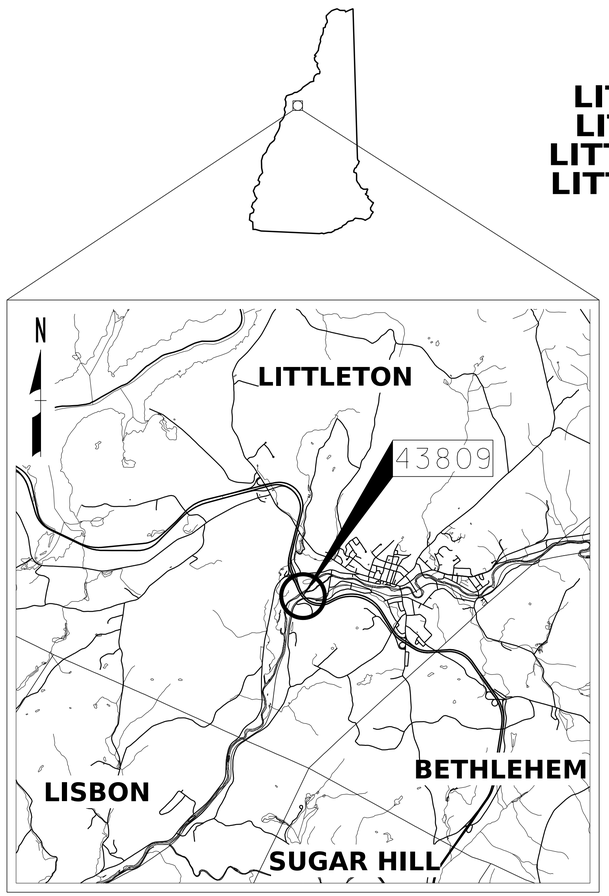
STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

WETLANDS PLANS

X-A005(203)
N.H. PROJECT NO. 43809

LITTLETON - I-93 NB OVER AMMONOOSUC RIVER BRIDGE NO. 188/060
LITTLETON - I-93 SB OVER AMMONOOSUC RIVER BRIDGE NO. 187/060
LITTLETON - I-93 NB OVER INDUSTRIAL PARK ROAD BRIDGE NO. 190/058
LITTLETON - I-93 SB OVER INDUSTRIAL PARK ROAD BRIDGE NO. 189/058

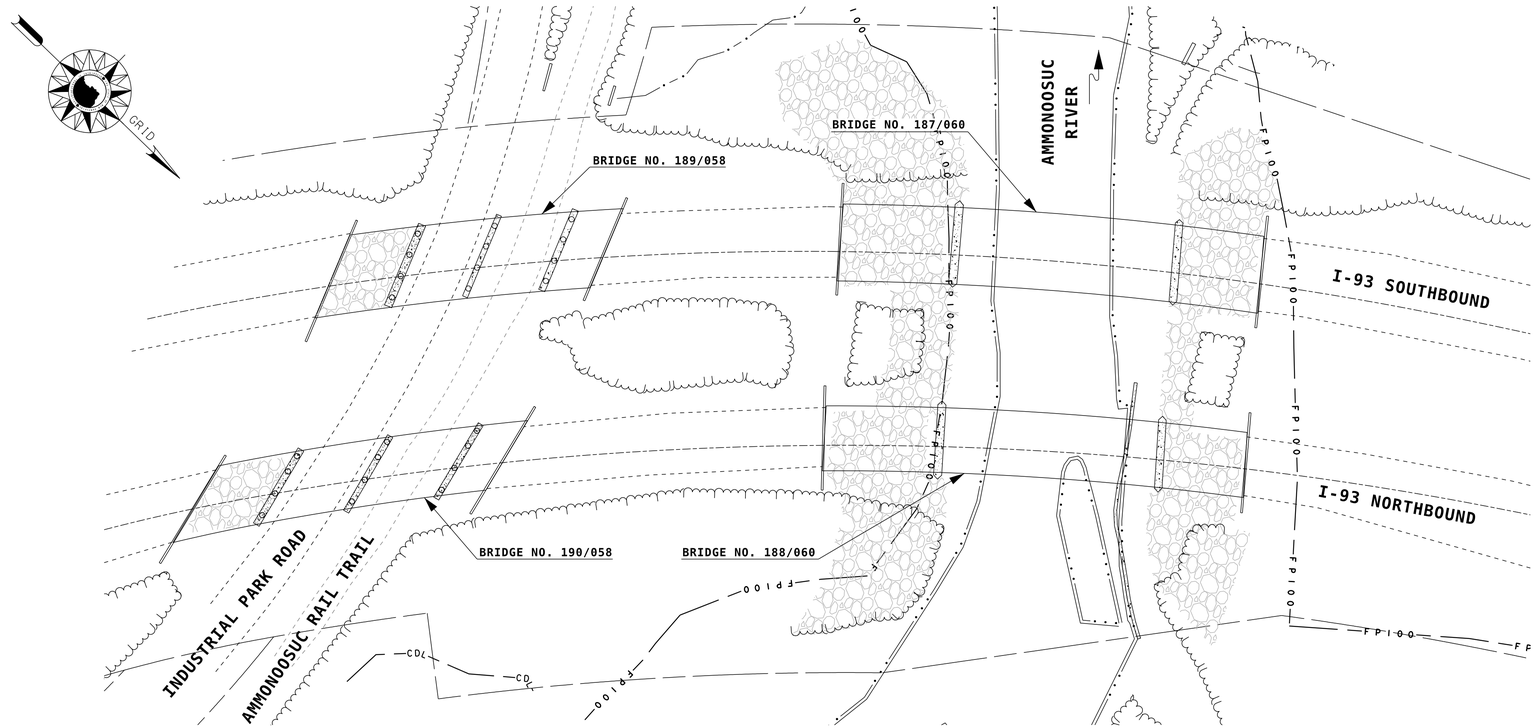
JOANNE THERIAULT, CERTIFIED WETLAND SCIENTIST #305, OF HOYLE, TANNER & ASSOCIATES, INC. OF MANCHESTER, NH, PERFORMED THE WETLAND MAPPING ON NOVEMBER 2 & 3, 2022 AND MAY 17, 2023 ACCORDING TO THE STANDARDS OF THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL AND THE REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, VERSION 2.0, JANUARY 2012, US ARMY CORPS OF ENGINEERS.



LOCATION MAP

2 1 0 2 4 mi.

GRAPHIC SCALE



INDEX OF SHEETS

DRAWN BY TAG DATE 02/2024

CHECKED BY STJ DATE 02/2024

TOWN OF LITTLETON
COUNTY OF GRAFTON

SCALE: 1" = 50'

FOR CONSTRUCTION AND ALIGNMENT DETAILS - SEE CONSTRUCTION PLANS

FOR SHEET 1 GRAPHICS,
FOR ALL CONTENT ON SHEETS 2-3 AND SHEET 6
FOR ACCESS LIMITS SHOWN ON SHEETS 7-9 AND
FOR ALL CONTENT ON SHEET 11.

STATE OF NEW HAMPSHIRE CHRISTOPHER J. FOURNIER No. 12851 LICENSED PROFESSIONAL ENGINEER

HEB ENGINEERS

STATE OF NEW HAMPSHIRE SEAN T. JAMES No. 10126 LICENSED PROFESSIONAL ENGINEER

HOYLE TANNER

NHDOT THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
X-A005(203)	43809	1	10

GENERAL

EDGE OF PAVEMENT — PROPOSED ROADWAY

TRAVELED WAY — 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)

DITCH LINE

INTERMITTENT WATER COURSE/STREAM

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 W

WELL

W

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

S

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 — DW

ORDINARY HIGH WATER — OHW

TOP OF BANK — TOB

TOP OF BANK & ORDINARY HIGH WATER — TOBOHW

NORMAL HIGH WATER — NHW

WIDTH AT BANK FULL — WBF

PRIME WETLAND — PWET

PRIME WETLAND 100' BUFFER — PWET100

NON-JURISDICTIONAL DRAINAGE AREA — DA — NJDA

COWARDIN DISTINCTION LINE — CDL

TIDAL BUFFER ZONE — TBZ

DEVELOPED TIDAL BUFFER ZONE — DTBZ

HIGHEST OBSERVABLE TIDE LINE — HOTL

MEAN HIGH WATER — MHW

MEAN LOW WATER — MLW

VERNAL POOL — VP

SPECIAL AQUATIC SITE — SAS

REFERENCE LINE — REF

WATER FRONT BUFFER — WB50

NATURAL WOODLAND BUFFER — NWB150

PROTECTED SHORELAND — PS250

INVASIVE SPECIES LABEL — I.S. I I.S. II

INVASIVE SPECIES — INV

FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY — FP500

100 YEAR FLOODPLAIN BOUNDARY — FP100

FLOODWAY — FW

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) 72.5

FINISHED GRADE ELEVATION (RIGHT) 79.14

72.5 79.14

STATE OF NEW HAMPSHIRE
LITTLETON
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

	REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
STD SYMB SHT 1 OF 2	07-31-2023	43809stdsymb1-2-ce	43809	2	10

DRAINAGE

MANHOLE

CATCH BASIN — cb

DROP INLET — di

(existing) / (PROPOSED)

DRAINAGE PIPE (existing) — DP — DP — (label size & type)

DRAINAGE PIPE (PROPOSED) — PDP — PDP

UNDERDRAIN (existing) W/ FLUSHING BASIN — DP — fb — DP — (label size & type)

UNDERDRAIN (PROPOSED) W/ FLUSHING BASIN — PDP — PDP

show direction of flow

HEADER (existing & PROPOSED) — DP — PDP — (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) — Z — Z

TOWN LINE — BOW / CONCORD

COUNTY LINE — COOS / GRAFTON

STATE LINE — MAINE / NEW HAMPSHIRE

NATIONAL FOREST

CONSERVATION LAND — LC — LC

BENCH MARK / SURVEY DISK

BOUND — bnd — (PROPOSED)

STATE LINE/ TOWN LINE MONUMENT — S/L — T/L

NHDOT PROJECT MARKER

IRON PIPE OR PIN — ip

DRILL HOLE IN ROCK — dh

TAX MAP AND LOT NUMBER — 156 / 14 — 1642/341 — 6.80 Ac.±

PROPERTY PARCEL NUMBER — 12

HISTORIC PROPERTY — H

UTILITIES

TELEPHONE POLE

POWER POLE

JOINT OCCUPANCY

MISCELLANEOUS/UNKNOWN POLE

GUY POLE OR PUSH BRACE

LIGHT POLE

LIGHT ON POWER POLE

LIGHT ON JOINT POLE

existing / PROPOSED

(plot point at face not center of symbol)

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 — OW — OW — (label type)

UNDERGROUND UTILITIES

WATER (on existing lines label size, type and note if abandoned) — W — W — PW — PW

SEWER — S — S — PS — PS

TELEPHONE — T — T — PT — PT

ELECTRIC — E — E — PE — PE

GAS — G — G — PG — PG

LIGHTING — L — L — PL — PL

INTELLIGENT TRANSPORTATION SYSTEM — ITS — ITS — PITS — PITS

FIBER OPTIC — FO — FO — PFO — PFO

WATER SHUT OFF — WSO

GAS SHUT OFF — GSO

HYDRANT — HYD

MANHOLES

SEWER — MHS

TELEPHONE — MHT

ELECTRICAL — MHE

GAS — MHG

UNKNOWN

WATER — MHW

TRAFFIC SIGNALS / ITS

	existing	PROPOSED
MAST ARM		30' MA (NOTE ANGLE FROM ℄)
OPTICOM RECEIVER		
OPTICOM STROBE		
TRAFFIC SIGNAL		
PEDESTAL WITH PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON UNIT		
SIGNAL CONDUIT	C — C — C	PC — PC — 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		SVF
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
LITTLETON
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

	REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
STD SYMB SHT 2 OF 2	07-31-2023	43809stdsymb1-2-ce	43809	3	10

GENERAL WETLAND IMPACT NOTES

1. PERFORM ALL WORK WITHIN THE EXISTING RIGHT-OF-WAY, UNLESS OTHERWISE SHOWN ON THE PLANS OR AS ORDERED BY THE CONTRACT ADMINSITRATOR.

2. AFTER COMPLETION OF IN-WATER WORK, REMOVE ALL WATER DIVERSION STRUCTURES. TEMPORARY ACCESS ROADS, CONSTRUCTION ACCESS ROADS AND STAGING AREA MATERIALS AND RESTORE ALL DISTURBED AREAS TO PRE-CONSTRUCTION CONDITIONS. RESTORATION OF DISTURBED AREAS BEYOND THE LIMITS AS SHOWN ON THESE PLANS TO SUIT CONTRACTOR'S MEANS AND METHODS AS DIRECTED BY THE CONTRACT ADMINISTRATION.

3. ALL EXCAVATION SHALL BE DONE WITHIN THE CONFINEMENTS OF THE WATER DIVERSION STRUCTURES. FILTER MATERIAL PLACEMENT SHALL BE DONE IN THE DRY.

4. THE CONTRACTOR SHALL CONSTRUCT WATER DIVERSION STRUCTURES, ITEM 503.103, AS REQUIRED TO MAINTAIN STREAM FLOW AND TO ALLOW FOR CONSTRUCTION OF THE ACCESS ROAD IN THE DRY. THE CONTRACTOR SHALL SUBMIT A WATER DIVERSION PLAN TO THE DEPARTMENT FOR REVIEW AND DOCUMENTATION FOUR WEEKS PRIOR TO COMMENCEMENT OF WORK.

ACCESS FOR BRIDGE REHABILITATION

1. ITEM 670.049X, TEMPORARY ACCESSS ROAD, SHALL CONSIST OF THE DESIGN, CONSTRUCTION, MAINTENANCE, AND REMOVAL OF ANY TEMPORARY ACCESS ROADS AND ACCESS ROADS BY THE CONTRACTOR. THE CONTRACTOR SHALL SUBMIT THE PLAN FOR ACCESS AND WATER CONTROL FOR REVIEW THREE WEEKS PRIOR TO COMMENCEMENT OF WORK. SEE SPECIAL PROVISIONS FOR ADDITIONAL DETAILS.

2. ANY CLEARING FOR CONSTRUCTION OF THE TEMPORARY ACCESSS SHALL BE INCLUDED IN ITEM 670.049X, CLEARING AND TREE REMOVAL OUTSIDE OF THE ACCESS ROAD FOR COUNTERMEASURE INSTALLATION SHALL BE PAID UNDER THE APPROPRIATE ITEM NUMBERS.

3. THE INSTALLATION OF THE ACCESS ROAD IS ASSUMED TO BE CONSTRUCTED WITH CRUSHED STONE OVER A SEPARATION GEOTEXTILE. FOR A PROPOSED ACCESS ROAD CONSTRUCTED OF MATERIAL OTHER THAN CRUSHED STONE THE CONTRACTOR SHALL PREPARE AND SUBMIT A PERMIT AMENDMENT REQUEST, DETAILING THE ANTICIPATED DREDGE AND FILL IMPACTS AS WELL AS THE MEANS AND METHODS OF CONSTRUCTION OF THE ACCESS ROADS TO THE NHDES WETLANDS BUREAU. ACCESS ROAD SHALL NOT EXTEND BEYOND LIMITS OF ACCESS ROAD IDENTIFIED IN THESE AND THE WETLAND IMPACT PLANS. NO IMPACTS ASSOCIATED WITH THE CONSTRUCTION OF SUCH A ACCESS ROAD SHALL OCCUR WITHIN THE JURISDICTION OF THE NHDES WETLANDS BUREAU UNTIL THE PERMIT AMENDMENT HAS BEEN OBTAINED.

4. TEMPORARY FILLS SHALL REMAIN WITHIN WETLAND IMPACT AREAS SHOWN IN THE WETLAND PERMIT. NO MATERIAL OF GRADATION LESS THAN 2" SHALL BE USED. A GEOTEXTILE FABRIC SHALL BE PLACED UNDER ALL TEMPORARY FILLS TO MINIMIZE DISRUPTION OF NATIVE SOILS AND VEGETATION. ALL COSTS SUBSIDIARY TO ITEM 670.049X.

5. ACCESS ROAD LIMITS SHOWN ARE BASED ON A 14' WIDE ROAD, 13% MAX PROFILE GRADE, AND 1.5H:1V SIDE SLOPES. THE CONTRACTOR MUST REMAIN WITHIN THE EXISTING RIGHT-OF-WAY, AND IMPACTS TO WETLANDS ARE RESTRICTED TO WHAT IS SHOWN. WORK OUTSIDE THE LIMITS SHOWN MAY REQUIRE ADDITIONAL PERMITS AND/OR ROW COORDINATION, WHICH IS THE RESPONSIBILITY OF THE CONTRACTOR; ADDITIONAL COSTS ASSOCIATED WITH THESE EFFORTS SHALL BE AT THE CONTRACTOR'S EXPENSE.

6. ITEM 646.31, TURF ESTABLISHMENT WITH MULCH AND TACKIFIERS AND ITEM 647.1, HUMUS SHALL BE USED TO LANDSCAPE AND RESTORE THE AREA DISTURBED BY THE TEMPORARY ACCESS ONCE IT IS REMOVED.

7. DESIGN, CONSTRUCTION, AND REMOVAL OF TEMPORARY RETAINING WALLS SHALL BE SUBSIDIARY TO ITEM 670.049X. TEMPORARY RETAINING WALLS ARE PROPOSED TO IMPROVE ACCESS ROAD FUNCTION AND LIMIT IMPACTS TO WETLANDS.

8. ITEM 550.1910X, TEMPORARY GIRDER SUPPORT SYSTEM, SHALL CONSIST OF DESIGN, CONSTRUCTION, AND REMOVAL OF A TEMPORARY GIRDER SUPPORT SYSTEM, INCLUDING JACKING, SHORING, BRACING, AND MONITORING AS REQUIRED FOR EXECUTION OF THE WORK. TEMPORARY GIRDER SUPPORT SYSTEM MAY INCLUDE A TEMPORARY CONCRETE FOOTING. ALL COMPONENTS SHALL BE REMOVED AND AREAS RESTORED.

CONCEPTUAL CONSTRUCTION SEQUENCING NOTES

1. INSTALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO ANY EARTH MOVING ACTIVITY THAT WILL INFLUENCE OR AFFECT STORMWATER RUNOFF. SEE PLAN SHEET 5 FOR EROSION CONTROL NOTES AND STRATEGIES.

2. CONSTRUCT TEMPORARY CONSTRUCTION ENTRANCES/EXITS.

3. CLEAR AND GRUB LIMITS OF WORK AS APPLICABLE.

4. INSTALL ACCESS ROADS ONE AT A TIME; THE ACCESS ROAD ALONG THE SOUTH BANK OF THE AMONOOSUC RIVER SHALL NOT BE INSTALLED CONCURRENTLY WITH THE ACCESS ROAD ALONG THE NORTH BANK OF THE AMONOOSUC RIVER.

5. INSTALL TURBIDITY BARRIER FOR FIRST ACCESS ROAD. TURBIDITY BARRIERS MUST BE INSTALLED PRIOR TO INSTALLATION OF WATER DIVERSION STRUCTURES.

6. INSTALL WATER DIVERSION STRUCTURE FOR FIRST ACCESS ROAD.

7. CONSTRUCT FIRST ACCESS ROAD. ESTABLISH DEWATERING PUMPS AND STRUCTURES.

8. PERFORM BRIDGE WORK FROM FIRST ACCESS ROAD, INCLUDING: SUBSTRUCTURE REPAIRS, CONSTRUCTION OF A TEMPORARY GIRDER SUPPORT SYSTEM, AND BEARING REPLACEMENT.

9. REMOVE FIRST ACCESS ROAD, WATER DIVERSION STRUCTURE, AND TURBIDITY BARRIER FOLLOWING COMPLETION OF WORK.

10. INSTALL TURBIDITY BARRIER FOR SECOND ACCESS ROAD.

11. INSTALL WATER DIVERSION STRUCTURE FOR SECOND ACCESS ROAD.

12. CONSTRUCT SECOND ACCESS ROAD. ESTABLISH DEWATERING PUMPS AND STRUCTURES.

13. PERFORM BRIDGE WORK FROM SECOND ACCESS ROAD, INCLUDING: SUBSTRUCTURE REPAIRS, CONSTRUCTION OF A TEMPORARY GIRDER SUPPORT SYSTEM, AND BEARING REPLACEMENT.

14. REMOVE SECOND ACCESS ROAD, WATER DIVERSION STRUCTURE, AND TURBIDITY BARRIER FOLLOWING COMPLETION OF WORK.

15. COMPLETE RESTORATION OF THE AREAS TEMPORARILY IMPACTED BY CONSTRUCTION. SEE PLAN SHEET 10 FOR NOTES AND DETAILS.

16. ONCE ALL CONTRIBUTING, UPSLOPE AREAS HAVE BEEN PERMANENTLY STABILIZED AND VEGETATED, REMOVE ALL TEMPORARY SEDIMENT CONTROL DEVICES.

17. ALL WORK FOR INSTALLATION, OPERATION AND REMOVAL OF ACCESS ROADS, INCLUDING ALL NECESSARY ESC AND WATER QUALITY CONTROLS, SHALL OCCUR ON ONE SIDE OF THE RIVER AT A TIME ONLY FOR THE DURATION OF A ONE YEAR PERIOD; WORK SHALL NOT EXCEED A TOTAL OF TWO YEARS FOR PROJECT COMPLETION.

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	

HOYLE TANNER

STATE OF NEW HAMPSHIRE
LITTLETON
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

PROJECT NOTES

HT PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
21.092597.04	432809NOTES	43809Notes	43809	4	10

EROSION CONTROL NOTES AND STRATEGIES

1. Erosion Control/Stormwater Control Selection, Sequencing and Maintenance
   - 1.1. Comply with RSA 485-A:17 Terrain Alteration.
   - 1.2. Install and maintain all erosion control/stormwater controls in accordance with the New Hampshire Stormwater Management Manual, Volume 3, Erosion and Sediment Controls During Construction, December 2008 (BMP Manual), available from the NH Department of Environmental Services (NHDES).
   - 1.3. Install erosion control/stormwater control measures prior to the start of work and in accordance with the manufacturer's recommendations.
   - 1.4. Select erosion control/stormwater control measures based on the size and nature of the project and physical characteristics of the site, including slope, soil type, vegetative cover, and proximity to jurisdictional areas.
   - 1.5. Install perimeter controls prior to earth disturbing activities.
   - 1.6. Install stormwater treatment ponds and drainage swales before rough grading the site.
   - 1.7. Clean, replace, and augment stormwater control measures and infiltration basins as necessary to prevent sedimentation beyond project limits throughout the project duration.
   - 1.8. Inspect erosion and sediment control measures in accordance with Section 645 of the specifications, weekly, and within 24 hours (during normal work hours), of any storm event greater than 0.25 inches of rain in a 24-hour period.
   - 1.9. Contain stockpiles with temporary perimeter controls. Protect inactive soil stockpiles with soil stabilization measures (temporary erosion control seed mix and mulch, soil binder) or cover them with anchored tarps. If the stockpile is to remain undisturbed for more than 14 days, mulch the stockpile.
   - 1.10. Maintain temporary erosion and stormwater control measures in place until the area has been permanently stabilized.
   - 1.11. An area is considered stable if one of the following has occurred:
     - Base course gravels have been installed in areas to be paved;
     - A minimum of 85% vegetative growth has been established;
     - A minimum of 3”of non-erosive material such as stone or rip-rap has been installed;
     - Temporary slope stabilization has been properly installed (see Table 1).
   - 1.12. Direct runoff to temporary practices until permanent stormwater infrastructure is constructed and stabilized.
   - 1.13. 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.
   - 1.14. Plan activities to account for sensitive site conditions
     - Sequence construction to limit the duration and area of exposed soils.
     - Clearly flag areas to be protected in the field and provide construction barrier to prevent trafficking outside of work areas.
     - Protect and maximize existing native vegetation and natural forest buffers between construction activities and sensitive areas.
     - When work is undertaken in a flowing watercourse, implement stream flow diversion methods prior to any excavation or filling activity.
   - 1.15. Utilize storm drain inlet protection to prevent sediment from entering a storm drainage system prior to the permanent stabilization of the contributing disturbed area.
   - 1.16. Use care to ensure that sediments do not enter any existing catch basins during construction. Place temporary inlet protection at inlets in areas of soil disturbance that are subject to sedimentation.
   - 1.17. Construct, stabilize, and maintain temporary and permanent ditches in a manner that will minimize scour. Direct temporary and permanent ditches to drain to sediment basins or stormwater collection areas.
   - 1.18. Supplement channel protection measures with perimeter control measures when ditch lines occur at the bottom of long fill slopes. Install the perimeter controls on the fill slope to minimize the potential for fill slope sediment deposits in the ditch line.
   - 1.19. Divert sediment laden water away from drainage inlet structures to the extent possible.
   - 1.20. Install sediment barriers and sediment traps at drainage inlets to prevent sediment from entering the drainage system.
   - 1.21. Clean catch basins, drainage pipes, and culverts if significant sediment is deposited.
   - 1.22. Construct and stabilize dewatering infiltration basins prior to any excavation that may require dewatering.
   - 1.23. Place and stabilize temporary sediment basins or traps at locations where concentrated flow (channels and pipes) discharge to the surrounding environment from areas of unstabilized earth disturbing activities.
   - 1.24. Stabilize, to appropriate anticipated velocities, conveyance channels or pumping systems needed to convey construction stormwater to basins and discharge locations prior to use.
   - 1.25. Size temporary sediment basins to contain the 2-year, 24 hour storm event.
   - 1.26. Size temporary sediment traps to contain 3,600 cubic feet of storage for each acre of drainage area.
   - 1.27. Construct detention basins to accommodate the 2-year, 24-hour storm event.

2. Construction Planning
   - 2.1. Divert off site runoff or clean water away from the construction activities to reduce the volume that needs to be treated on site.
   - 2.2. Divert storm runoff from upslope drainage areas away from disturbed areas, slopes and around active work areas to a stabilized outlet location.
   - 2.3. Construct impermeable barriers, as necessary, to collect or divert concentrated flows from work or disturbed areas.
   - 2.4. Locate staging areas and stockpiles outside of wetlands jurisdiction.
   - 2.5. Do not store, maintain, or repair mobile heavy equipment in wetlands, unless equipment cannot be practicably removed and secondary containment is provided.
   - 2.6. Provide a water truck to control excessive dust, at the discretion of the Contract Administrator.

3. Site Stabilization
   - 3.1. Stabilize all areas of unstabilized soil as soon as practicable, but no later than 45 days after initial disturbance.
   - 3.2. Limit unstabilized soil to a maximum of 5 acres unless documentation is provided that demonstrates that cuts and fills are such that 5 acres is unreasonable.
   - 3.3. Use erosion control seed mix 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.
   - 3.4. Apply, and reapply as necessary, soil tackifiers in accordance with the manufacturer’s specifications to minimize soil and mulch loss until permanent vegetation is established.
   - 3.5. Stabilize basins, ditches and swales prior to directing runoff to them.
   - 3.6. Stabilize roadway and parking areas within 72 hours of achieving finished grade.
   - 3.7. Stabilize cut and fill slopes within 72 hours of achieving finished grade.
   - 3.8. When temporarily stabilizing soils and slopes, utilize the techniques outlined in Table 1.
   - 3.9. Stabilize all areas that can be stabilized prior to opening up new areas to construction activities.
   - 3.10. Utilize Table 1 when selecting temporary soil stabilization measures.
   - 3.11. Divert off-site water through the project in an appropriate manner so as not to disturb the upstream or downstream soils, vegetation or hydrology beyond the permitted area.
   - 3.12. Install and maintain construction exits anywhere traffic leaves a construction site onto a public right-of-way.
   - 3.13. Sweep all construction related debris and soil from the adjacent paved roadways, as necessary.

4. Slope Protection
   - 4.1. Intercept and divert storm runoff from upslope drainage areas away from unprotected and newly established areas and slopes to a stabilized outlet or conveyance.
   - 4.2. Consider how groundwater seepage on cut slopes may impact slope stability and incorporate appropriate measures to minimize erosion.
   - 4.3. Convey storm water down the slope in a stabilized channel or slope drain.
   - 4.4. The outer face of the fill slope should be in a loose, ruffled condition prior to turf establishment.

5. Winter Construction
   - 5.1. To minimize erosion and sedimentation impacts, limit the extent and duration of winter excavation and earthwork activities. 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 contractor’s Critical Path Method (CPM) schedule, and the contractor has adequate resources available to ensure that environmental requirements will be met.
   - 5.2. Construction performed any time between November 30" and May 1" of any year is considered winter construction. During winter construction:
     - Stabilize all proposed vegetation areas which do not exhibit a minimum of 85% vegetative growth by October 15", or which are disturbed after October 15", in accordance with Table 1.
     - Stabilize all ditches or swales which do not exhibit a minimum of 85% vegetative growth by October 15", or which are disturbed after October 15", in accordance with Table 1.
     - Protect incomplete road surfaces, where base course gravels have not been installed, and where work has stopped for the season after November 30", in accordance with Table 1.
     - Unless a winter construction plan has been approved by NHDOT, conduct winter excavation and earthwork such that no more than 1 acre of the project is without stabilization an any one time.

6. Wildlife Protection Measures
   - 6.1. Report all observations of threatened and endangered species on the project site to the Department’s Bureau of Environment by phone at 603-271-3226 or by email at Bureau16@dot.nh.gov, indicating in the subject line the project name, number, and that a threatened/endangered species was found.
   - 6.2. Photograph the observed species and nearby elements of habitat or areas of land disturbance and provide them to the Department’s Bureau of Environment at the above email address.
   - 6.3. In the event that a threatened or endangered species is observed on the project during work, the species shall not be disturbed, handled, or harmed prior to receiving direction from the Bureau of Environment.
   - 6.4. Utilize wildlife friendly erosion control methods when:
     - Erosion control blankets are used,
     - A protected species or habitat is documented,
     - The proposed work is in or adjacent to a priority resource area, and/or when specifically requested by NHB or NHF&G

GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES
TABLE 1

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	YES1	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

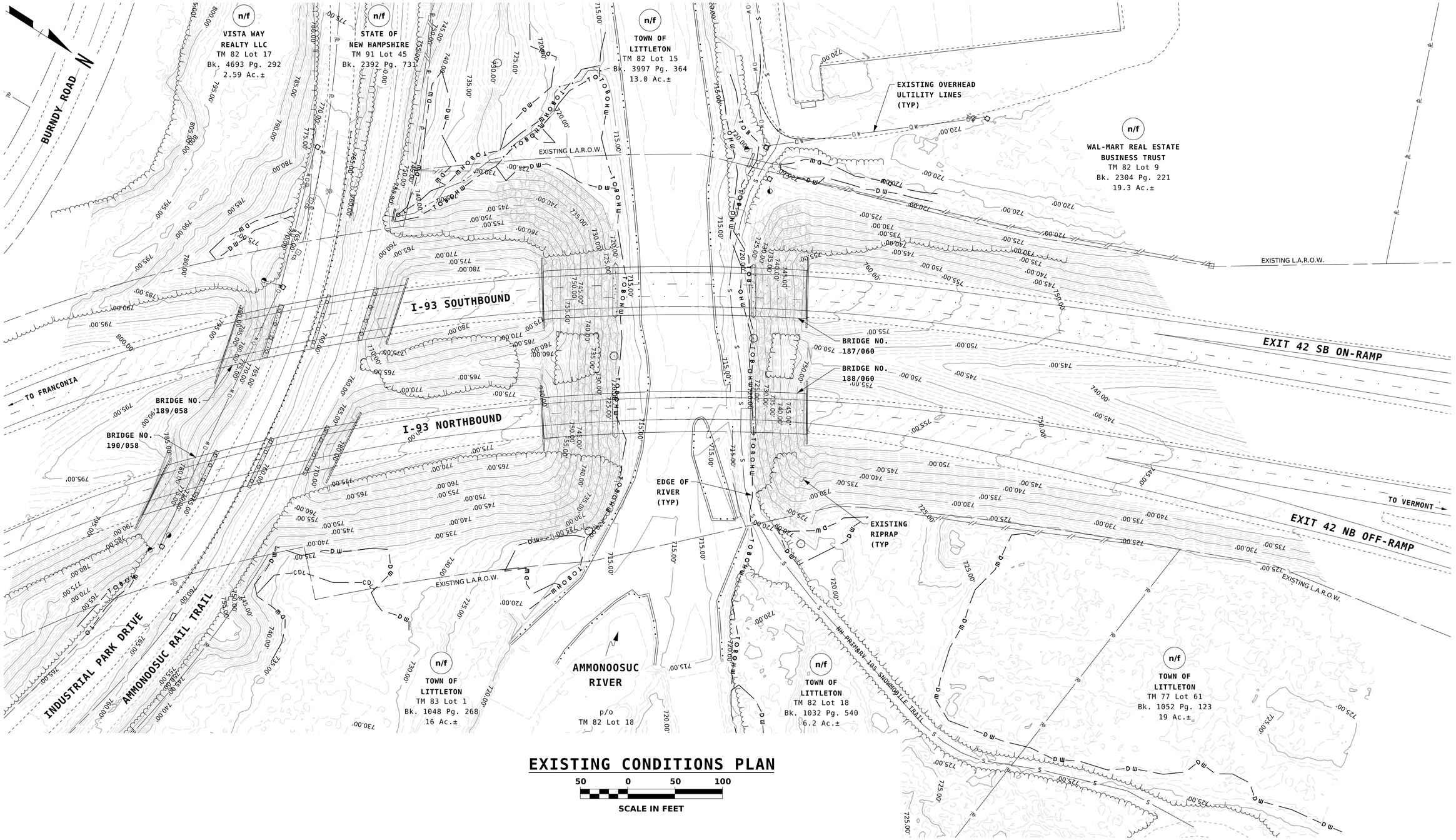
NOTES:
1. All slope stabilization options assume a slope length ≤ 10 times the horizontal distance component of the slope, in feet.
2. Do not apply products containing polyacrylamide (PAM) directly to, or within 100 feet of any surface water without NHDES approval.
3. Install all methods in Table 1 per the manufacturer’s recommendation for time of year and steepness of slope.

STATE OF NEW HAMPSHIRE
LITTLETON
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
07-31-2023	43809erostrat-ce	43809	5	10

erosstrat-ce



EXISTING CONDITIONS PLAN

50 0 50 100

SCALE IN FEET

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	DATE	STATION

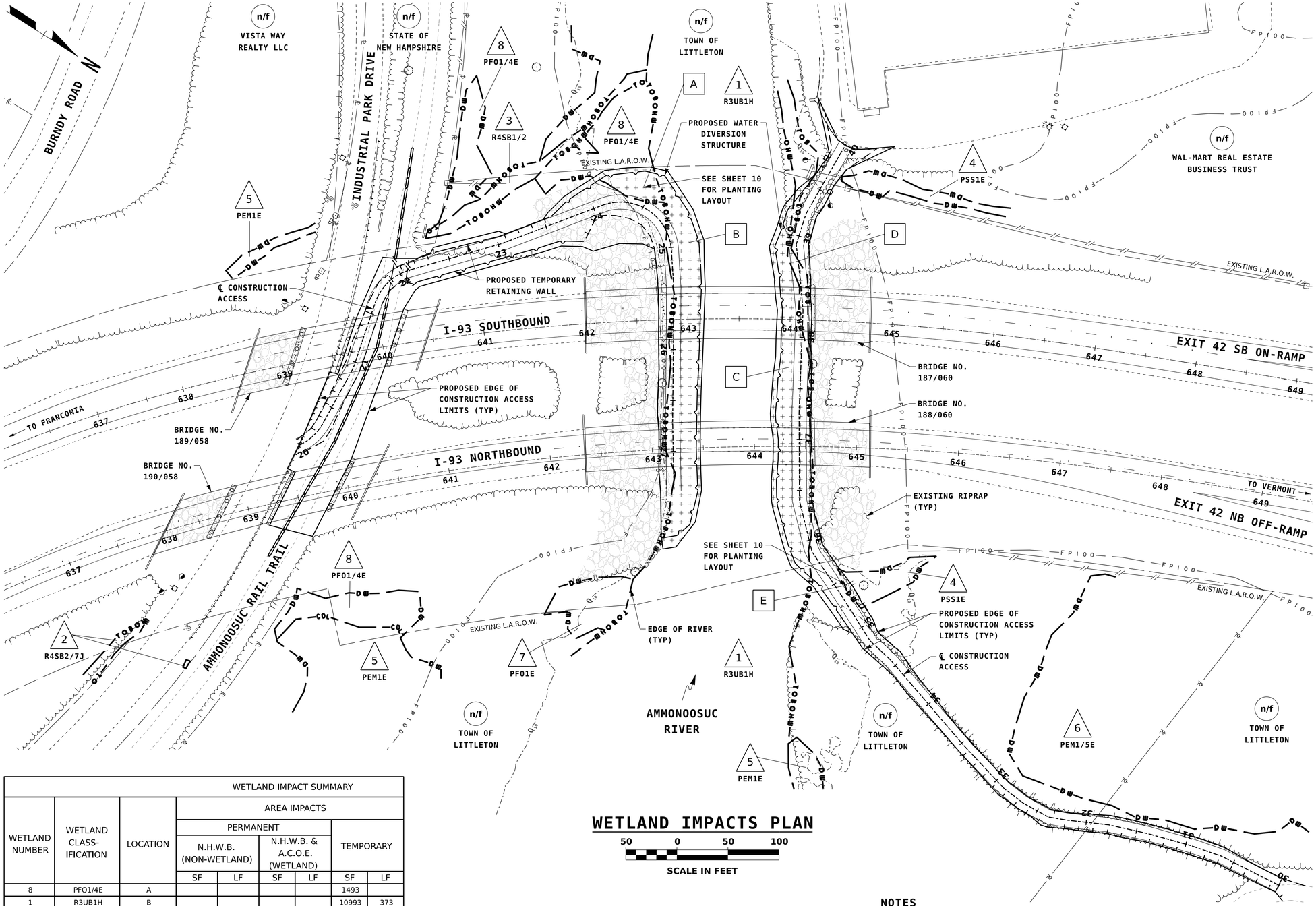
SDR PROCESSED	NAME1	DATE	DATE1
NEW DESIGN	NAME2	DATE	DATE2
SHEET CHECKED	NAME3	DATE	DATE3
AS BUILT DETAILS		DATE	

HOYLE TANNER

STATE OF NEW HAMPSHIRE
LITTLETON
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EXISTING CONDITIONS PLAN

HT PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
21.092597.04	43809_Existplan	43809existplan	43809	6	10



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
- —TOB— TOP OF BANK
- —OHW— ORDINARY HIGH WATER
- -TOBOHW- TOP OF BANK/ORDINARY HIGH WATER
- —DW— DELINEATED WETLANDS
- —COL— CHANGE IN CLASSIFICATION
- -FP100- 100 YEAR FLOOD PLAIN BOUNDARY
- APPROXIMATE LOCATION OF Q10

WETLAND CLASSIFICATION CODES	
1 R3UB1H	RIVERINE, UPPER PERENNIAL FLOW REGIME, UNCONSOLIDATED BOTTOM, GRAVEL/COBBLE SUBSTRATE, PERMANENTLY FLOODED
2 R4SB2/7J	RIVERINE, INTERMITTENT, STREAMBED, RUBBLE/VEGETATED SUBSTRATE, INTERMITTENTLY FLOODED
3 R4SB1/2	RIVERINE, INTERMITTENT, STREAMBED, COBBLE/GRAVEL AND SAND SUBSTRATE
4 PSS1E	PALUSTRINE, SCRUB SHRUB, BROAD-LEAD DECIDUOUS VEGETATION, SEASONALLY FLOODED/SATURATED
5 PEM1E	PALUSTRINE, EMERGENT, PERSISTENT VEGETATION, SEASONALLY FLOODED/SATURATED
6 PEM1/5E	PALUSTRINE, EMERGENT, PHRAGMITES AUSTRALIS/PERSISTENT VEGETATION, SEASONALLY FLOODED/SATURATED
7 PFO1E	PALUSTRINE, FORESTED, BROAD-LEAD DECIDUOUS VEGETATION, SEASONALLY FLOODED/SATURATED
8 PFO1/4E	PALUSTRINE, FORESTED, BROAD-LEAF DECIDUOUS AND NEEDLE-LEAF EVERGREEN VEGETATION, SEASONALLY FLOODED/SATURATED

WETLAND IMPACTS PLAN

50 0 50 100

SCALE IN FEET

WETLAND IMPACT SUMMARY								
WETLAND NUMBER	WETLAND CLASS-IFICATION	LOCATION	AREA IMPACTS					
			PERMANENT				TEMPORARY	
			N.H.W.B. (NON-WETLAND)		N.H.W.B. & A.C.O.E. (WETLAND)			
			SF	LF	SF	LF	SF	LF
8	PFO1/4E	A					1493	
1	R3UB1H	B					10993	373
1	R3UB1H	C					10379	373
1	BANK	D					1253	*227
4	PSS1E	E					214	
		TOTAL					24332	973

* REPRESENTS LF IMPACT OF AREA C, SEE TOTAL LINEAR FOOT IMPACT LENGTH BELOW

TEMPORARY IMPACTS: 24332 SF / 973 LF

TOTAL IMPACTS: 24332 SF / 973 LF

TOTAL LINEAR FOOT IMPACTS ARE AS FOLLOWS:

BANK = 373 LF
CHANNEL = 373 LF
BANK = 373 LF

NOTES

1. OVERHEAD UTILITY LINES AND UNDERGROUND SEWER LINES NOT SHOWN FOR CLARITY.
2. ALL WORK FOR INSTALLATION, OPERATION AND REMOVAL OF ACCESS ROADS, INCLUDING ALL NECESSARY ESC AND WATER QUALITY CONTROLS, SHALL OCCUR ON ONE SIDE OF THE RIVER AT A TIME ONLY FOR THE DURATION OF A ONE YEAR PERIOD; WORK SHALL NOT EXCEED A TOTAL OF TWO YEARS FOR PROJECT COMPLETION.

HOYLE TANNER

STATE OF NEW HAMPSHIRE
LITTLETON
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

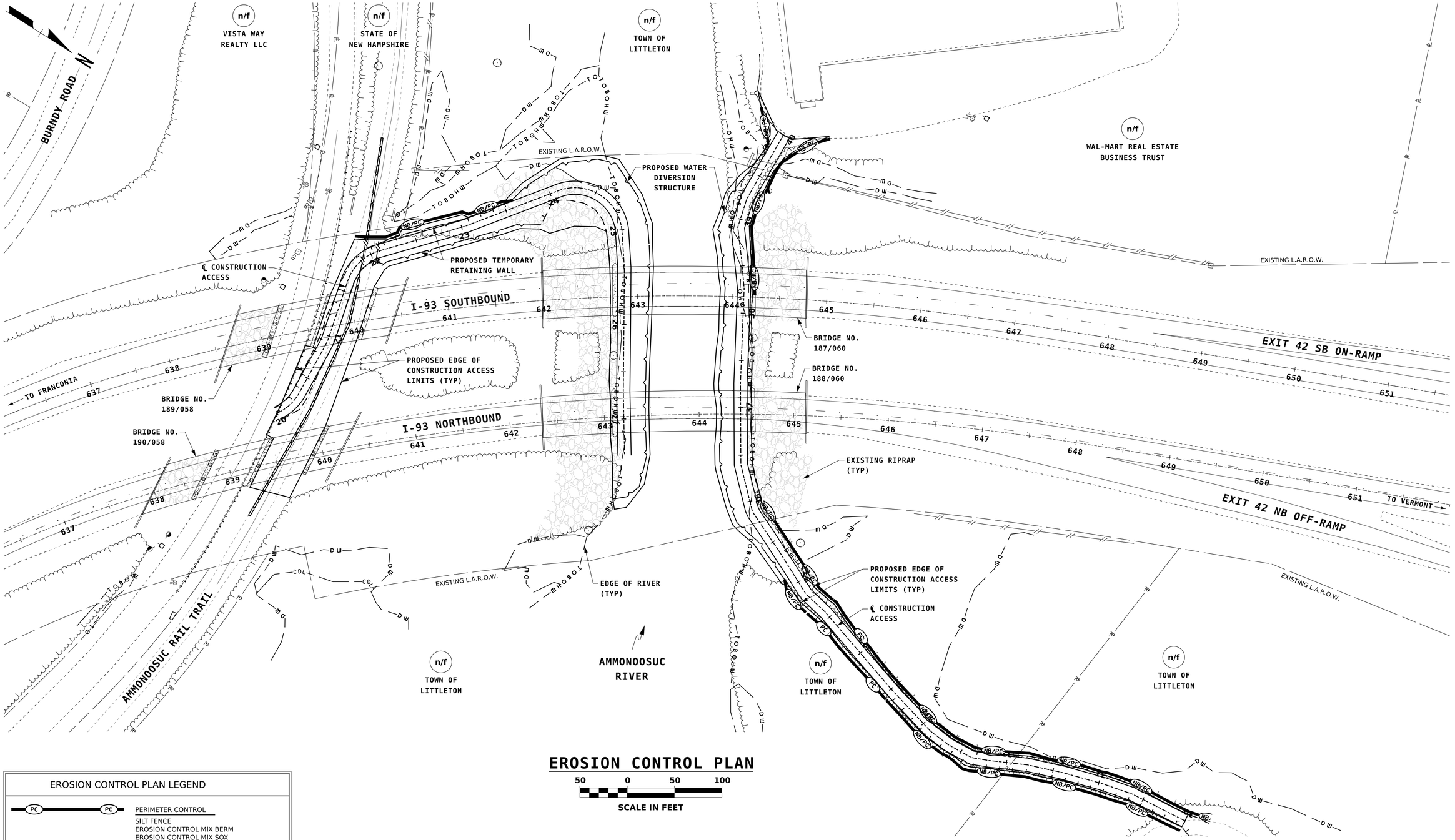
WETLAND IMPACTS PLAN

HT PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
21.092597.04	43809_Wetland	43809Wetplan	43809	7	10

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	DATE

SDR PROCESSED	NAME1	DATE	DATE1
NEW DESIGN	NAME2	DATE	DATE2
SHEET CHECKED	NAME3	DATE	DATE3
AS BUILT DETAILS		DATE	



EROSION CONTROL PLAN

50 0 50 100

SCALE IN FEET

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

NOTES

1. OVERHEAD UTILITY LINES AND UNDERGROUND SEWER LINES NOT SHOWN FOR CLARITY.
2. PERIMETER CONTROL SHALL NOT BE PLACED OUTSIDE OF THE CONSTRUCTION ACCESS LIMITS AND IS ONLY DEPICTED OUTSIDE OF THE CONSTRUCTION LIMITS FOR CLARITY.

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED	NAME1	DATE1
NEW DESIGN	NAME2	DATE2
SHEET CHECKED	NAME3	DATE3
AS BUILT DETAILS		DATE

HOYLE TANNER

STATE OF NEW HAMPSHIRE
LITTLETON
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLAN

HT PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
21.092597.04	43809_Erosplan	43809eroplan	43809	8	10

LANDSCAPING NOTES:

SCIENTIFIC NAME	COMMON NAME	QUANTITY	SIZE/TYPE	SPACING
ACER RUBRUM	RED MAPLE	94	18-24"	2-3' APART
VACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	88	18-24"	2-3' APART

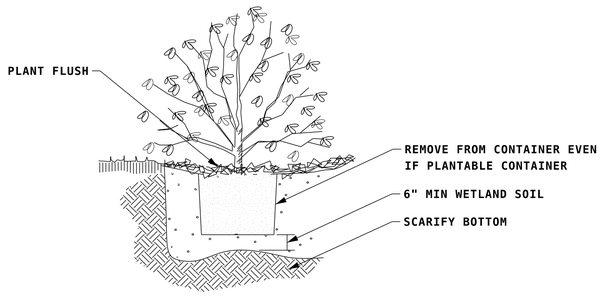
1. EFFORT SHALL BE MADE TO USE NATIVE GROWN OR LOCALLY-SOURCED SPECIES WHERE AVAILABLE.
2. LIVE STAKES WILL BE INSTALLED 2-3' APART IN A TRIANGULAR SPACING, APPROXIMATING 2-4 STAKES PER SQUARE YARD.
3. NATIVE EXCAVATE FROM BANK AREAS, IF AVAILABLE, SHALL BE STOCKPILED AND RE-USED WHERE FEASIBLE IN PLANTING SITE PREPARATION TO AID IN GROWTH OF NATIVE VEGETATION.
4. ONCE THE AREA HAS BEEN FULLY PLANTED THE UNDERSTORY SHALL BE SEEDED WITH ITEM 647.1 - HUMUS AND ITEM 646.31 - TURF ESTABLISHMENT WITH MULCH AND TACKIFIERS.
5. TUBELINGS, PLUGS OR CONTAINER GROWN PLANTS USING SIZE AND SPACING LISTED ABOVE MAY BE USED INSTEAD OF LIVE STAKES DEPENDING ON PRODUCT AVAILABILITY. SEE DETAILS ON THIS SHEET FOR PLANTING LAYOUT.
6. ALL PLANTINGS SHALL BE PAID UNDER ITEM 650.203, LANDSCAPING.

LIVE STAKE PLANTING NOTES:

1. INSPECT PLANTS TO ENSURE THEY ARE IN GOOD CONDITION PRIOR TO PLANTING.
2. STAKES SHOULD BE 1-2" IN DIAMETER AND 2-3' LONG.
3. REMOVE ANY SIDE BRANCHES, LEAVING BARK INTACT.
4. CUT THE BASAL ENDS AT AN ANGLE OR POINT FOR EACH INSERTION INTO SOIL. TOP SHOULD BE CUT SQUARE.
5. INSTALL MATERIALS THE SAME DAY THEY ARE PREPARED.
6. ORIENT BUDS UPWARD.
7. USE IRON BAR OR POWER AUGER 1" DIAMETER TO MAKE PILOT HOLE - DO NOT TAMP IN LIVE STAKES UNLESS SOIL IS FIRST LOOSENED.
8. INSTALL 2/3RD OF LENGTH OF LIVE STAKE INTO THE GROUND AND FIRMLY PACK SOIL AROUND STAKE.
9. REMOVE AND REPLACE ANY STAKES THAT SPLIT DURING INSTALLATION.

TUBELING/PLUG PLANTING NOTES:

1. INSPECT PLANTS TO ENSURE THEY ARE IN GOOD CONDITION PRIOR TO PLANTING.
2. INSTALL MATERIALS THE SAME DAY THEY ARE PREPARED FOR PLANTING.
3. PLANTS SHOULD HAVE BEEN PROPAGATED FOR A SUFFICIENT TIME AS TO DEVELOP ROOTS SUFFICIENT TO HOLD SOIL.
4. PLANTS SHOULD BE BETWEEN 8-24" IN HEIGHT.
5. EXCAVATE HOLE TWICE THE DIAMETER OF THE TUBELING/PLUG.
6. REMOVE FROM CONTAINER.
7. CENTER PLANT IN HOLE, INSTALL PLANT TO SUFFICIENT DEPTH THAT ROOT CROWN IS COVERED.
8. REPLACE AND TAMP SOIL AS NEEDED TO STABILIZE PLANT.
9. PLANTS TO BE 2-3' APART.



CONTAINER GROWN PLANT DETAIL

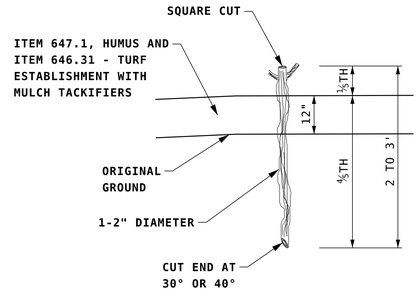
NOT TO SCALE

SITE PREPARATION NOTES:

1. LOCATE STAGING AREAS OUTSIDE OF WORK AREAS TO THE EXTENT FEASIBLE.
2. PLANTING SHOULD BE DONE DURING PERIODS WITHIN THE PLANTING SEASON WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE AND IN ACCORDANCE WITH ACCEPTED PRACTICES. PLANTS SHALL NOT BE INSTALLED IN FROZEN OR HIGH FLOW CONDITIONS.
3. PLANTS SHALL NOT REMAIN ON-SITE AND UNPLANTED FOR LONGER THAN A THREE-DAY PERIOD AFTER DELIVERY.
4. GRADE SITE FOR PLANTINGS AS NEEDED.
5. PLACE PERMEABLE FABRIC LAYER OR NON-PLASTIC EROSION CONTROL MATTING, AS NEEDED, TO STABILIZE SLOPE DURING WORK (SUBSIDIARY TO PLANTINGS).
6. MINIMIZE TRAVEL ACROSS, AND SUBSEQUENT COMPACTION OF, SOILS.
7. INSTALL PLANTINGS TO FINISHED GRADE, APPLY ITEM 647.1 - AND ITEM 646.31 - TURF ESTABLISHMENT WITH MULCH AND TACKIFIERS.
8. WATER BY FLOODING TWICE IN FIRST TWO HOURS AFTER PLANTING.
9. RAISE AND REPLANT ANY PLANTS THAT SETTLE MORE THAN 3" AFTER PLANTING AND WATERING.

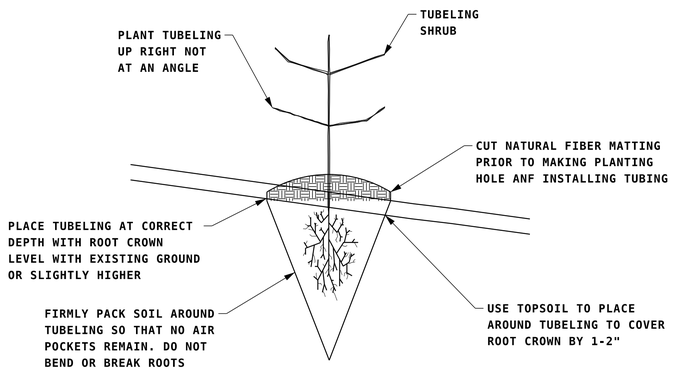
MONITORING NOTES:

1. MONITORING OF THE PLANTING AREAS SHALL OCCUR TWICE DURING THE FIRST GROWING SEASON.
2. PER ENV-WT 307.12, TEMPORARY IMPACT AREAS THAT ARE DISTURBED WILL BE PLANTED AS SHOWN WILL BE MONITORED TO CONFIRM AT LEAST 75% SUCCESSFUL ESTABLISHMENT OF WETLANDS VEGETATION AFTER 2 GROWING SEASONS AND NUISANCE SPECIES SHALL NOT INVADE AFTER 1 GROWING SEASON.SPECIES.
3. MONITORING REPORTS SHALL BE PREPARED BY NHDOT AND SUBMITTED TO NHDES ANNUALLY.



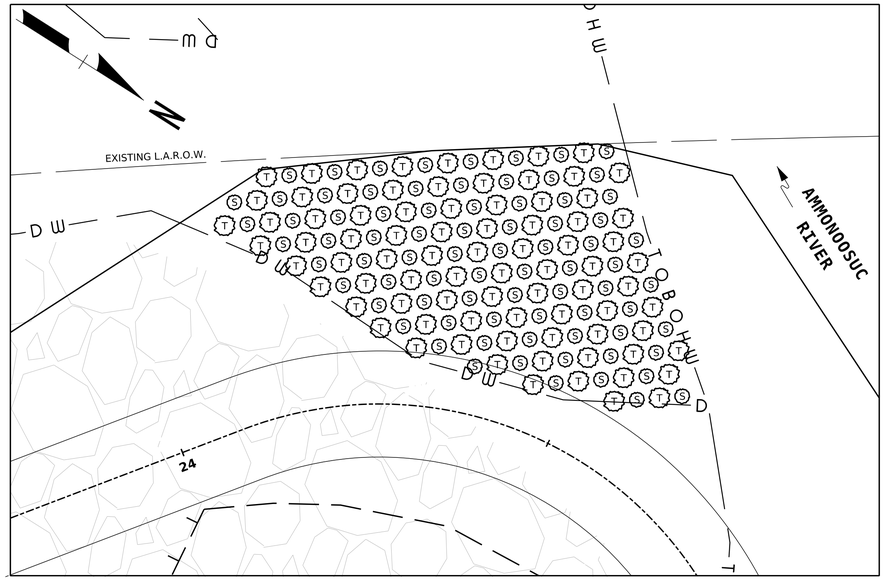
LIVE STAKE DETAIL

NOT TO SCALE



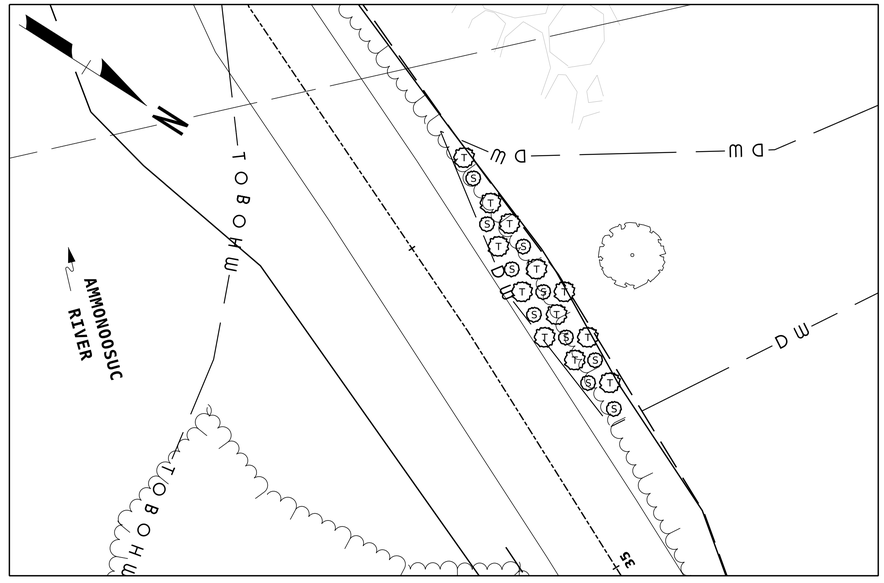
TUBELING DETAIL

NOT TO SCALE



PLANTING AREA "A"

SCALE: 1" = 10'



PLANTING AREA "B"

SCALE: 1" = 10'

LEGEND

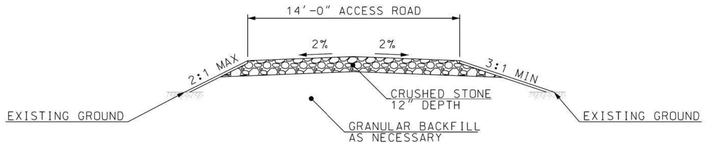
- (T) PROPOSED TREE
- (S) PROPOSED SHRUB

HOYLE TANNER

STATE OF NEW HAMPSHIRE
LITTLETON
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

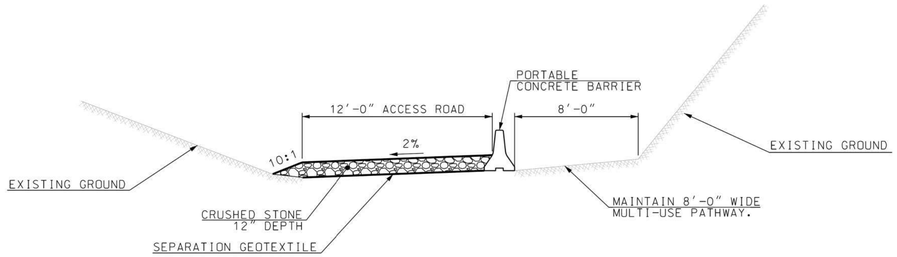
RESTORATION PLAN

HT PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
21.092597.04	43809Resto	43809Resto	43809	9	10



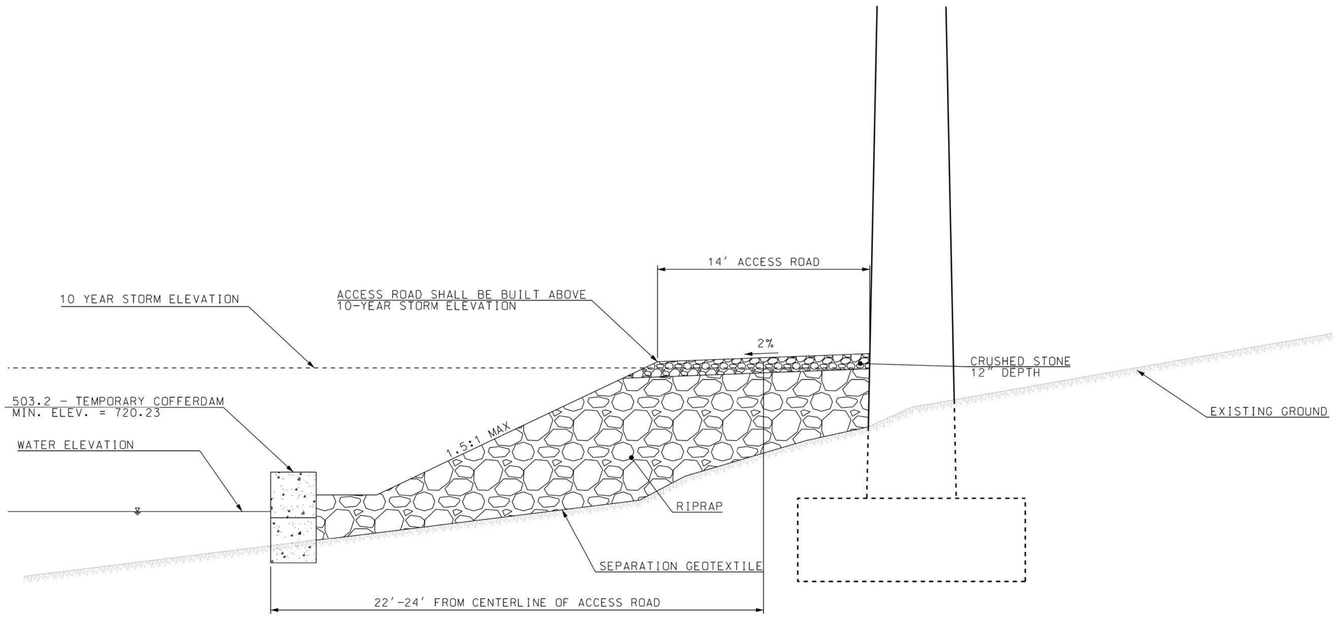
ACCESS ROAD TYP. SECTION

N.T.S.



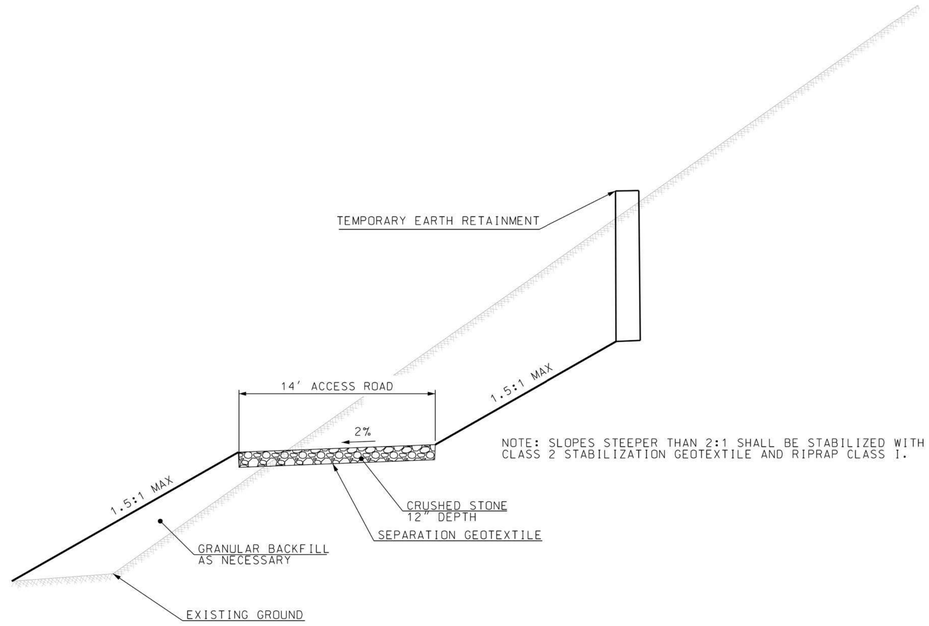
RAIL TRAIL TYP. SECTION

N.T.S.



STREAM CHANNEL TYP. SECTION

N.T.S.



NOTE: SLOPES STEEPER THAN 2:1 SHALL BE STABILIZED WITH CLASS 2 STABILIZATION GEOTEXTILE AND RIPRAP CLASS I.

RETAINING WALL TYP. SECTION

N.T.S.

10-YEAR STORM ELEVATIONS		
	NON-PHASED CONSTRUCTION	PHASED CONSTRUCTION
INLET (OF I93 NB BRIDGE)	723.52'	722.59'
OUTLET (OF I93 SB BRIDGE)	721.21'	721.21'

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED DATE

NEW DESIGN CFX DATE 12/12/2023

SHEET CHECKED JDP DATE 12/12/2023

AS BUILT DETAILS DATE

HEB ENGINEERS

STATE OF NEW HAMPSHIRE
LITTLETON

DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

ACCESS ROAD TYPICAL SECTIONS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
43809ARS	43809	10	10