NHDES WETLAND PERMIT APPLICATION FOR

Martin Road over Brown Brook Bridge Replacement

Fremont, New Hampshire

Bridge No. 155/133

April 2023

Stantec

Prepared for:

Town of Fremont

Prepared by:

Stantec Consulting Services, Inc.

5 Dartmouth Drive, Suite 200

Auburn, NH 03032

NHDES Wetland Permit Application for
Martin Road over Brown Brook Bridge Replacement
Bridge No. 155/133 located in Fremont, New Hampshire
Applicant: Town of Fremont

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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: **Town of Fremont** **TOWN NAME:** **Fremont**

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? o If yes, species or habitat name(s): American Eel, Blanding's Turtle o NHB Project ID #: NHB22-3844	☒ 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): • A copy of the application was sent to the LAC on Month: Day: Year:	☐ Yes ☒ No

For dredging projects, is the subject property contaminated? • If yes, list contaminant:	☐ Yes ☒ No
Is there potential to impact impaired waters, class A waters, or outstanding resource waters?	☒ Yes ☐ No
For stream crossing projects, provide watershed size (see WPPT or Stream Stats): 4.1 +/- square miles	

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 Application is to replace the Martin Rd bridge over Brown Brook, a tier 3 stream with flood plain wetlands located up and downstream of the bridge. The downstream wetland (Wetland 5) associated with Brown Brook is a designated Prime Wetlands and includes a 100-foot buffer. The existing bridge was built in 1930 with a skewed opening at 12'-3" at the inlet and 10'-2" at the outlet. The clear height varies between 4'-0" and 4'-5" with a fence gate located at the upstream side of the bridge. The existing bridge (No.155/133) is on the State's Municipal Red List due to the poor condition of the deck and substructure with a load posting of 15 tons. The abutments are poorly aligned with the channel. The bridge inspection report dated December 21, 2021, notes the abutments are undermined and the north abutment has settled about 3.5 inches with channel scour and bank slumping also noted. The project engineering study identified the preferred alternative as a new 22 ft wide x 7 ft high precast concrete box culvert with wingwalls on concrete spread footings and stone fill armoring and stream simulation gravel to provide a simulated channel bottom. Construction procedures will include a road closure with a detour to allow for shorter project duration. The bridge replacement allows for an increase in the hydraulic opening along with correction of the misalignment of the existing abutments. The proposed design has been discussed at the NHDOT BOE-Natural Resources Meetings on 1/18/2023 and 2/15/2023. Under that latest design a total of 10,478 SF of stream, wetlands, prime wetlands and 100-ft buffer will be impacted. Permanent impacts total to 6,122 for the stream, wetlands, and prime wetland & buffer. Temporary impacts total to 4,356 SF. Mitigation discussed at the 2/15/23 BOE-NRM is for the 2 PRA areas, Tier 3 floodplain and Prime Wetlands/Buffer totaling 4,264 SF. The culvert design self-mitigates the stream impacts. Copies of the BOE-NRM minutes are attached.

SECTION 3 - PROJECT LOCATION

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

ADDRESS: Martin Road over Brown Brook - Bridge No. 155/133	
TOWN/CITY: Fremont	
TAX MAP/BLOCK/LOT/UNIT: Map 6, Lots 34 & 35	
US GEOLOGICAL SURVEY (USGS) TOPO MAP WATERBODY NAME: Brown Brook ☐ N/A	
(Optional) LATITUDE/LONGITUDE in decimal degrees (to five decimal places):	43.1.14346° North 71.5.82641° 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: Town of Fremont - Heidi Carlson - Town Administrator		
MAILING ADDRESS: 295 Main Street		
TOWN/CITY: Fremont	STATE: NH	ZIP CODE: 03044
EMAIL ADDRESS: hcarlson@fremont.nh.gov		
FAX: 603-895-3149	PHONE: 603-895- 2226 x301	
ELECTRONIC COMMUNICATION: By initialing here: HC, 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.: Leach, Michael		
COMPANY NAME: Stantec Consulting Services, Inc		
MAILING ADDRESS: 5 Dartmouth Drive - Suite 200		
TOWN/CITY: Auburn	STATE: NH	ZIP CODE: 03032
EMAIL ADDRESS: michael.leach@stantec.com		
FAX: 603-669-7636	PHONE: 603-206-7538	
ELECTRONIC COMMUNICATION: By initialing here ml, I hereby authorize NHDES to communicate all matters relative to this application electronically.		
SECTION 6 - PROPERTY OWNER INFORMATION (IF DIFFERENT THAN APPLICANT) (Env-Wt 311.04(b)) If the owner is a trust or a company, then complete with the trust or company information. ☒ Same as applicant		
NAME:		
MAILING ADDRESS:		
TOWN/CITY:	STATE:	ZIP CODE:
EMAIL ADDRESS:		
FAX:	PHONE:	
ELECTRONIC COMMUNICATION: By initialing here , I hereby authorize NHDES to communicate all matters relative to this application electronically.		

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

Describe how the resource-specific criteria have been met for each chapter listed above (please attach information about stream crossings, coastal resources, prime wetlands, or non-tidal wetlands and surface waters):

Env-Wt. 400 - A wetland delineation report (Exhibit) and a stream assessment report (Exhibit E) are provided in this application to meet and address Env-Wt. 400.

Env-Wt-500, only sections 514 - Banks Stabilization and 527 - Public Highways apply to the project. The project proposes stream bank restoration to 100-year elevation with stone fill to minimize erosion in the Brown Brook floodplain area and a mixture of stone and loam above the 100-year elevation to promote and establish vegetated banks. The impacts to the stream for the culvert replacement are minimized to the extent practical. The calculations to address the 100-year flows for the stone fill stream banks are provided in the hydraulic study provided in Exhibit I. Under Section 527, the criteria references meeting Env-Wt. 900 - noted below - and meets the purpose to improve public safety under 527.02.(c) and does not increase 100-year flooding per 527.02.(e). This is further noted in the attached application information. Env-Wt-600 relative to coastal lands/tidal waters/wetlands does not apply to this project.

Prime Wetlands - Env-Wt. 700 are impacted under this municipal safety improvement project located adjacent to the southerly side of Martin Road A waiver is being requested for the prime wetland impacts and 100-foot buffer impacts described in the attached application information and waiver request form W-06-088.

Env-Wt. 900- The project application is for a replacement stream crossing and the application and supporting information include the stream crossing worksheet. Impacts to the stream are minimized to the extent practical and discussed at NHDOT-BOE meetings on 1-18-23 and 2-15-23 (Exh J)

SECTION 8 - AVOIDANCE AND MINIMIZATION

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

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

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

SECTION 9 - MITIGATION REQUIREMENT (Env-Wt 311.02)

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

Mitigation Pre-Application Meeting Date: Month: 2 Day: 16 Year: 2023

(☐ N/A - Mitigation is not required)

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

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

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

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

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

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

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

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

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

JURISDICTIONAL AREA		PERMANENT			TEMPORARY		
		SF	LF	ATF	SF	LF	ATF
Wetlands	Forested Wetland			☐			☐
	Scrub-shrub Wetland			☐			☐
	Emergent Wetland	311		☐	399		☐
	Wet Meadow			☐			☐
	Vernal Pool			☐			☐
	Designated Prime Wetland	448		☐	347		☐
	Duly-established 100-foot Prime Wetland Buffer	3505		☐	2817		☐
Surface Water	Intermittent / Ephemeral Stream			☐			☐
	Perennial Stream or River	1858	66	☐	793	23	☐
	Lake / Pond			☐			☐
	Docking - Lake / Pond			☐			☐
	Docking - River			☐			☐
Banks	Bank - Intermittent Stream			☐			☐
	Bank - Perennial Stream / River		130	☐			☐
	Bank / Shoreline - Lake / Pond			☐			☒
Tidal	Tidal Waters			☐			☐
	Tidal Marsh			☐			☐
	Sand Dune			☐			☐
	Undeveloped Tidal Buffer Zone (TBZ)			☐			☐
	Previously-developed TBZ			☐			☐
	Docking - Tidal Water			☐			☐
TOTAL		6122	196		4356	23	

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):	10,478 SF	× $0.40 =	$ 4192.20
Seasonal docking structure:	SF	× $2.00 =	$
Permanent docking structure:	SF	× $4.00 =	$
Projects proposing shoreline structures (including docks)		add $400 =	$
		Total =	$ 4192.20

The application fee for minor or major impact is the above calculated total or $400, whichever is greater = $ 4192.20

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: HC ml	To the best of the signer's knowledge and belief, all required notifications have been provided.
Initials: HC ml	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: HC ml	The signer understands that: • The submission of false, incomplete, or misleading information constitutes grounds for NHDES to: 1. Deny the application. 2. Revoke any approval that is granted based on the information. 3. If the signer is a certified wetland scientist, licensed surveyor, or professional engineer licensed to practice in New Hampshire, refer the matter to the joint board of licensure and certification established by RSA 310-A:1. • The signer is subject to the penalties specified in New Hampshire law for falsification in official matters, currently RSA 641. • The signature shall constitute authorization for the municipal conservation commission and the Department to inspect the site of the proposed project, except for minimum impact forestry SPN projects and minimum impact trail projects, where the signature shall authorize only the Department to inspect the site pursuant to RSA 482-A:6, II.
Initials: ml	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): Heidi Carlson	PRINT NAME LEGIBLY: HEIDI CARLSON	DATE: 4/28/23
SIGNATURE (APPLICANT, IF DIFFERENT FROM OWNER):	PRINT NAME LEGIBLY:	DATE:
SIGNATURE (AGENT, IF APPLICABLE	PRINT NAME LEGIBLY: Michael Leach	DATE: 4/14/2023

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: Deborah Caputo
TOWN/CITY: FREMONT	DATE: 04/28/2023

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".

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: Town of Fremont **TOWN NAME:** Fremont

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.

THIS APPLICATION IS FOR THE REPLACEMENT OF AN EXISTING NHDOT RED LIST BRIDGE THAT CROSSES OVER BROWN BROOK. A CHECKLIST FOR AVOIDANCE AND MINIMIZATION W-06-050 IS ATTACHED. DURING THE NHDOT BUREAU OF ENVIRONMENT NATURAL RESOURCE MEETING ON JANUARY 18, 2023 REVIEW IT WAS REQUESTED TO REDUCE IMPACTS AND THE IMPACTS WERE REDUCED TO EXTENT PRACTICAL AND PRESENTED AT THE FEBRUARY 15, 2023 (EXHIBIT J). MOST OF THE PROPOSED IMPACTS ARE RELATED TO PROPOSED BRIDGE REPLACEMENT AND THE ASSOCIATED ROAD AND SAFETY IMPROVEMENTS DESCRIBED IN THE ENGINEERING REPORT (EXHIBIT L). IMPACTS TO THE PRIME WETLAND AND 100-FOOT PRIME WETLAND BUFFER ARE MINIMIZED TO THE EXTENT PRACTICAL AND ARE ASSOCIATED WITH THE MINOR ROADWAY WIDENING FOR THE APPROACHES AND GUARDRAILS TO THE PROPOSED BRIDGE. UNAVOIDABLE IMPACTS TO STREAM AND ADJACENT 100-YEAR FLOODPLAIN WETLAND ARE REDUCED WITH BANK STABILIZATION WITH STONE FILL PROVIDED TO THE 100-YEAR ELEVATION. THE PROJECT REDUCES THE UPSTREAM 100-YEAR FLOOD ELEVATION BY 1.5 FEET (CREATED BY THE EXISTING UNDERSIZED BRIDGE) AND RESTORES HYDRAULIC CONDUCTIVITY ALONG THE STREAM CHANNEL. THE PROPOSED WIDER BRIDGE REDUCES FLOODING IMPACTS BY CREATING A MINOR INCREASE IN OVERALL FLOODPLAIN VOLUME OF APPROXIMATELY 200 CF.

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.

The project is not located in a tidal marsh and downstream area of the project is upstream of a marsh. The project design is intended to provide 2 feet of water through the opening under normal flow conditions to promote aquatic passage upstream and downstream.

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

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

The project improves the stream hydraulic connections with the proposed bridge replacement increasing the stream opening under the structure by 2.1 times from the existing and is intended to provide 2 feet of water through the opening under normal flow conditions. The project reduces the upstream 100-year flood elevation by 1.5 feet (created by the existing undersized bridge) and restores hydraulic conductivity along the stream channel. This improvement benefits aquatic passage, enhances stream conductivity and sediment transport, and minimizes potential inlet obstructions. The proposed bridge does not restrict high flows and maintains low flows and will pass a 100-year storm with more than 1-foot of freeboard under the structure.

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.

The application is to replace the Martin Rd bridge over Brown Brook, a tier 3 stream with flood plain wetlands located up and downstream of the bridge. The downstream wetland (Wetland 5) associated with Brown Brook is a designated Prime Wetlands and includes a 100-foot buffer. The project engineering study identified the preferred alternative as a new 22 ft wide x 7 ft high precast concrete box culvert with wingwalls on concrete spread footings and stone fill armoring and stream simulation gravel to provide a simulated channel bottom. Construction procedures will include a road closure with a detour to allow for shorter project duration. The project proposes temporary impacts for the proposed erosion control measures and temporary bypass measures needed during construction. The design will impact a total of 10,478 SF of stream, wetlands, prime wetlands, and 100-ft buffer will be impacted. Permanent impacts total to 6,122 for the stream, wetlands, and prime wetland & buffer. Temporary impacts total to 4,356 SF. The Town has acquired an easement on abutting lots 34 and 35 on tax map 6 to conduct the work. The specific wetland impacts and impacts to the prime wetland and wetland buffers are shown in the plan set on sheets 22 (C-115) and 23 (C-116).

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 existing bridge was built in 1930 with a skewed opening at 12'-3" at the inlet and 10'-2" at the outlet. The existing bridge (No.155/133) is on the State's Municipal Red List due to the poor condition of the deck and substructure with a load posting of 15 tons and currently impacts public commerce. The project engineering study identified the preferred alternative as a new 22 ft wide x 7 ft high precast concrete box culvert with wingwalls on concrete spread footings and stone fill armoring and stream simulation gravel to provide a simulated channel bottom. Construction procedures will include a road closure with a detour to allow for shorter project duration and minimize impacts to commerce. Upon completion, public commerce will be restored. From the NHDOT- BOE meetings for the project (Exhibit J) Brown Brook is not a navigatable water per the US Coast Guard and the project is not located in a recreational area.

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 existing and proposed bridge are located in the 100-year floodplain and wetlands of Brown Brook as indicated in Figure 2 and Exhibit H. The impacts for the bridge replacement have been reduced to the extent practicable under the revised design presented to the NHDOT-BOE Natural Resources meeting on February 15, 2023 (Exhibit J) and the revised design is provided in this application submission. The proposed bridge increases the stream opening under the structure by 2.1 times and creates approximately 200 CF of additional 100-year flood storage.

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

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

The project is not located in a forested wetland or scrub-shrub-marsh complex as noted in the wetland delineation report - Exhibit D.

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.

The project is not located adjacent to a public drinking water supply zone. To minimize project impacts that could be detrimental to downstream wetlands, construction procedures will include a road closure with a detour to allow for shorter project duration. The project proposes temporary impacts for the proposed erosion control measures and temporary bypass measures needed during construction. Upon completion, all disturbed areas outside of paved areas and stone stream channels will be stabilized with loam and seed.

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.

The existing bridge was built in 1930 with a skewed opening at 12'-3" at the inlet and 10'-2" at the outlet. The clear height varies between 4'-0" and 4'-5" with a fence gate located at the upstream side of the bridge. The abutments are poorly aligned with the channel. The project engineering study identified the preferred alternative as a new 22 ft wide x 7 ft high precast concrete box culvert with wingwalls on concrete spread footings and stone fill armoring and stream simulation gravel to provide a simulated channel bottom. The proposed bridge replacement increasing the stream opening under the structure by 2.1 times from the existing and is intended to provide 2 feet of water through the opening under normal flow conditions. The bridge replacement allows for an increase in the hydraulic opening along with correction of the misalignment of the existing abutments and improved the stream channel flow. The proposed design reduces the upstream 100-year flood elevation by 1.5 feet (created by the existing undersized bridge). The proposed bridge does not restrict high flows and maintains low flows and will pass a 100-year storm with more than 1-foot of freeboard under the structure.

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.

Not Applicable - The project is not a shoreline structure.

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.

Not Applicable - The project is not a shoreline structure and docking is not proposed or intended.

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.

The project is not a shoreline structure. The project avoids and minimzes impacts to the adjacent abutters to the extent practical. Temporary impacts for the bridge replacement work and stream channel reconstruction occur during construction. The Town has obtained temporary construction easement from the abutter for the proposed work on the properties. Upon completion of the bridge replacement, the abutter's use and enjoyment of the property will be enhanced slightly on the upstream side due to the lowering of the upstream flood elevations provided with the new bridge.

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.

Not Applicable - The project is not a shoreline structure. Responses to commerce and navigation are noted under V above.

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.

The project is not a shoreline structure. With the enlarged stream opening placed along the current stream alignment and a design intent to provide a minimum 2-foot depth under the proposed bridge structure, we believe the proposed design provides improves wildlife and finfish habitat, retains aquatic vegetation along the stream banks above the 100-year flood elevation and reduces impacts to water quality with the reduction of the upstream flood elevations.

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.

The project is not a shoreline structure. The proposed design minimizes the impacts to wetlands, banks and streams. The disturbed areas along the stream banks are stabilized with riprap to 100-year flood elevation and riprap intermixed with humus above the 100-year elevation to promote vegetative banks.

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: Army Corps - Highway Methodology Workbook Suppliment and the NH Method
NAME OF CERTIFIED WETLAND SCIENTIST (FOR NON-TIDAL PROJECTS) OR QUALIFIED COASTAL PROFESSIONAL (FOR TIDAL PROJECTS) WHO COMPLETED THE ASSESSMENT: TOM TETREAU
DATE OF ASSESSMENT: 12-03-2021
Check this box to confirm that the application includes a NARRATIVE ON FUNCTIONAL ASSESSMENT: ☒
For minor or major projects requiring a standard permit without mitigation, the applicant shall submit a wetland evaluation report that includes completed checklists and information demonstrating the RELATIVE FUNCTIONS AND VALUES OF EACH WETLAND EVALUATED. Check this box to confirm that the application includes this information, if applicable: ☒ Note: The Wetlands Functional Assessment worksheet can be used to compile the information needed to meet functional assessment requirements.

NHDES-W-06-088

PRIME WETLAND WAIVER
FORESTRY & OTHER ACTIVITIES
Water Division/Land Resources Management
Wetlands Bureau

RSA/Rule: RSA 482-A:11/ Env-Wt 706

APPLICANT LAST NAME, FIRST NAME, M.I.: Town of Fremont

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

As provided in RSA 482-A:11, IV(b)(1), to be eligible for the Forestry Statutory Permit-by-Notification (Forestry SPN), a property owner must obtain a waiver to perform any forest management work and related activities in the forested portion of a designated **prime wetland*** or **duly-established 100-foot buffer†** from the department. *For a waiver request for Forestry Activities within a designated prime wetland or duly-established 100-foot buffer, please complete Part I of this form.*

As provided in RSA 482-A:11, IV(c), a property owner may request a waiver from the department to perform work not addressed above within a portion of any **duly-established 100-foot buffer†** of a prime wetland on his or her property. Please note that waivers for such activities may only be requested for work within a duly-established 100-foot buffer, not for work within prime wetlands. *For a waiver request for Activities Other than Forest Management within a duly-established 100-foot buffer, please complete Part II of this form.*

A waiver request for work in a prime wetland or duly-established 100-foot buffer must be submitted to the department at the same time as a notification for an SPN or other application, as applicable.

*Prime Wetlands: Any contiguous areas falling within the jurisdictional definitions of RSA 482-A:2, X and RSA 482-A:4 that, because of their size, unspoiled character, fragile condition, or other relevant factors, make them of substantial significance (482-A:15, I-a).

†Duly-Established 100-foot Buffer: The buffer recognized in RSA 482-A:11, IV for prime wetlands designated on or after September 11, 2009 but before August 17, 2012 (Env-Wt 102.63).

PART I: WAIVER REQUEST FOR FORESTRY ACTIVITIES

SECTION 1 - REQUESTED WAIVER AND FILING FEE (Env-Wt 706.02(b)(3))

Check or money order for the applicable filing fee payable to "Treasurer – State of NH" (RSA 482-A:3, I(c)).

- ☐ $200 for a project that would otherwise qualify for a Forestry SPN if it was not located in or near a designated prime wetland or duly-established 100-foot buffer.
- ☐ $500 for a minor impact project that does not otherwise qualify as minimum or major impact project.
- ☐ $1,250 for a major impact project classified regardless of prime wetlands designation.

SECTION 2 - PROPOSED WORK (Env-Wt 706.02(b); RSA 482-A:11, IV(b)(1))

Provide a brief written description of the work to be performed.

SECTION 3 - PRIME WETLANDS VALUES (Env-Wt 706.02(b); RSA 482-A:11, IV(b)(1))

Provide a list of the prime wetlands values as identified by the municipality when the prime wetland or duly-established 100-foot buffer was designated. Demonstrate that the project will not create a significant net loss of these wetland values.

SECTION 4 - REQUIRED ATTACHMENTS (Env-Wt 706.02; RSA 482-A:11, IV(b)(1))

☐ A sketch of the property depicting the best approximate location of each prime wetlands/buffer in which work is proposed and the location of proposed work, including access roads.

☐ A copy of the notice of intent to cut, if applicable.

☐ Other information to demonstrate that there will be no significant net loss of wetland values identified by the municipality when the prime wetland/buffer was designated.

☐ Written comments from the conservation commission or local governing authority as applicable, stating that:

- The members have no objections to the requested waiver.
- The members have no objections to a waiver if the conditions specified in the comments are met.
  OR
- The members object to the waiver for the reason(s) stated in the comments.

SECTION 5 - ADDITIONAL INSTRUCTIONS (Env-Wt 706.02; RSA 482-A:11, IV(b)(3))

☐ At the time the applicant submits the waiver request to the department, the applicant also shall submit, ***via certified mail***, a copy of the waiver request and all supporting documentation to the local governing body, the planning board, if any, and the conservation commission, if any, of the municipalities in which any prime wetlands/buffers associated with the application are located.

☐ If a prime wetland/buffer associated with the application extends into an abutting property, the property owner requesting the waiver shall provide a copy of the waiver request and all supporting documentation to the owner of that abutting property. The applicant shall send the notice required ***by certified mail***.

Please note:

- As provided in RSA 482-A:11, IV(b)(3), the department shall not issue a waiver for forestry activities prior to 14 days after receipt of the waiver request, provided however that a municipal conservation commission may request an extension on such waiver issuance, not to exceed 14 days, which the department shall grant if requested.
- As provided by RSA 482-A:11, IV(b)(2), the department shall not issue a waiver unless the department determines that there will be no significant net loss of wetland values as identified by the local conservation commission/local governing authority or in RSA 482-A:1.
- If the department determines that the criteria for issuing a waiver are met, the waiver shall be issued as part of the Forestry SPN or permit, as applicable.
- If the department is unable to determine, based on the information submitted, that the proposed work will not cause a significant net loss of wetland values, the department shall notify the applicant of what additional information is needed and establish a deadline in consultation with the applicant for the submission of the additional information.
- If the department determines that the project would not cause a significant net loss of wetland values if certain conditions were met, the department shall place such conditions on the waiver as are necessary to protect the prime wetland resource.
- Any waiver issued shall be valid for the term of the permit or SPN with which it is associated, but may be extended.

PART II: WAIVER REQUEST FOR ACTIVITIES OTHER THAN FOREST MANAGEMENT

SECTION 1 - REQUESTED WAIVER AND FILING FEE (Env-Wt 706.04(b)(5))

Check or money order for the applicable filing fee payable to "Treasurer – State of NH" (RSA 482-A:3, I(c)).

☐ $200 for projects that would otherwise qualify as a minimum impact project if it was not located in a designated prime wetlands buffer.

☐ $500 for a minor impact project that does not otherwise qualify as minimum or major impact project.

☒ $1,250 for a major impact projects.

SECTION 2 - PROPOSED WORK (Env-Wt 706.04(b)(2))

Provide a written description of the work to be performed.

The proposed project is the replacement of the NHDOT red listed 1930 Martins Road Bridge over Brown Brook with a new 22'W x 7'H x 30'L concrete box culvert bridge. The work will include roadway widening for the approaches to the new bridge and includes installation of guardrails for safety and temporary impacts during construction. Brown Brook is a tier 3 stream with a 100-year flood plain and associated wetlands. The downstream stream and wetlands are prime wetlands (Wetland #5) and have a 100-ft buffer. During construction, Martin Road will be closed to expedite the construction. Under the project a total 10, 478 SF of Stream, Wetlands, Prime Wetlands and 100-ft Buffer will be impacted with 6,122 SF being permanent impact and 4,356 SF being temporary impact during construction. The bridge replacement design minimizes the impacts to the wetland resources to the extent practical. Additional project details can be found in the attached wetland permit application package.

SECTION 3 - PRIME WETLANDS VALUES (Env-Wt 706.04(b))

Provide a list of the prime wetlands values identified by the municipality when the prime wetlands associated with the buffer was designated. Demonstrate that the project will not create a significant net loss of these wetland values. Based upon the report dated September 2007, 18.2 acre prime wetland #5 (Exhibit J) has the following principal functions: Groundwater Recharge/Discharge, Flood Flow Alteration; Sediment/Toxicant/Pathogen Retention; Nutrient Removal/Retention/Transformation; Sediment/Shoreline Stabilization; Wildlife Habitat; and notes a medium Recreational Value and High Educational/Scientific and Uniqueness/Heritage Values. The project proposes 795 SF total impact to the prime wetlands with 448 SF permanent and 347 SF temporary adjacent to the stream to install the new wider bridge. Impacts to the 100-ft buffer total to 6,322 SF with 3,505 SF permanent for the roadway approach widening and 2,817 temporary during construction. All impacts are along the fringes of the previously disturbed areas of the bridge and roadway in the wetlands and buffer areas. Upon completion of the work, all disturbed areas will be be stabilized. In our opinion, the temporary and permanent impacts to the prime wetlands and buffer in the previously disturbed fringe locations does not create a significant change to or loss of the identified prime wetland functions and values. Additional project details can be found in the attached wetland permit application package.

SECTION 4 - REQUIRED ATTACHMENTS (Env-Wt 706.04)

☒ A sketch of the property depicting the best approximate location of the duly-established 100-foot buffer in which work is proposed and the location of proposed work, including access roads.

☒ Other information to demonstrate that there will be no significant net loss of wetland values identified by the municipality when the prime wetlands associated with the buffer was designated.

SECTION 5 - ADDITIONAL INSTRUCTIONS (Env-Wt 706.04; RSA 482-A:11, IV(c))

☐ At the time the applicant submits the waiver request to the department, the applicant also shall notify, ***by certified mail***, the local governing body, the planning board, if any, and the conservation commission, if any, of the municipalities in which the waiver is being sought that the waiver is being requested.

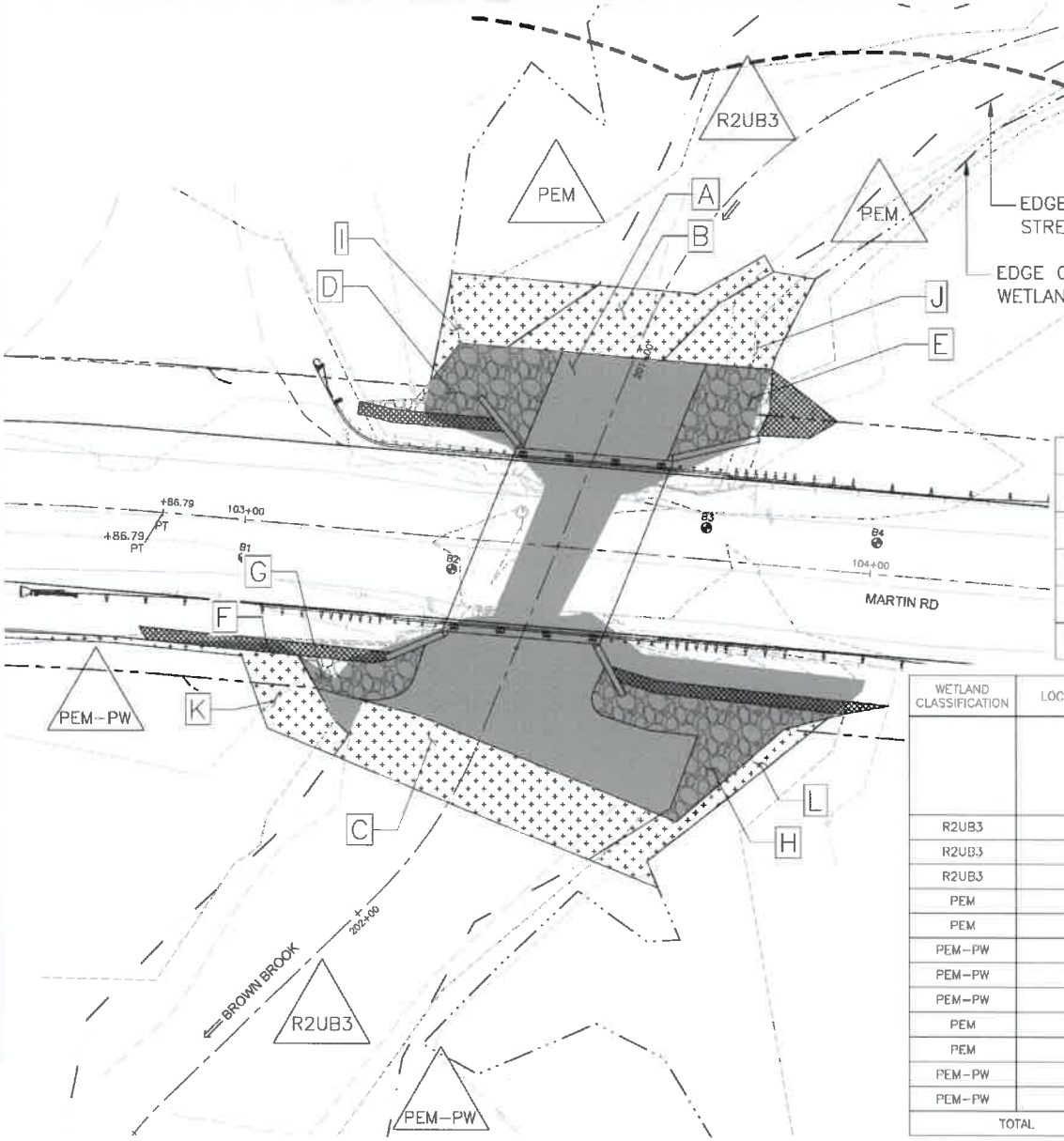
☐ If the buffer associated with the application extends onto an abutting property, the property owner requesting the waiver shall provide notice that the waiver is being requested to the owner of that abutting property.

Please note:

- As provided in Env-Wt 706.05, the department shall not issue a waiver under Env-Wt 706.01(b) prior to 14 days after receipt of the waiver request, provided however that a municipal conservation commission may request an extension on such waiver issuance, not to exceed 14 days, which the department shall grant if and as requested.
- The department shall not issue a waiver unless the department determines that there will be no significant net loss of wetland values as identified by the local conservation commission/local governing authority and in RSA 482-A:1.
- If the department determines that the criteria for issuing a waiver are met, the waiver shall be issued as part of the SPN or permit, as applicable.
- If the department is unable to determine, based on the information submitted, that the proposed work will not cause a significant net loss of wetland values, the department shall notify the applicant of what additional information is needed and establish a deadline in consultation with the applicant for the submission of the additional information.
- If the department determines that the project would not cause a significant net loss of wetland values if certain conditions were met, the department shall place such conditions on the waiver as are necessary to protect the prime wetlands resource.

- Any waiver issued shall be valid for the term of the permit or SPN with which it is associated, but may be extended.

Wetland Impact Summary



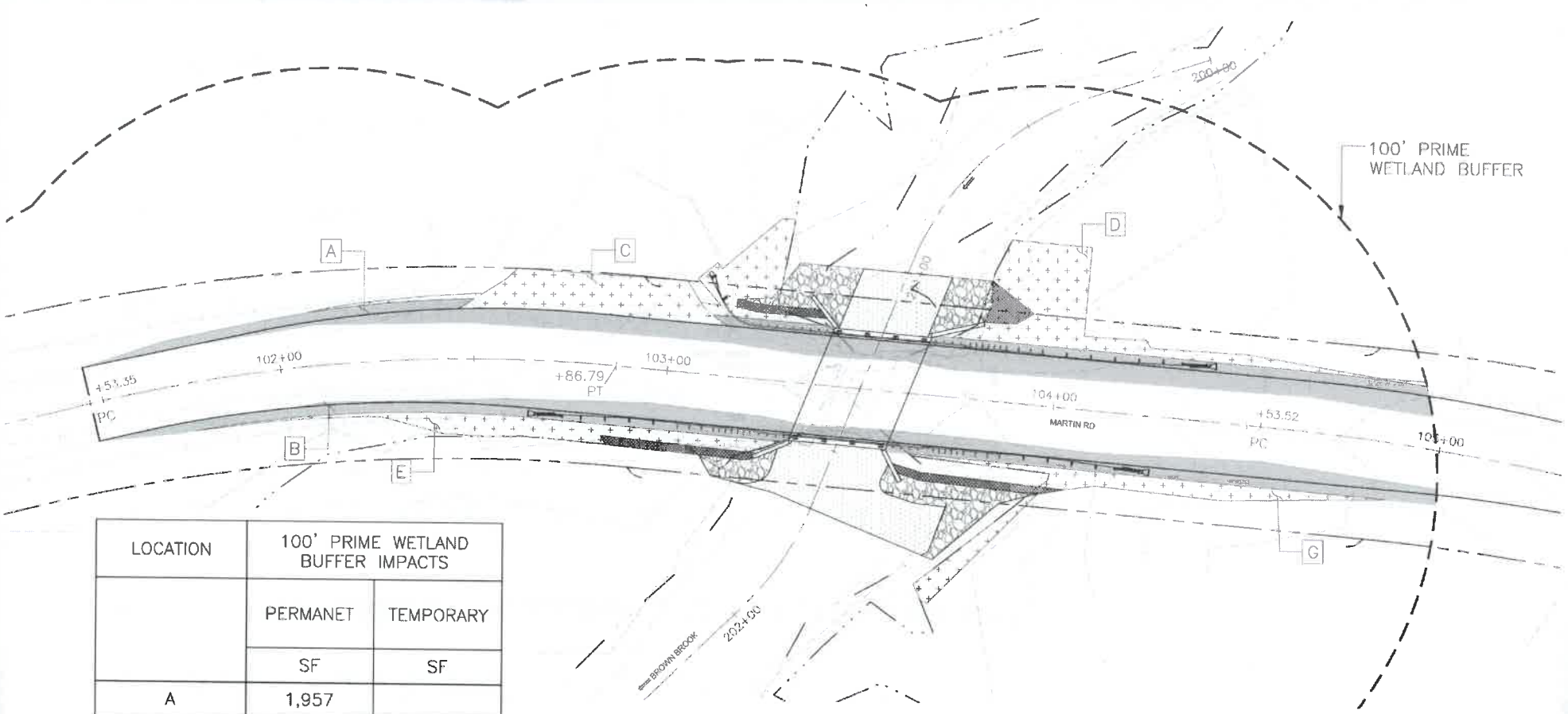
WETLAND CLASSIFICATION CODES	
PEM	PALUSTRINE EMERGENT
PEM-PW	PALUSTRINE EMERGENT – PRIME WETLAND
R2UB3	PERENIAL STREAM – BROWN BROOK

PROJECT IMPACT SUMMARY		
STREAM IMPACTS:	2,651 SF	(TEMPORARY & PERMANENT)
WETLAND IMPACTS:	710 SF	(TEMPORARY & PERMANENT)
PRIME WETLAND IMPACTS:	795 SF	(TEMPORARY & PERMANENT)
100' PRIME WETLAND BUFFER IMPACTS:	6,322 SF	(TEMPORARY & PERMANENT)
TOTAL IMPACTS:	10,478 SF	(TEMPORARY & PERMANENT)

WETLAND CLASSIFICATION	LOCATION	AREA							COMMENTS
		PERMANENT IMPACTS				TEMPORARY IMPACTS			
		N.H.W.B. (NON-WETLAND)	N.H.W.B. & A.C.O.E. (WETLAND)	BANK	CHANNEL	PERENNIAL STREAM/ RIVER		N.H.W.B. & A.C.O.E. (WETLAND)	
		SF	SF	LF	LF	SF	LF	SF	
R2UB3	A		1,858	129	66				
R2UB3	B					281	12		
R2UB3	C					512	11		
PEM	D		129						
PEM	E		182						
PEM-PW	F		25						
PEM-PW	G		74						
PEM-PW	H		349						
PEM	I							199	
PEM	J							200	
PEM-PW	K							205	
PEM-PW	L							142	
TOTAL			2,617	129	66	793	23	746	

New Hampshire DOT Department of Transportation

100' Prime Wetland Buffer Impact Summary



LOCATION	100' PRIME WETLAND BUFFER IMPACTS	
	PERMANET	TEMPORARY
	SF	SF
A	1,957	
B	1,548	
C		997
D		847
E		498
G		475
TOTAL:	3,505	2,817

New Hampshire DOT
Department of Transportation

Mitigation

- Culvert sizing based on 1.2 x bankfull width + 2' equal to 22 feet which is an increase in width of greater than 200%
- Preserves natural alignment of stream channel
- Increases opening by 2.1 times from existing
  - Benefits aquatic passage
  - Enhances stream conductivity and sediment transport
  - Minimizes potential for inlet obstructions
- Will provide simulated stream bottom material
- Does not restrict high flows and maintains low flows
- Will pass 100-year storm for Brown Brook with more than 1' of freeboard
- Reduces upstream 100-year floodplain elevation by approximately 1.5'

New Hampshire DOT Department of Transportation

Mitigation

- 100-year flood volume storage increased by approximately 200 CF
- Maintains approximately 2' depth of water through opening under normal flow conditions to promote aquatic passage upstream and downstream
- Design intent to not cause erosion, aggregation, or scouring upstream or downstream of the crossing or water quality degradation
- Alternative Design Report will be provided for the project
- Impacts to prime wetland and 100' buffer minimized to the extent practicable
  - Waiver will be requested for impacts to the prime wetland and 100' buffer

New Hampshire DOT Department of Transportation

US Army Corps of Engineers®
New England District

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

USACE Section 404 Checklist

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

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See the following to determine if there is an impaired water in the vicinity of your work area. * https://nhdes-surface-water-quality-assessment-site-nhdes.hub.arcgis.com/ https://www.des.nh.gov/water/rivers-and-lakes/water-quality-assessment https://www4.des.state.nh.us/onestopdatamapper/onestopmapper.aspx	X	
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	X	
2.2 Are there proposed impacts to tidal SAS, prime wetlands, or priority resource areas? Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) DataCheck Tool for information about resources located on the property at https://www4.des.state.nh.us/NHB-DataCheck/.	X	
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	X	
2.4 Would the project remove part or all of a riparian buffer? (Riparian buffers are lands adjacent to streams where vegetation is strongly influenced by the presence of water. They are often thin lines of vegetation containing native grasses, flowers, shrubs and/or trees that line the stream banks. They are also called vegetated buffer zones.)	X	
2.5 The overall project site is more than 40 acres?		X
2.6 What is the area of the previously filled wetlands?	UNKNOWN	
2.7 What is the area of the proposed fill in wetlands?	10,500 SF	
2.8 What % of the overall project site will be previously and proposed filled wetlands?	10%	
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.

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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.: Town of Fremont		
PROJECT STREET ADDRESS: Martin Road over Brown Brook	PROJECT TOWN: Fremont	
TAX MAP/LOT NUMBER: Map 6 - Lots 34 &35		
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 proposed project is the replacement of the NHDOT red listed 1930 Martins Road Bridge over Brown Brook with a new 22'W x 7'H x 30'L concrete box culvert bridge. The work will include roadway widening for the approaches to the new bridge and includes installation of guardrails for safety and temporary impacts during construction. Brown Brook is a tier 3 stream with a 100-year flood plain and associated wetlands. The downstream stream and wetlands are prime wetlands (Wetland #5) and have a 100-ft buffer. During construction, Martin Road will be closed to expedite the construction. Under the project a total 10,478 SF of Stream, Wetlands, Prime Wetlands and 100-ft Buffer will be impacted with 6,122 SF being permanent impact and 4,356 SF being temporary impact during construction. The bridge replacement design minimizes the impacts to the wetland resources to the extent practical. Additional project details can be found in the attached wetland permit application package.

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

Map by NH GRANIT

Legend

Parcels
- Parcel Polygons
- Attributes for Additional Lines

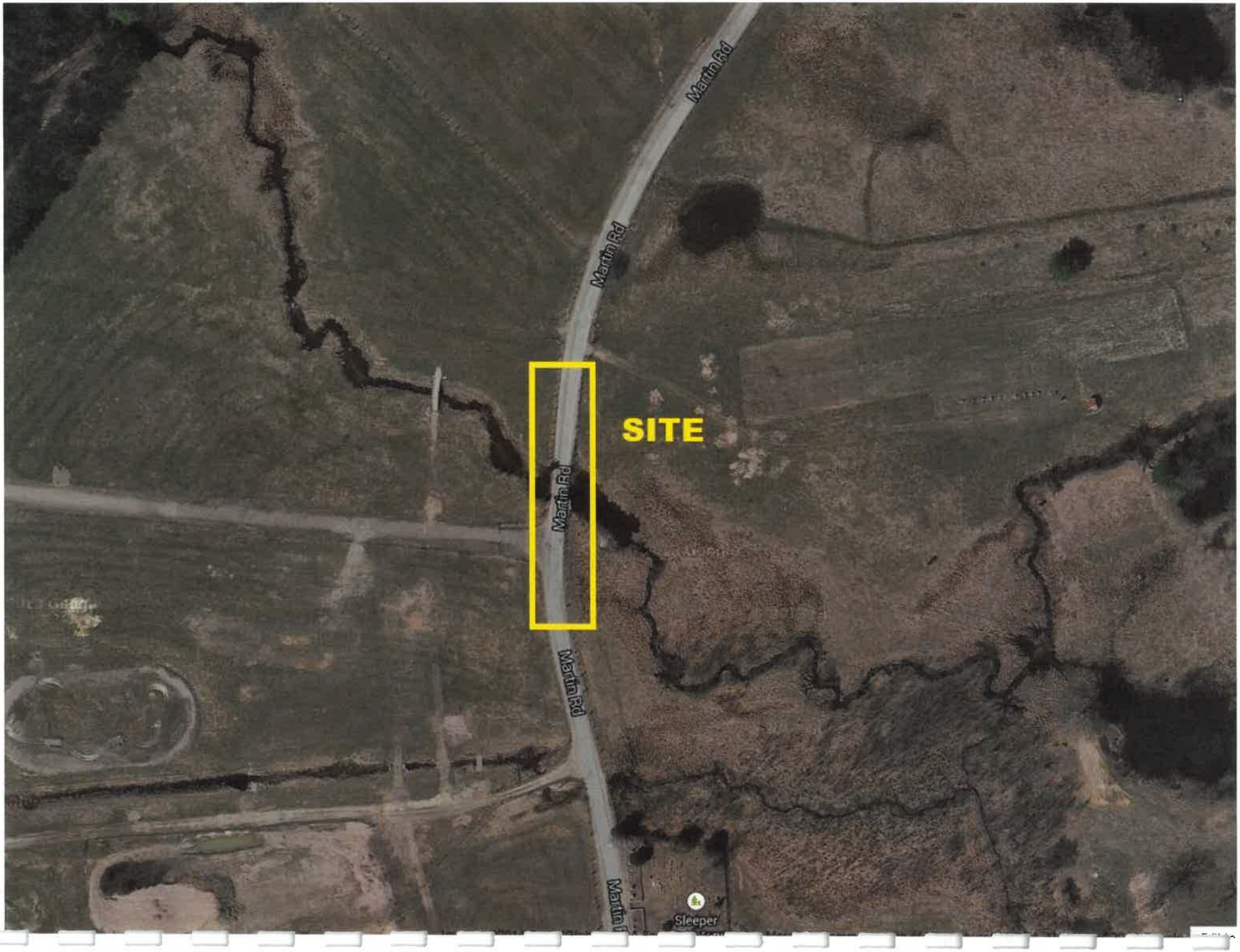
State
County
City/Town

Map Scale
1: 5,000

Map Generated: 3/3/2023

Notes

Martin Road Bridge over Brown Brook


Martin Rd
Martin Rd
SITE
Martin Rd
Martin Rd
Sleeper

Stantec Consulting Services Inc.
5 Dartmouth Drive, Suite 200, Auburn NH 03032

April 17, 2023
File: 195112878

Brenda Barthelemy, Rev Tr
Scott Barthelemy, Rev Tr
154 Martin Road
Fremont, NH 03044

Re: NHDES Wetland Permit Application for
Martin Road over Brown Brook Bridge Replacement
Bridge No. 155/133 located in Fremont, New Hampshire
Applicant: Town of Fremont

Dear Abutter:

This letter is to inform you that the Town of Fremont, Applicant of the above referenced project, will be applying to the New Hampshire Wetlands Bureau for a Wetlands Permit for temporary and permanent impacts to the wetlands for a bridge replacement along Martin Road over Brown Brook. The application is to replace the Martin Rd bridge over Brown Brook, a tier 3 stream with flood plain wetlands located up and downstream of the bridge. The downstream wetland (Wetland 5) associated with Brown Brook is a designated Prime Wetlands and includes a 100-foot buffer. The existing bridge was built in 1930 with a skewed opening at 12'-3" at the inlet and 10'-2" at the outlet. The existing bridge (No.155/133) is on the State's Municipal Red List due to the poor condition of the deck and substructure with a load posting of 15 tons. The project engineering study identified the preferred alternative as a new 22 ft wide x 7 ft high precast concrete box culvert with wingwalls on concrete spread footings and stone fill armoring and stream simulation gravel to provide a simulated channel bottom. Construction procedures will include a road closure with a detour to allow for shorter project duration. The project proposes temporary impacts for the proposed erosion control measures and temporary bypass measures needed during construction. The design will impact a total of 10,478 SF of stream, wetlands, prime wetlands, and 100-ft buffer will be impacted. Permanent impacts total to 6,122 for the stream, wetlands, and prime wetland & buffer. Temporary impacts total to 4,356 SF. The Town has acquired a temporary construction easement on abutting lots 34 and 35 on tax map 6 to conduct the work. Under state law RSA 482-A:3 I (d)(1), it is required that you be notified about the application, which proposes work near your property.

Once the application has been submitted, copies of the applications and plans will be available at the New Hampshire Wetlands Bureau in Concord, New Hampshire and at the office of the Town Clerk at the Town of Fremont during normal business hours. Please call ahead to ensure the application is available for your review.

Please call or e-mail if you have any questions.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Michael Leach
Senior Associate
Cell: 603-203-3048
michael.leach@stantec.com

NHDES Wetland Permit Application for
Martin Road over Brown Brook Bridge Replacement
Bridge No. 155/133 located in Fremont, New Hampshire
Applicant: Town of Fremont

WRITTEN NOTIFICATION LIST FOR WETLANDS PERMIT

Map 6 Lots 32, 33, 34, 35, 36 and Brentwood Map 201 Lot 10
Brenda Barthelemy, Rev Tr
Scott Barthelemy, Rev Tr
154 Martin Road
Fremont, NH 03044

Map 6 Lot 37
Town of Fremont
295 Main Street
Fremont, NH 03044

Map 6 Lots 39 and 42
Emil J Plante Jr
286 North Road
Fremont, NH 03044

Map 6 Lot 40
David & Colleen E Bunnell
300 North Road
Fremont, NH 03044

Map 6 Lot 41
Schreiber Children's Family Rev Trust
Eric R Schreiber, Jason M Schreiber Jr Trustees
328 North Road
Fremont, NH 03044

Map 6 Lot 44-3
Gary J & Tanice A Cloutier
15 Martin Road
Fremont, NH 03044

Map 6 Lot 163
State of New Hampshire DRED
Po Box 1856
Concord, NH 03302-1856

7018 1830 0001 1855 7104

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Postage
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Total Postage and Fees
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Street and Apt. No., or PO Box
City, State, ZIP+4®

David & Colleen E Bunnell
300 North Road
Fremont, NH 03044

AUBURN, NH APR 17 2023 Postmark Here 03032-9998

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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City, State, ZIP+4®

Brenda Barthelemy, Rev Tr
Scott Barthelemy, Rev Tr
154 Martin Road
Fremont, NH 03044

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PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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- [ ] Adult Signature Restricted Delivery $

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City, State, ZIP+4®

Town of Fremont
295 Main Street
Fremont, NH 03044

AUBURN, NH APR 17 2023 Postmark Here 03032-9998

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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- [ ] Return Receipt (electronic) $
- [ ] Certified Mail Restricted Delivery $
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$

Total Postage and Fees
$

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Street and Apt. No., or PO Box No.
City, State, ZIP+4®

Emil J Plante Jr
286 North Road
Fremont, NH 03044

Postmark Here

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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- [ ] Return Receipt (electronic) $
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- [ ] Adult Signature Required $
- [ ] Adult Signature Restricted Delivery $

Postage
$

Total Postage and Fees
$

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Street and Apt. No.
City, State, ZIP+4®

State of New Hampshire DRED
PO Box 1856
Concord, NH 03302-1856

AUBURN NH
APR 17 2023
Postmark Here
03032-9998

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

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Extra Services & Fees (check box, add fee as appropriate)
- [x] Return Receipt (hardcopy) $
- [ ] Return Receipt (electronic) $
- [ ] Certified Mail Restricted Delivery $
- [ ] Adult Signature Required $
- [ ] Adult Signature Restricted Delivery $

Postage
$

Total Postage and Fees
$

Sent To
Street and Apt. No., or PO Box No.
City, State, ZIP+4®

Gary J & Tanice A Cloutier
15 Martin Road
Fremont, NH 03044

AUBURN NH
APR 17 2023
Postmark Here
03032-9998

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

7018 1830 0001 1855 7098

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Extra Services & Fees (check box, add fee as appropriate)
- [x] Return Receipt (hardcopy) $
- [ ] Return Receipt (electronic) $
- [ ] Certified Mail Restricted Delivery $
- [ ] Adult Signature Required $
- [ ] Adult Signature Restricted Delivery $

Postage
$

Total Postage and Fees
$

Sent To
Street and Apt.
City, State, Zip

Schreiber Children's Family Rev Trust
Eric R Schreiber, Jason M Schreiber Jr Trustees
328 North Road
Fremont, NH 03044

AUBURN NH
APR 17 2023
Postmark Here
03032-9998

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

NHDES Wetland Permit Application for
Martin Road over Brown Brook Bridge Replacement
Bridge No. 155/133 located in Fremont, New Hampshire
Applicant: Town of Fremont

Photo 1- Standing east and downstream of Martin Road bridge along the northerly side of Brown Brook and prime wetland area looking upstream (westerly) at the proposed impact area to replace the bridge. Taken December 3, 2021

Photo 2- Standing on the Martin Road bridge looking downstream (east) along Brown Brook and prime wetland area at the proposed impact area to replace the bridge. Taken December 3, 2021

NHDES Wetland Permit Application for
Martin Road over Brown Brook Bridge Replacement
Bridge No. 155/133 located in Fremont, New Hampshire
Applicant: Town of Fremont

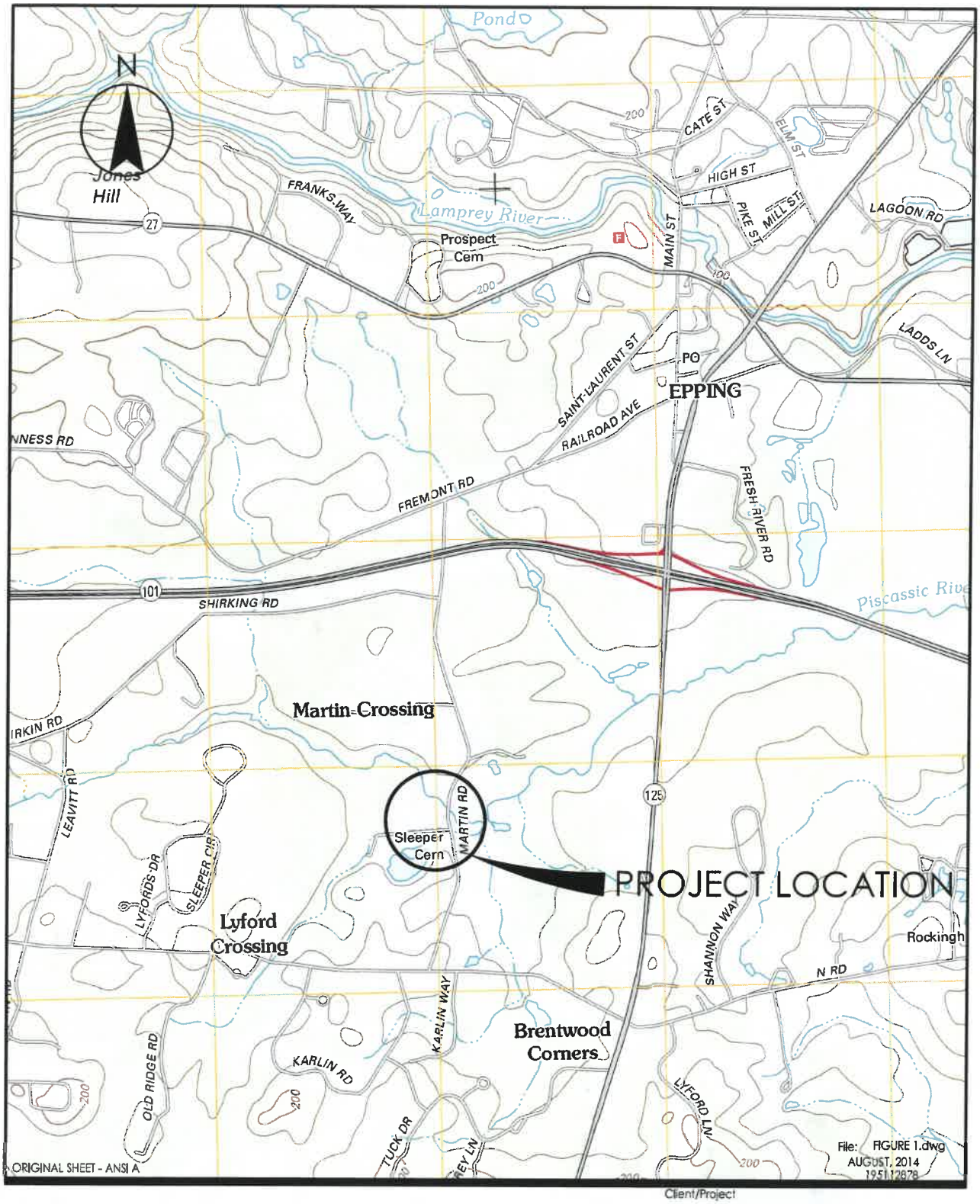
Photo 3- Standing on the Martin Road bridge looking upstream (northeasterly) along Brown Brook at the proposed impact area to replace the bridge. Taken December 3, 2021

Photo 4 - Standing upstream and northeast of Martin Road bridge looking downstream (southwesterly) along Brown Brook at the bridge and proposed impact area to replace the bridge. Taken December 3, 2021

NHDES Wetland Permit Application for
Martin Road over Brown Brook Bridge Replacement
Bridge No. 155/133 located in Fremont, New Hampshire
Applicant: Town of Fremont

Photo 5- Standing south of Martin Road bridge looking northerly along Martin Road at the bridge to be removed and 100-foot prime wetland buffer areas along the roadway edge to be impacted with the new bridge, roadway approach and guardrails. Taken December 3, 2021

Photo 6- Standing north of Martin Road bridge looking southerly along Martin Road at the bridge to be removed and 100-foot prime wetland buffer areas to be impacted along the roadway edge with the new bridge, roadway approach and guardrails. Taken December 3, 2021



Client/Project

TOWN OF FREMONT
MARTIN ROAD BRIDGE REPLACEMENT

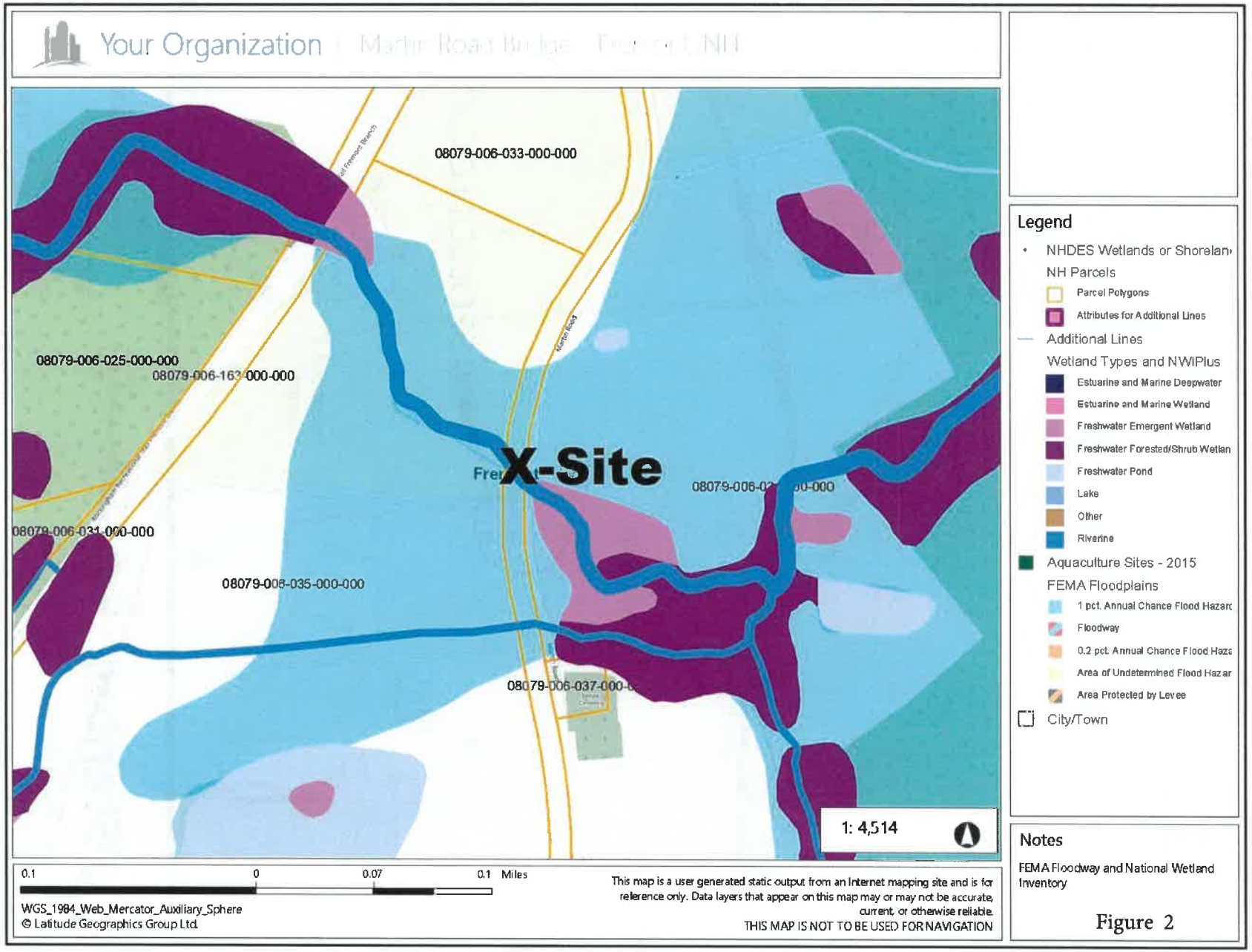
0 2000' 4000'

Figure No.
1.0

Title
SITE LOCATION PLAN

Stantec

Stantec Consulting Services Inc.
5 Dartmouth Drive, Suite 101
Auburn NH 03032 U.S.A.
Tel. 603.669.8672
Fax. 603.669.7636
www.stantec.com


Your Organization
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X-Site
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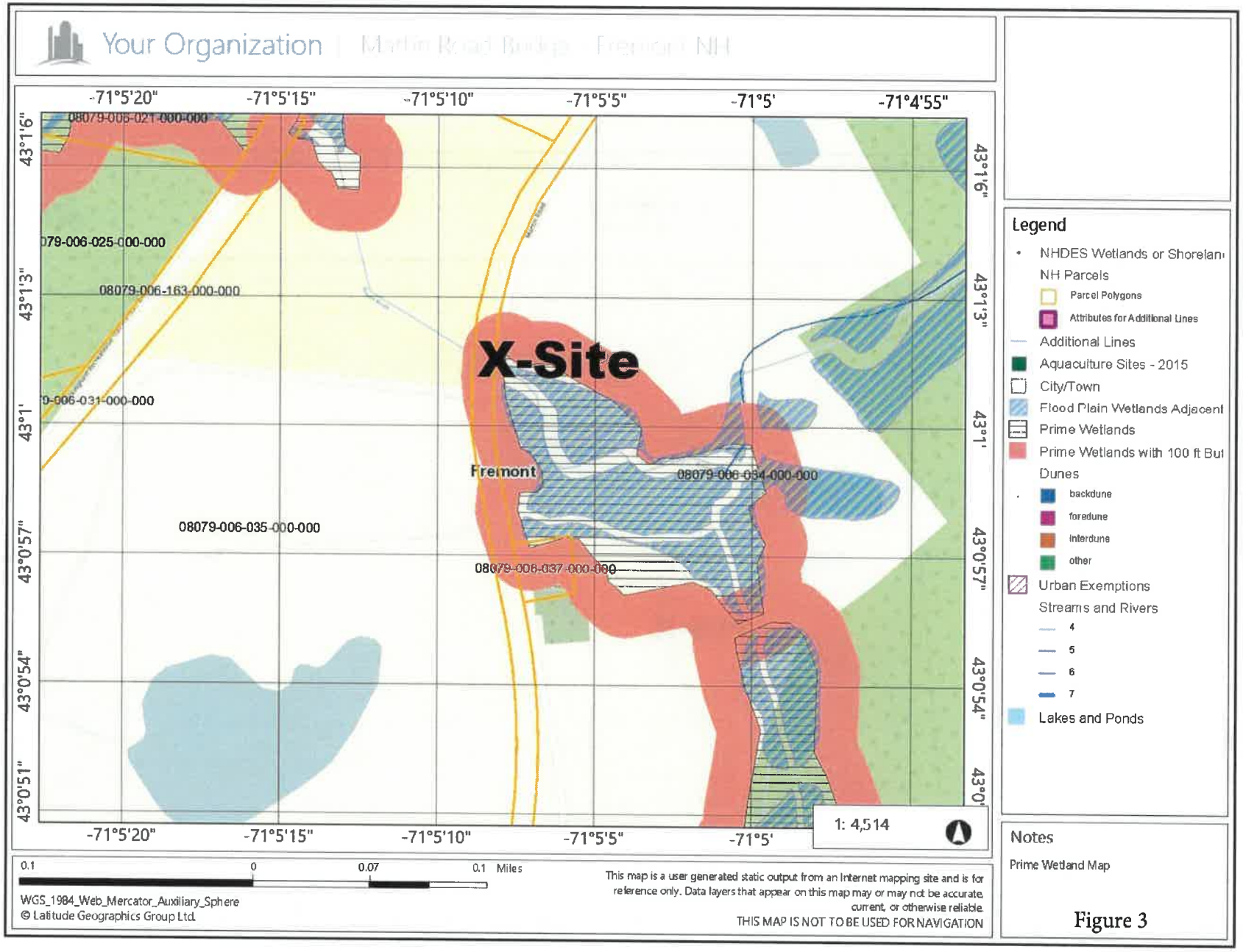
1: 4,514
Legend
NHDES Wetlands or Shorelan
NH Parcels
Parcel Polygons
Attributes for Additional Lines
Additional Lines
Wetland Types and NWIPlus
Estuarine and Marine Deepwater
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetlan
Freshwater Pond
Lake
Other
Riverine
Aquaculture Sites - 2015
FEMA Floodplains
1 pct. Annual Chance Flood Hazar
Floodway
0.2 pct. Annual Chance Flood Haza
Area of Undetermined Flood Hazar
Area Protected by Levee
City/Town
0.1 0 0.07 0.1 Miles
WGS_1984_Web_Mercator_Auxiliary_Sphere
© Latitude Geographics Group Ltd.
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
Notes
FEMA Floodway and National Wetland Inventory

Figure 2


Your Organization
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-71°5'15"
-71°5'10"
-71°5'5"
-71°5'
-71°4'55"
43°1'6"
43°1'3"
43°1'
43°0'57"
43°0'54"
43°0'51"
08079-006-021-000-000
079-006-025-000-000
08079-006-163-000-000
9-006-031-000-000
X-Site
Fremont
08079-006-034-000-000
08079-006-035-000-000
08079-006-037-000-000
1: 4,514
Legend
NHDES Wetlands or Shorelan
NH Parcels
Parcel Polygons
Attributes for Additional Lines
Additional Lines
Aquaculture Sites - 2015
City/Town
Flood Plain Wetlands Adjacent
Prime Wetlands
Prime Wetlands with 100 ft Bu
Dunes
backdune
foredune
interdune
other
Urban Exemptions
Streams and Rivers
4
5
6
7
Lakes and Ponds
Notes
Prime Wetland Map
0.1
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0.1 Miles
WGS_1984_Web_Mercator_Auxiliary_Sphere
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THIS MAP IS NOT TO BE USED FOR NAVIGATION

Figure 3

Fremont, NH

1 Inch = 400 Feet

April 11, 2014

Figure 4

www.cai-tech.com

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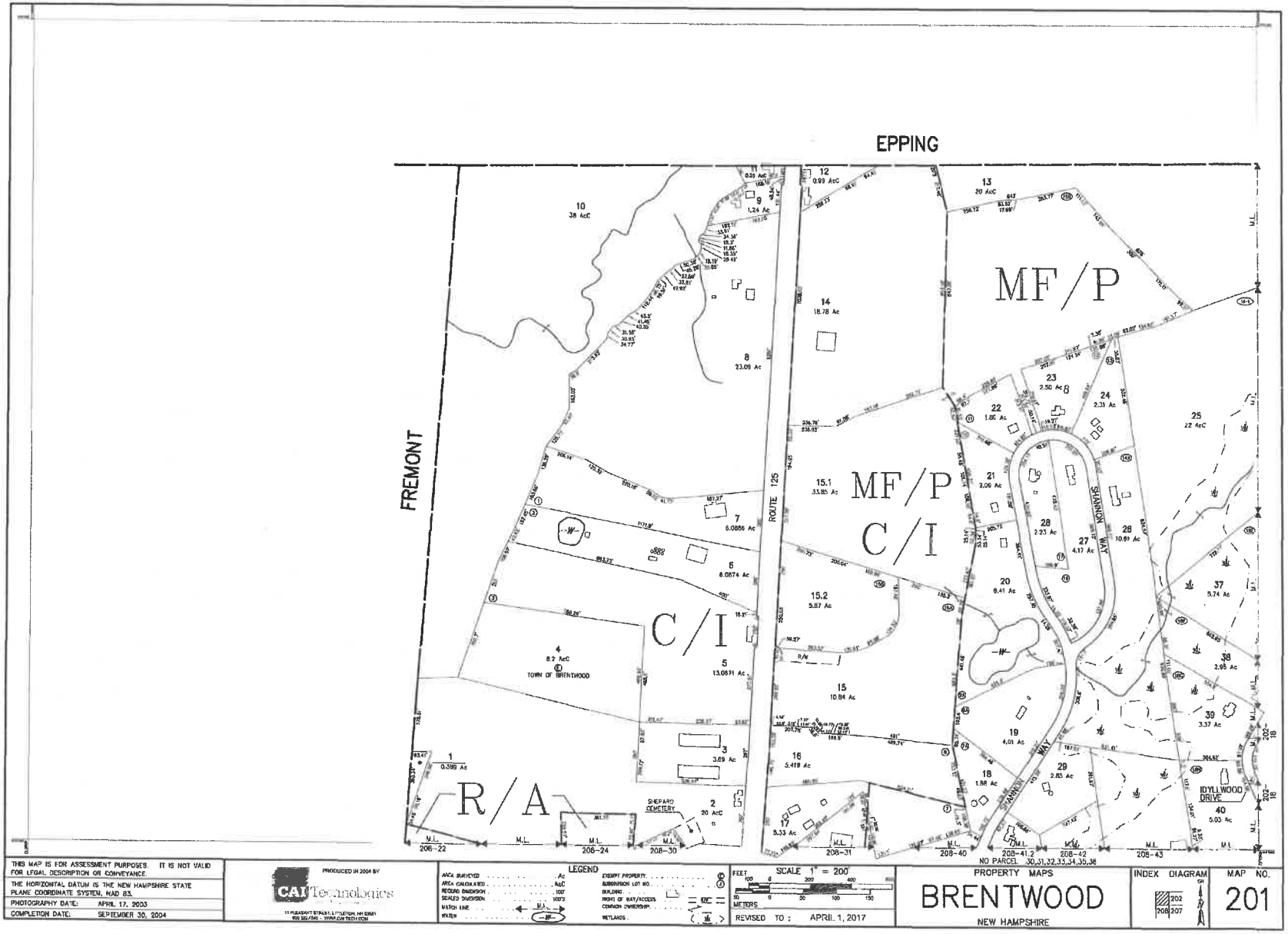

EPPING
FREMONT
ROUTE 125
MF/P
MF/P
C/I
C/I
R/A
SHANNON WAY
SHANNON WAY
IDYLLWOOD DRIVE
SHEPARD CEMETERY
TOWN OF BRENTWOOD
NO PARCEL 30,31,32,33,34,35,36
THIS MAP IS FOR ASSESSMENT PURPOSES. IT IS NOT VALID FOR LEGAL DESCRIPTION OR CONVEYANCE.
THE HORIZONTAL DATUM IS THE NEW HAMPSHIRE STATE PLANE COORDINATE SYSTEM, NAD 83.
PHOTOGRAPHY DATE: APRIL 17, 2003
COMPLETION DATE: SEPTEMBER 30, 2004
PRODUCED IN 2004 BY
CAI Technologies
LEGEND
SCALE 1" = 200'
PROPERTY MAPS
BRENTWOOD
NEW HAMPSHIRE
REVISED TO : APRIL 1, 2017
INDEX DIAGRAM
MAP NO.
201

Figure 5

Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

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

To: mike leach, Stantec Consulting Services, Inc.
5 Dartmouth Drive - Suite 200
auburn, NH 03032

From: NHB Review, NH Natural Heritage Bureau
Date: 12/20/2022 (valid until 12/20/2023)
Re: Review by NH Natural Heritage Bureau
Permits: NHDES - Wetland Standard Dredge & Fill - Major, USACE - General Permit

NHB ID: **NHB22-3844** Town: Fremont Location: Martin Road
Description: Proposed Martin Road over Brown Brook bridge replacement project that will impact a total of about 1,900 SF including temporary and permanent impacts to the existing wetlands, stream and stream banks. The bridge replacement is to address a NHDOT red list bridge with bidding and construction intended in 2023.
cc: NHFG Review

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

Comments **NHB: No comments at this time.**
F&G: Please refer to NHFG consultation requirements below. Could you clarify if this is a NHDOT job.

Vertebrate species	State[1]	Federal	Notes
American Eel (*Anguilla rostrata*)	SC	--	Contact the NH Fish & Game Dept (see below).
Blanding's Turtle (*Emydoidea blandingii*)	E	--	Contact the NH Fish & Game Dept (see below).

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

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

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

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

Exhibit A

Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

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

IMPORTANT: NHFG Consultation

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

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

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

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

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

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

Exhibit A

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: 2023-0040256
Project Name: Fremont 23793 - Martin Road over Brown Brook

January 31, 2023

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:

Updated 12/27/2022 - Please review this letter each time you request an Official Species List, we will continue to update it with additional information and links to websites may change.

About Official Species Lists

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

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

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

Endangered Species Act Project Review

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

Exhibit B

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

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

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

Northern Long-eared Bat - (Updated 12/27/2022) Please visit our New England Field Office Project Review webpage at the link above for updated northern long-eared bat consultation guidance. The Service published a final rule to reclassify the northern long-eared bat (NLEB) as endangered on November 30, 2022. The final rule will go into effect on **January 30, 2023**. After that date, the current 4(d) rule for NLEB will no longer be in effect, and the 4(d) determination key will no longer be available. New compliance tools will be available by mid- to late-January, and information will be posted on our New England Field Office Project Review webpage in January, so please check this site often for updates.
Depending on the type of effects a project has on NLEB, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective. If your project may result in incidental take of NLEB after the new listing goes into effect, this will need to be addressed in an updated consultation that includes an Incidental Take Statement. Many of these situations will be addressed through the new compliance tools. If your project may require re-initiation of consultation, please wait for information on the new tools to appear on our website or contact our office at **newengland@fws.gov** for additional guidance.

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

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

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

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

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

Migratory Birds

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

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

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

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

Attachment(s): Official Species List

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

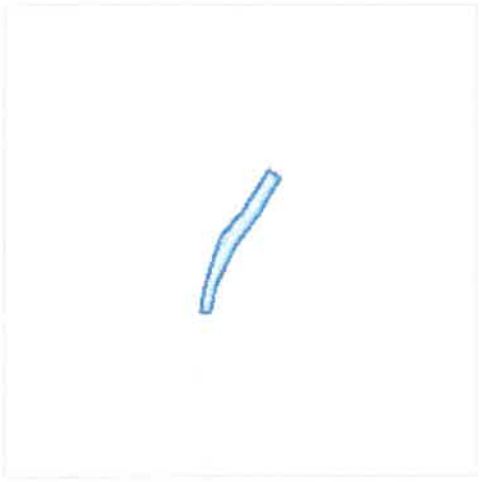
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Project Code: 2023-0040256
Project Name: Fremont 23793 - Martin Road over Brown Brook
Project Type: Bridge - Replacement
Project Description: Culvert Replacement Project at Martin Road over Brown Brook in Fremont NH. The project proposed to replace the existing NHDOT Red Listed 1930 bridge with a wider and longer buried box culvert at the same location.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.01819365,-71.08519342411333,14z



Counties: Rockingham County, New Hampshire

Endangered Species Act Species

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

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

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

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

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

Mammals

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

Insects

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

Critical habitats

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

IPaC User Contact Information

Agency: Auburn town
Name: mike leach
Address: 5 Dartmouth Drive - Suite 200
City: Auburn
State: NH
Zip: 03032
Email michael.leach@stantec.com
Phone: 6032067538

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: 2023-0040256
Project Name: Fremont 23793 - Martin Road over Brown Brook

January 31, 2023

Subject: Verification letter for the 'Fremont 23793 - Martin Road over Brown Brook' project under the January 5, 2016, Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-eared Bat and Activities Excepted from Take Prohibitions.

Dear mike leach:

The U.S. Fish and Wildlife Service (Service) received on January 31, 2023 your effects determination for the 'Fremont 23793 - Martin Road over Brown Brook' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. This IPaC key assists users in determining whether a Federal action is consistent with the activities analyzed in the Service's January 5, 2016, Programmatic Biological Opinion (PBO). The PBO addresses activities excepted from "take"[1] prohibitions applicable to the northern long-eared bat under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, the Action is consistent with activities analyzed in the PBO. The Action may affect the northern long-eared bat; however, any take that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the PBO satisfies and concludes your responsibilities for this Action under ESA Section 7(a)(2) with respect to the northern long-eared bat.

Additionally, please note that on March 23, 2022, the Service published a proposal to reclassify the northern long-eared bat (NLEB) as endangered under the Endangered Species Act. The U.S. District Court for the District of Columbia has ordered the Service to complete a new final listing determination for the NLEB by November 2022 (Case 1:15-cv-00477, March 1, 2021). The bat, currently listed as threatened, faces extinction due to the range-wide impacts of white-nose syndrome (WNS), a deadly fungal disease affecting cave-dwelling bats across the continent. The proposed reclassification, if finalized, would remove the current 4(d) rule for the NLEB, as these rules may be applied only to threatened species. Depending on the type of effects a project has on NLEB, the change in the species' status may trigger the need to re-initiate consultation for any

actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective (anticipated to occur by December 30, 2022). If your project may result in incidental take of NLEB after the new listing goes into effect this will first need to be addressed in an updated consultation that includes an Incidental Take Statement. If your project may require re-initiation of consultation, please contact our office for additional guidance.

Please report to our office any changes to the information about the Action that you submitted in IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation. If the Action is not completed within one year of the date of this letter, you must update and resubmit the information required in the IPaC key.

This IPaC-assisted determination allows you to rely on the PBO for compliance with ESA Section 7(a)(2) only for the northern long-eared bat. It **does not** apply to the following ESA-protected species that also may occur in the Action area:

- Monarch Butterfly *Danaus plexippus* Candidate

If the Action may affect other federally listed species besides the northern long-eared bat, a proposed species, and/or designated critical habitat, additional consultation between you and this Service office is required. If the Action may disturb bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act is recommended.

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

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

1. Name

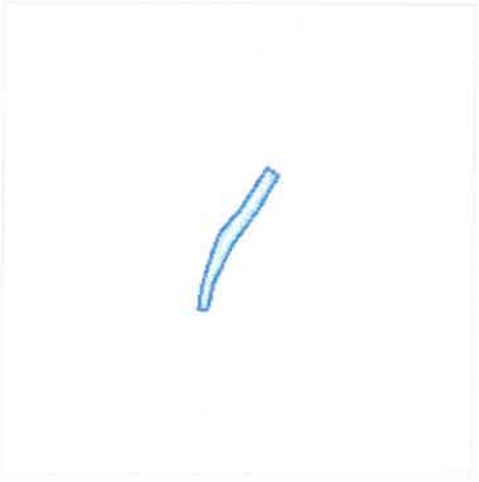
Fremont 23793 - Martin Road over Brown Brook

2. Description

The following description was provided for the project 'Fremont 23793 - Martin Road over Brown Brook':

> Culvert Replacement Project at Martin Road over Brown Brook in Fremont NH. The project proposed to replace the existing NHDOT Red Listed 1930 bridge with a wider and longer buried box culvert at the same location.

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.01819365,-71.08519342411333,14z



Determination Key Result

This Federal Action may affect the northern long-eared bat in a manner consistent with the description of activities addressed by the Service's PBO dated January 5, 2016. Any taking that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o). Therefore, the PBO satisfies your responsibilities for this Action under ESA Section 7(a)(2) relative to the northern long-eared bat.

Determination Key Description: Northern Long-eared Bat 4(d) Rule

This key was last updated in IPaC on May 15, 2017. Keys are subject to periodic revision.

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

The purpose of the key for Federal actions is to assist determinations as to whether proposed actions are consistent with those analyzed in the Service's PBO dated January 5, 2016.

Federal actions that may cause prohibited take of northern long-eared bats, affect ESA-listed species other than the northern long-eared bat, or affect any designated critical habitat, require ESA Section 7(a)(2) consultation in addition to the use of this key. Federal actions that may affect species proposed for listing or critical habitat proposed for designation may require a conference under ESA Section 7(a)(4).

Determination Key Result

This project may affect the threatened Northern long-eared bat; therefore, consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.) is required. However, based on the information you provided, this project may rely on the Service's January 5, 2016, *Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions* to fulfill its Section 7(a)(2) consultation obligation.

Qualification Interview

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

   Yes

2. Have you determined that the proposed action will have "no effect" on the northern long-eared bat? (If you are unsure select "No")

   No

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

   No

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

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

   Yes

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

   No

6. Will the action involve Tree Removal?

   No

Project Questionnaire

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

1. Estimated total acres of forest conversion:

0

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

0

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

0

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

4. Estimated total acres of timber harvest

0

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

0

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

0

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

7. Estimated total acres of prescribed fire

0

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

0

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

0

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

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

0

IPaC User Contact Information

Agency: Auburn town
Name: mike leach
Address: 5 Dartmouth Drive - Suite 200
City: Auburn
State: NH
Zip: 03032
Email michael.leach@stantec.com
Phone: 6032067538

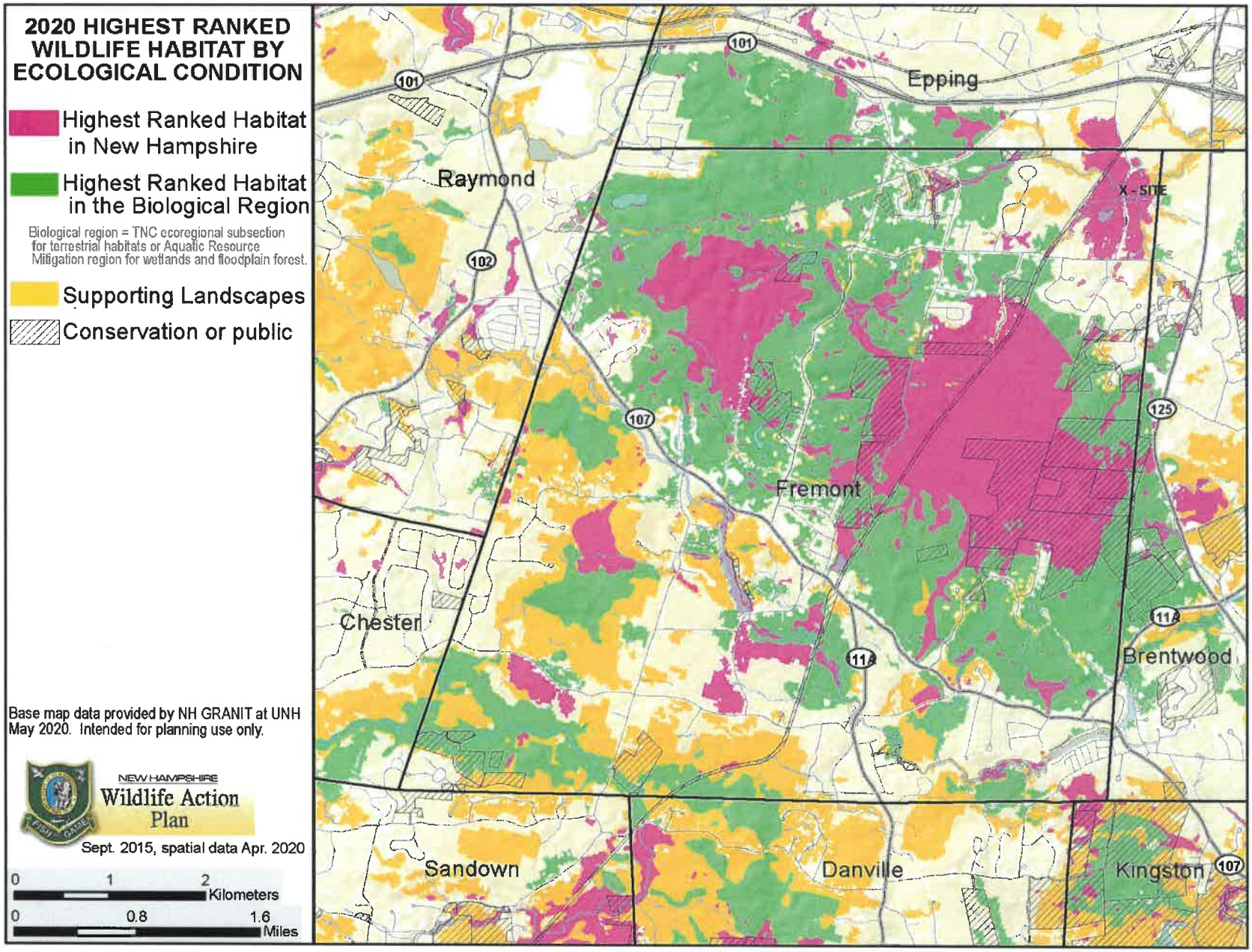

2020 HIGHEST RANKED WILDLIFE HABITAT BY ECOLOGICAL CONDITION
Highest Ranked Habitat in New Hampshire
Highest Ranked Habitat in the Biological Region
Biological region = TNC ecoregional subsection for terrestrial habitats or Aquatic Resource Mitigation region for wetlands and floodplain forest.
Supporting Landscapes
Conservation or public
Base map data provided by NH GRANIT at UNH May 2020. Intended for planning use only.
NEW HAMPSHIRE Wildlife Action Plan
Sept. 2015, spatial data Apr. 2020
0 1 2 Kilometers
0 0.8 1.6 Miles
Epping
Raymond
Fremont
Chester
Brentwood
Sandown
Danville
Kingston
X - SITE
101
102
107
125
111

Exhibit C

Stantec Consulting Services Inc.
30 Park Drive, Topsham, ME 04086-1737

July 19, 2022
File: 195112878

Attention: Heidi Carlson, Town Administrator
Town of Fremont
295 Main Street
Fremont, NH 03044

Reference: Wetland and Watercourse Delineation and Wetland Functional Assessment, Piscassic River, Martin Road, Shelburne, New Hampshire

On December 3, 2021, Stantec Consulting Services Inc. (Stantec) conducted a wetland and watercourse delineation at a proposed bridge replacement location on Martin Road in Fremont, New Hampshire. Martin Road crosses the Piscassic River (also known as Brown Brook) over an existing bridge that is proposed to be replaced. The wetland and watercourse delineations were performed to supplement the required New Hampshire Department of Environmental Services (NHDES) permit application to replace the bridge. The delineation was performed by Tom Tetreau, New Hampshire Certified Wetland Scientist #283.

Wetland boundaries under local, state, and federal jurisdiction were determined using the technical criteria described in the *Corps of Engineers Wetlands Delineation Manual*[1] and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Regional Supplement*[2]. Wetland boundaries were located using a Global Positioning System (GPS) receiver capable of submeter accuracy. Wetland boundaries were not flagged because it is an active livestock pasture. Jurisdictional determinations made during the wetland delineations were based on the criteria set forth in the NHDES Wetlands Bureau Administrative Rules. Watercourses (e.g., streams) identified during the delineations were identified based on the definitions in NHDES Certified Administrative Rules Env-Wt. 406 as well as the technical guidance available from the U.S. Army Corps of Engineers (Corps) on the identification of an Ordinary High Water Mark (OHWM)[3] and definition of a tributary as described in the Clean Water Act[4]. Data was collected on flow regime, top of bank and OHWM widths, dominant substrates, and evidence of biological use. GPS data were used to produce the attached Figure 1 (Attachment A). Representative site photographs and Corps Wetland Determination Forms are provided at the end of the report in Attachments B and C, respectively.

Stantec also performed a wetland functional assessment of the delineated wetland and stream in accordance with New Hampshire Wetland Rules (Env-Wt. 311.10). The Wetland Functional Assessment Worksheet and required wildlife and vegetation list is included in Attachment D.

SITE DESCRIPTION

Stantec surveyed the area within approximately 150 feet of either side of the stream, including approximately 250 feet upstream and downstream of Martin Road. The survey area is primarily active

[1] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS.
[2] 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, and C. V. Noble. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
[3] U.S. Army Corps of Engineers. 2005. Regulatory Guidance Letter: Ordinary High Water Mark Identification. December 8, 2005. No. 05-05.
[4] U.S. Army Corps of Engineers. 2015. 33 Code of Federal Regulations, Part 328, "Waters of the United States". June 29, 2015.

Exhibit D

livestock pasture and devoid of trees. The upland pasture areas consist of typical field grasses and other herbaceous vegetation that are browsed by livestock to near ground level.

The U.S. Department of Agriculture Soil Survey of Rockingham County, NH[5], has mapped two primary soil types in this area: Squamscott fine sandy loam (poorly drained) is associated with the areas immediately around the Piscassic River and Eldridge fine sandy loam (moderately well drained) in the surrounding pasture areas. and Cohas loam (poorly drained).

WETLAND AND WATERCOURSE DELINEATION RESULTS

Stantec identified two wetlands and one stream within the survey area. Wetland delineations occurred outside of the appropriate vernal pool amphibian breeding season (typically April–May), but no features were identified that might be considered vernal pools based on the New Hampshire Fish and Game protocols in *Identification and Documentation of Vernal Pools in New Hampshire*[6].

Stream S-01TT is the Piscassic River, a perennial stream that flows northwest to southeast through the survey area and across Martin Road. The stream turns north outside the survey area and continues to flow northeast towards Route 101. The streams banks are altered in many locations by the livestock that cross and wade in the stream. In general, the top of bank is defined by an abrupt break in slope and vegetation. The stream gradient is relatively flat and the OHWM is essentially the same width as the top of bank throughout the survey area, approximately 10-15 feet. Areas immediately upstream and downstream of the existing bridge/road are widest (approximately 20-30 feet) and most heavily impacted by the livestock. Substrate within the stream channel consists of silt/muck, sand, and some cobbles.

Wetland W-01TTA is a primarily palustrine emergent (PEM)[7] community located east of Martin Road, bordering stream S-01TT. Some palustrine scrub-shrub (PSS) areas are present along the edges of the stream near the eastern edge of the survey area. No trees are present within the wetland, and it is bordered by upland pasture. Dominant shrubs species along the stream include speckled alder (*Alnus incana*), pussy willow (*Salix discolor*), and broad-leaf meadowsweet (*Spiraea latifolia*). Dominant herbaceous vegetation includes uptight sedge (*Carex stricta*), cottongrass bulrush (*Scirpus cyperinus*), lamp rush (*Juncus effusus*), reed canary grass (*Phalaris arundinacea*), and bluejoint (*Calamagrostis canadensis*). Hydric soils were indicated by a dark, mucky surface layer underlain by a layer with a depleted matrix with redoximorphic concentrations. Hydrology indicators present at the time of the delineation include saturation at the soil surface, a high water table, and some areas of shallow surface water.

Wetland W-01TTA is designated as a Prime Wetland with an associated 100-foot buffer on the NHDES Wetlands Permit Planning Tool[8]. Wetland W-01TTA is a floodplain wetland contiguous to a tier 3 or higher watercourse and would also be considered a Priority Resource Area (PRA) under Env-Wt. 103.66.

Wetland W-01TTB is a palustrine emergent (PEM) community located west of Martin Road, bordering stream S-01TT. No trees or shrubs are present within the wetland, and it is bordered by upland pasture.

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[5] Web Soil Survey, Natural Resources Conservation Service, United States Department of Agriculture. Available at: http://websoilsurvey.nrcs.usda.gov/ [accessed December 2021].
[6] New Hampshire Fish and Game Department. Third Edition, 2016. Identification and Documentation of Vernal Pools in New Hampshire.
[7] Wetland classifications based on: Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Office of Biological Services, U.S. Fish and Wildlife Service. FWS/OBS-79/31.
[8] Wetlands Permit Planning Tool, New Hampshire Department of Environmental Services. Available at: https://nhdeswppt.unh.edu/Html5Viewer/index.html?viewer=WPPT.gvh [Accessed December 2021]

Reference: **Wetland and Watercourse Delineation and Wetland Functional Assessment, Piscassic River, Martin Road, Shelburne, New Hampshire**

Dominant herbaceous vegetation includes uptight sedge (*Carex stricta*), cottongrass bulrush (*Scirpus cyperinus*), lamp rush (*Juncus effusus*), reed canary grass (*Phalaris arundinacea*), and bluejoint (*Calamagrostis canadensis*). Hydric soils were indicated by a dark, mucky surface layer underlain by a layer with a depleted matrix with redoximorphic concentrations. Hydrology indicators present at the time of the delineation include saturation at the soil surface, a high water table, and some areas of shallow surface water.
Wetland W-01TTB is a floodplain wetland contiguous to a tier 3 or higher watercourse and would be considered a PRA under Env-Wt. 103.66.

WETLAND FUNCTIONAL ASSESSMENT

On December 3, 2021, Stantec performed a wetland functional assessment at wetland W-01TTA, wetland W01TTB, and stream S-01TT to support future NHDES permit applications for the replacement road crossing.

Wetland and stream functions and values were evaluated through direct field observation and a review of existing public data resources following the Corps *Highway Methodology Workbook Supplement*[9] and the New Hampshire Method for evaluating the Ecological Integrity of the wetland and stream (RSA 482-A:2, XI). The Wetland Functional Assessment Worksheet and required wildlife and vegetation list is included in Attachment D. The required wetland delineation plans, and photographs are included in Attachments A and B, respectively. Flood storage, groundwater recharge, nutrient trapping/retention & transformation, sediment trapping, and shoreline anchoring were determined to be the principal functions of wetlands W-01TTA and W-01TTB and stream S-01TT.

Please contact me if you have any questions about the information contained in this report.

Regards,

Stantec Consulting Services Inc.

Tom Tetreau PWS, NHCWS #283, CPESC
Project Scientist
Phone: 207 504 7231
thomas.tetreau@stantec.com

Attachment: Attachment A – Figure 1
Attachment B – Representative Photographs
Attachment C – Corps Wetland Determination Data Forms
Attachment D – Wetland Functional Assessment

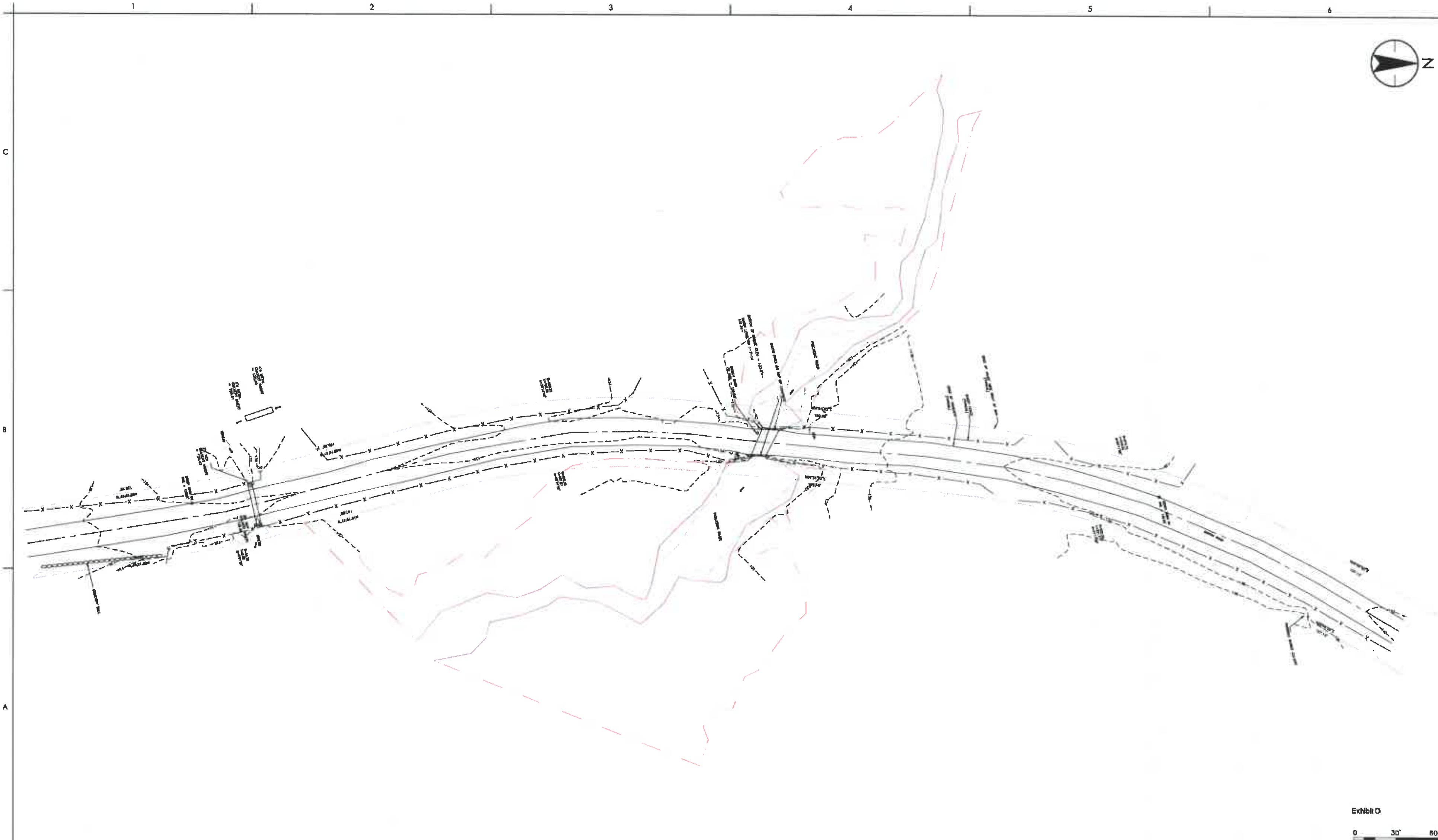
[9] U.S. Army Corps of Engineers. 1999. The Highway Methodology Workbook Supplement, Wetland Functions and Values: A Descriptive Approach. U.S. Army Corps of Engineers. New England Division. 32pp. NAEEP-360-1-30a.

July 19, 2022

Heidi Carlson, Town Administrator

Reference: **Wetland and Watercourse Delineation and Wetland Functional Assessment, Piscassic River, Martin Road, Shelburne, New Hampshire**

ATTACHMENT A – FIGURE 1



Revision | By | Appd | YYYY.MM.DD

Issued | By | Appd | YYYY.MM.DD

Permit/Seal

PRELIMINARY NOT FOR CONSTRUCTION

Not for permits, pricing or other official purposes. This document has not been completed or checked and is for general information or comment only.

Consultant

Stantec

None
None
None None None
Tel: None
www.stantec.com

Client/Project Logo

Client/Project
TOWN OF FREMONT

MARTIN RD BRIDGE REPLACEMENT

Fremont, New Hampshire

AJG | - | - | 2022-01-19
Dwn. | Dsgn. | Chkd. | YYYY.MM.DD

Title
WETLAND DELINEATION

Project No. 195112878
Scale AS NOTED
Revision 0
Sheet 1 of 1
Drawing No. **FIG-1**

July 19, 2022
Heidi Carlson, Town Administrator
Attachment

Reference: **Wetland and Watercourse Delineation and Wetland Functional Assessment, Piscassic River, Martin Road, Shelburne, New Hampshire**

ATTACHMENT B – REPRESENTATIVE PHOTOGRAPHS

Exhibit D

July 19, 2022

Heidi Carlson, Town Administrator

Reference: **Wetland and Watercourse Delineation and Wetland Functional Assessment, Piscassic River, Martin Road, Shelburne, New Hampshire**

Photo 1: View downstream (southeast) of stream S-01TT, Piscassic River, from Martin Road. Stantec, December 3, 2021.

Photo 2: View upstream (northwest) of stream S-01TT, Piscassic River, from Martin Road. Stantec, December 3, 2021.

Photo 3: Wetland W-01TTA on the north side of stream S-01TT. Stantec, December 3, 2021.

Photo 4: Upper, northwestern portion of wetland W-01TTB. Stantec, December 3, 2021.

Photo 5: View downstream along stream S-01TT and wetland W-01TTB (southeast), back towards the Martin Road bridge. Stantec, December 3, 2021.

Photo 6: View upstream along stream S-01TT and wetland W-01TTA (northwest), towards the Martin Road bridge. Stantec, December 3, 2021.

Exhibit D

Photo 7: View south over the Martin Road bridge.
Stantec, December 3, 2021.

Photo 8: Upstream (west) side of the Martin Road Bridge. Stantec, December 3, 2021.

Exhibit D

July 19, 2022
Heidi Carlson, Town Administrator
Attachment

Reference: **Wetland and Watercourse Delineation and Wetland Functional Assessment, Piscassic River, Martin Road, Shelburne, New Hampshire**

ATTACHMENT C – CORPS WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Martin Road Bridge City/County: Fremont/Rockingham Sampling Date: 12/3/2021

Applicant/Owner: Town of Fremont, NH State: NH Sampling Point: Upland

Investigator(s): Tom Tetreau Section, Township, Range:

Landform (hillslope, terrace,etc.): Floodplain Local relief (concave, convex, none): Convex Slope (%) 1 - 2

Subregion (LRR or MLRA): LRR R Lat: 43.016485 Long: -71.085334 Datum: NAD83

Soil Map Unit Name: NWI Classification: UPL

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

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

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

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

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

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

Vegetation browsed very short by livestock.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Surface Water Present?	Yes ____ No X	Depth (inches) ____	
Water Table Present?	Yes ____ No X	Depth (inches) ____	Wetland Hydrology Present? Yes ____ No X
Saturation Present?	Yes ____ No X	Depth (inches) ____	

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

Remarks:

VEGETATION - Use scientific names of plants Sampling Point: **Upland-W-01TTA**

Tree Stratum (Plot Size: 30'radius)	Absolute % Cover	Dominant Species?	Indicator Status
	= Total Cover		

Shrub Stratum (Plot Size: 15'radius)	Absolute % Cover	Dominant Species?	Indicator Status
	= Total Cover		

Herb Stratum (Plot Size: 5'radius)	Absolute % Cover	Dominant Species?	Indicator Status
Acer saccharum	95	X	FACU
Hieracium greenii	10		FACU
Trifolium pratense	5		FACU
	110 = Total Cover		

Woody Vine Stratum (Plot Size: 30'radius)	Absolute % Cover	Dominant Species?	Indicator Status
	= Total Cover		

Dominance Test Worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index Worksheet:

OBL species	0	x 1	0	
FACW species	0	x 2	0	
FAC species	0	x 3	0	
FACU species	110	x 4	440	
UPL species	0	x 5	0	
Column Totals	110	(A)	440	(B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:

___ 1- Rapid Test For Hydrophytic Vegetation

___ 2- Dominance Test is > 50%

___ 3- Prevalence Index is =< 3.0

___ 4- Morphological Adaptations

___ 5- Problematic Hydrophytic Vegetation

Definitions of Vegetation Strata:

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

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

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

Woody Vines- All woody vines greater than 3.28ft in height.

Hydrophytic Vegetation Present? Yes ___ No X

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

Dominated by unidentifiable grasses due to livestock browsing. Assumed FACU due to landscape position and lack of hydrology.

Exhibit D

SOIL Sampling Point: **Upland-W-01TTA**

Depth (inches	Matrix Color	%	Redox Features Color	%	Type	Loc	Texture	Remarks
0-6	10YR 3/3	100					Sandy Loam	
6-10	10YR 4/4	100					Sandy Loam	

Hydric Soil Indicators:

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7)
- ____ Polyvalue Below Surface (B15)
- ____ Thin Dark Surface (S9)
- ____ Loamy Mucky Mineral (F1)
- ____ Loamy Gleyed Matric (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Soils:

- ____ 2 cm Muck (A10)
- ____ Coast Prarie Redox (A16)
- ____ 5 cm Mucky Peat or Peat (S3)
- ____ Dark Surface (S7)
- ____ Polyvalue Below Surface (S8)
- ____ Thin Dark Surface (S9)
- ____ Iron-Manganese Masses (F12)
- ____ Piedmont Floodplain Soils (F19)
- ____ Mesic Spodic (TA6)
- ____ Red Parent Material (F21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: Dense

Depth (inches): 16

Hydric Soil Present? Yes ____ No X

Remarks:

Exhibit D

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Martin Road Bridge City/County: Fremont/Rockingham Sampling Date: 12/3/2021

Applicant/Owner: Town of Fremont, NH State: NH Sampling Point: Wetland

Investigator(s): Tom Tetreau Section, Township, Range:

Landform (hillslope, terrace,etc.): Floodplain Local relief (concave, convex, none): Linear Slope (%) 0 - 1

Subregion (LRR or MLRA): LRR R Lat: 43.016596 Long: -71.085230 Datum: NAD83

Soil Map Unit Name: NWI Classification: PEM

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

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

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

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

Hydrophytic Vegetation Present?	Yes X No	**Is the Sampled Area within a Wetland?**	Yes X No
Hydric Soil Present?	Yes X No	if yes, optional Wetland Site ID:	W-01TTA
Wetland Hydrology Present?	Yes X No		

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

Vegetation continually browsed by livestock.

HYDROLOGY

Wetland Hydrology Indicators:

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

X Surface Water (A1)	X Water-Stained Leaves (B9)	Secondary Indicators (minimum of two required)
X High Water Table (A2)	Aquatic Fauna (B13)	Surface Soil Cracks (B6)
X Saturation (A3)	Marl Deposits (B15)	Drainage Patterns (B10)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Moss Trim Lines (B16)
Sediment Deposits (B2)	Oxidized Rhizospheres on Living Roots (C3)	Dry-Season Water Table (C2)
Drift Deposits (B3)	Presence of Reduced Iron (C4)	Crayfish Burrows (C8)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils (C6)	Saturation Visible in Aerial Imagery (C9)
Iron Deposits (B5)	Thin Muck Surface (C7)	Stunted or Stressed Plants (D1)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	Geomorphic Position (D2)
Sparsley Vegetated Concave Surface (B8)		Shallow Aquitard (D3)
		Microtopographic Relief (D4)
		FAC-Neutral Test (D5)

Surface Water Present?	Yes X No	Depth (inches)	1
Water Table Present?	Yes X No	Depth (inches)	4
Saturation Present?	Yes X No	Depth (inches)	0

Wetland Hydrology Present? Yes X No

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

Remarks:

Exhibit D

VEGETATION - Use scientific names of plants Sampling Point: **Wetland-W-01TTA**

Tree Stratum (Plot Size: 30'radius)	Absolute % Cover	Dominant Species?	Indicator Status
	= Total Cover		

Shrub Stratum (Plot Size: 15'radius)	Absolute % Cover	Dominant Species?	Indicator Status
	= Total Cover		

Herb Stratum (Plot Size: 5'radius)	Absolute % Cover	Dominant Species?	Indicator Status
Scirpus cyperinus	60	X	OBL
Juncus effusus	25	X	OBL
Calamagrostis canadensis	25	X	OBL
	110 = Total Cover		

Woody Vine Stratum (Plot Size: 30'radius)	Absolute % Cover	Dominant Species?	Indicator Status
	= Total Cover		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

OBL species	110	x 1	110	
FACW species	0	x 2	0	
FAC species	0	x 3	0	
FACU species	0	x 4	0	
UPL species	0	x 5	0	
Column Totals	110	(A)	110	(B)

Prevalence Index = B/A = 1

Hydrophytic Vegetation Indicators:

X 1- Rapid Test For Hydrophytic Vegetation

X 2- Dominance Test is > 50%

X 3- Prevalence Index is =< 3.0

4- Morphological Adaptations

5- Problematic Hydrophytic Vegetation

Definitions of Vegetation Strata:

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

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

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

Woody Vines- All woody vines greater than 3.28ft in height.

Hydrophytic Vegetation Present? Yes X No

Remarks: (Include photo numbers here or on a separate sheet.)
Some unidentifiable grasses due to browsing.

Exhibit D

SOIL Sampling Point: **Wetland-W-01TTA**

Depth (inches	Matrix Color	%	Redox Features Color	%	Type	Loc	Texture	Remarks
0-4	10YR 2/2	100					Loam	
4-8	10YR 4/2	95	10YR 4/6	5	C	M	Fine Sandy Loam	
8-14	10YR 5/2	95	10YR 4/6	5	C	M	Fine Sandy Loam	
14-20	10YR 5/1	95	10YR 4/6	5	C	M	Sand	

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (B15)
- ___ Thin Dark Surface (S9)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matric (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Soils:

- ___ 2 cm Muck (A10)
- ___ Coast Prarie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Mesic Spodic (TA6)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

Exhibit D

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Martin Road Bridge City/County: Fremont/Rockingham Sampling Date: 12/3/2021

Applicant/Owner: Town of Fremont, NH State: NH Sampling Point: Upland

Investigator(s): Tom Tetreau Section, Township, Range:

Landform (hillslope, terrace,etc.): Floodplain Local relief (concave, convex, none): Convex Slope (%) 1 - 2

Subregion (LRR or MLRA): LRR R Lat: 43.017379 Long: -71.086015 Datum: NAD83

Soil Map Unit Name: NWI Classification: UPL

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

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

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

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

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

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

Vegetation browsed very short by livestock.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Surface Water Present?	Yes ____ No X	Depth (inches) ____	
Water Table Present?	Yes ____ No X	Depth (inches) ____	Wetland Hydrology Present? Yes ____ No X
Saturation Present?	Yes ____ No X	Depth (inches) ____	

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

Remarks:

Exhibit D

VEGETATION - Use scientific names of plants

Sampling Point: **Upland-W-01TTB**

Tree Stratum (Plot Size: 30'radius)	Absolute % Cover	Dominant Species?	Indicator Status
	= Total Cover		

Shrub Stratum (Plot Size: 15'radius)	Absolute % Cover	Dominant Species?	Indicator Status
	= Total Cover		

Herb Stratum (Plot Size: 5'radius)	Absolute % Cover	Dominant Species?	Indicator Status
Acer saccharum	95	X	FACU
Hieracium greenii	10		FACU
Trifolium pratense	5		FACU
	110 = Total Cover		

Woody Vine Stratum (Plot Size: 30'radius)	Absolute % Cover	Dominant Species?	Indicator Status
	= Total Cover		

Dominance Test Worksheet:

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

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index Worksheet:

OBL species	0	x 1	0	
FACW species	0	x 2	0	
FAC species	0	x 3	0	
FACU species	110	x 4	440	
UPL species	0	x 5	0	
Column Totals	110	(A)	440	(B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:

____ 1- Rapid Test For Hydrophytic Vegetation

____ 2- Dominance Test is > 50%

____ 3- Prevalence Index is =< 3.0

____ 4- Morphological Adaptations

____ 5- Problematic Hydrophytic Vegetation

Definitions of Vegetation Strata:

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

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

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

Woody Vines- All woody vines greater than 3.28ft in height.

Hydrophytic Vegetation Present? Yes ____ No X

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

Dominated by unidentifiable grasses due to livestock browsing. Assumed FACU due to landscape position and lack of hydrology.

Exhibit D

SOIL Sampling Point: **Upland-W-01TTB**

Depth (inches	Matrix Color	%	Redox Features Color	%	Type	Loc	Texture	Remarks
0-6	10YR 3/3	100					Sandy Loam	
6-10	10YR 4/4	100					Sandy Loam	

Hydric Soil Indicators:

- ____ Histosol (A1)
- ____ Histic Epipedon (A2)
- ____ Black Histic (A3)
- ____ Hydrogen Sulfide (A4)
- ____ Stratified Layers (A5)
- ____ Depleted Below Dark Surface (A11)
- ____ Thick Dark Surface (A12)
- ____ Sandy Mucky Mineral (S1)
- ____ Sandy Gleyed Matrix (S4)
- ____ Sandy Redox (S5)
- ____ Stripped Matrix (S6)
- ____ Dark Surface (S7)
- ____ Polyvalue Below Surface (B15)
- ____ Thin Dark Surface (S9)
- ____ Loamy Mucky Mineral (F1)
- ____ Loamy Gleyed Matric (F2)
- ____ Depleted Matrix (F3)
- ____ Redox Dark Surface (F6)
- ____ Depleted Dark Surface (F7)
- ____ Redox Depressions (F8)

Indicators for Problematic Soils:

- ____ 2 cm Muck (A10)
- ____ Coast Prarie Redox (A16)
- ____ 5 cm Mucky Peat or Peat (S3)
- ____ Dark Surface (S7)
- ____ Polyvalue Below Surface (S8)
- ____ Thin Dark Surface (S9)
- ____ Iron-Manganese Masses (F12)
- ____ Piedmont Floodplain Soils (F19)
- ____ Mesic Spodic (TA6)
- ____ Red Parent Material (F21)
- ____ Very Shallow Dark Surface (TF12)
- ____ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: Dense

Depth (inches): 16

Hydric Soil Present? Yes ____ No X

Remarks:

Exhibit D

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Martin Road Bridge City/County: Fremont/Rockingham Sampling Date: 12/3/2021
Applicant/Owner: Town of Fremont, NH State: NH Sampling Point: Wetland
Investigator(s): Tom Tetreau Section, Township, Range:
Landform (hillslope, terrace,etc.): Floodplain Local relief (concave, convex, none): Linear Slope (%) 0 - 0
Subregion (LRR or MLRA): LRR R Lat: 43.017341 Long: -71.086025 Datum: NAD83
Soil Map Unit Name: NWI Classification: PEM
Are climatic / hyrologic conditions on the site typical for this time of year? Yes X No ____ (if no, explain in Remarks.)
Are Vegetation X , Soil ____ , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ____ No X
Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (if needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X	No ____	if yes, optional Wetland Site ID: W-01TTB
Wetland Hydrology Present?	Yes X	No ____	

Remarks: (Explain alternative procedures here or in a separate report.)
Vegetation browsed by livestock.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Surface Water Present?	Yes ____	No X	Depth (inches) ____	
Water Table Present?	Yes X	No ____	Depth (inches) 4	Wetland Hydrology Present? Yes X No ____
Saturation Present?	Yes X	No ____	Depth (inches) 0	

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

Remarks:

Exhibit D

VEGETATION - Use scientific names of plants Sampling Point: **Wetland-W-01TTB**

Tree Stratum (Plot Size: 30'radius)	Absolute % Cover	Dominant Species?	Indicator Status
	= Total Cover		

Shrub Stratum (Plot Size: 15'radius)	Absolute % Cover	Dominant Species?	Indicator Status
	= Total Cover		

Herb Stratum (Plot Size: 5'radius)	Absolute % Cover	Dominant Species?	Indicator Status
Phalaris arundinacea	40	X	FACW
Scirpus cyperinus	40	X	OBL
Juncus effusus	25	X	OBL
	105	= Total Cover	

Woody Vine Stratum (Plot Size: 30'radius)	Absolute % Cover	Dominant Species?	Indicator Status
	= Total Cover		

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

OBL species	65	x 1	65	
FACW species	40	x 2	80	
FAC species	0	x 3	0	
FACU species	0	x 4	0	
UPL species	0	x 5	0	
Column Totals	105	(A)	145	(B)

Prevalence Index = B/A = 1.38

Hydrophytic Vegetation Indicators:

X 1- Rapid Test For Hydrophytic Vegetation

X 2- Dominance Test is > 50%

X 3- Prevalence Index is =< 3.0

4- Morphological Adaptations

5- Problematic Hydrophytic Vegetation

Definitions of Vegetation Strata:

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

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

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

Woody Vines- All woody vines greater than 3.28ft in height.

Hydrophytic Vegetation Present? Yes X No

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

Exhibit D

SOIL

Sampling Point: **Wetland-W-01TTB**

Depth (inches	Matrix Color	%	Redox Features Color	%	Type	Loc	Texture	Remarks
0-4	10YR 2/2	100					Loam	
4-12	10YR 4/2	95	10YR 4/6	5	C	M	Fine Sandy Loam	
12-18	10YR 5/2	95	10YR 4/6	5	C	M	Fine Sandy Loam	
18-20	10YR 5/1	95	10YR 4/6	5	C	M	Sand	

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (B15)
- ___ Thin Dark Surface (S9)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matric (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Soils:

- ___ 2 cm Muck (A10)
- ___ Coast Prarie Redox (A16)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Mesic Spodic (TA6)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

Exhibit D

July 19, 2022
Heidi Carlson, Town Administrator
Attachment

Reference: **Wetland and Watercourse Delineation and Wetland Functional Assessment, Piscassic River, Martin Road, Shelburne, New Hampshire**

ATTACHMENT D – WETLAND FUNCTIONAL ASSESSMENT

Exhibit D

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.: Town of Fremont, NH

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: Livestock Pasture	
CONTIGUOUS UNDEVELOPED BUFFER ZONE PRESENT? ☐ Yes ☒ No	
DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT (in feet): 10	
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: Tom Tetreau, NHCWS #283	
DATE(S) OF SITE VISIT(S): 12/3/21	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):	

Exhibit D

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)	
WETLAND ID: W-01TTA	LOCATION: (LAT/ LONG) 43.016860°/-71.085482°
WETLAND AREA: 1+ acres	DOMINANT WETLAND SYSTEMS PRESENT: emergent, scrub-shrub
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? 1	COWARDIN CLASS: PEM, PSS
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☒ No if not, where does the wetland lie in the drainage basin? Lower portion of drainage basin with approximately 4 acres of drainage basin above the existing road crossing.	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: potential fill associated with bridge replacement	PROPOSED WETLAND IMPACT AREA: TBD

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".

Exhibit D

"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	Ecological Integrity from NH Method	☐ Yes ☒ No	Moderate ecological integrity; adjacent to road way and impacted by livestock. Performs several functions and values and associated with perennial stream, but not an uncommon wetland type.
2	☐ Yes ☒ No	NA	☐ Yes ☒ No	No public access.
3	☒ Yes ☐ No	4, 14, 16, 17	☐ Yes ☒ No	No fish or shellfish oberserved but the perennial stream may provide some habitat. Water quality likely impacted by surrounding livestock pasture. Limited shading due to overall lack of trees and shrubs.
4	☒ Yes ☐ No	5, 6, 7, 8, 9, 10, 13, 16	☒ Yes ☐ No	The wetland is located in a flat pasture area and associated with a perennial stream. Within the 100-year floodplain.
5	☒ Yes ☐ No	2, 4, 6, 7, 15	☒ Yes ☐ No	The wetland contains sandy soils with evidence of a high water table. Associated with a perennial stream.
6	☐ Yes ☒ No	NA	☐ Yes ☒ No	No rare species observed. Impacted by active livestock pasture.
7	☒ Yes ☐ No	1, 3, 4, 5, 7, 9, 10, 11, 14	☒ Yes ☐ No	Surrounding livestock pasutre provides signficant source of nutrients that could enter and potentially be removed within the wetland.
8	☐ Yes ☒ No	4	☐ Yes ☒ No	Livestock have altered the vegetation and browse on vegetation that would otherwise be available to wildlife. Birds and deer may utilize the area occasionally.
9	☐ Yes ☒ No	2	☐ Yes ☒ No	The wetland can be seen from a public road but is part of an active, private livestock pasture.
10	☒ Yes ☐ No	1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 14, 15, 16	☒ Yes ☐ No	Active livestock pasture provides a source of toxicants and sediments. The wetland can trap these items in runoff water and protect the associated perennial stream.

11	☒ Yes ☐ No	1, 3, 4, 7, 9, 15	☒ Yes ☐ No	The wetland helps stabilize the streambank of the associated perennial stream. Livestock crossings of the stream and wetland create erosion.
12	☐ Yes ☒ No	NA	☐ Yes ☒ No	Not a unique wetland class. Located on active, private pastureland.
13	☐ Yes ☒ No	NA	☐ Yes ☒ No	No public access. Located behind fence of active, private pastureland.
14	☒ Yes ☐ No	4, 6, 8, 17, 19	☐ Yes ☒ No	The fenced pastureland prevents some mammal use, but birds and insects likely utilize the wetland. Mostly devoid of fruit producing shrubs, but seed sources are present.

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)	LENGTH OF HYDROPERIOD	IMPORTANT NOTES
1					
2					
3					

Exhibit D

4					
5					

SECTION 6 - STREAM RESOURCES SUMMARY

DESCRIPTION OF STREAM: Perennial, Piscassic River	STREAM TYPE (ROSGEN): E
HAVE FISHERIES BEEN DOCUMENTED? ☐ Yes ☒ No	DOES THE STREAM SYSTEM APPEAR STABLE? ☒ Yes ☐ No

OTHER KEY ON-SITE FUNCTIONS OF NOTE: The stream flows through an active livestock pasture.

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	Ecological Integrity from NH Method	☐ Yes ☒ No	Moderate ecological integrity; adjacent to road way and impacted by livestock and existing bridge/road impoundment. Performs several functions and values but is not an uncommon stream system.
2	☐ Yes ☒ No	NA	☐ Yes ☒ No	No public access.
3	☒ Yes ☐ No	4, 14, 16, 17	☐ Yes ☒ No	No fish or shellfish oberserved but the perennial stream may provide some habitat. Water quality likely impacted by surrounding livestock pasture. Limited shading due to overall lack of trees and shrubs.
4	☒ Yes ☐ No	5, 6, 7, 8, 9, 10, 13, 16	☒ Yes ☐ No	The perennial stream is located in a flat pasture area within the 100-year floodplain.
5	☒ Yes ☐ No	2, 4, 6, 7, 15	☒ Yes ☐ No	The surrounding wetland contains sandy soils with evidence of a high water table. Sandy substrate observed.
6	☐ Yes ☒ No	NA	☐ Yes ☒ No	No rare species observed. Impacted by active livestock pasture.

7	☒ Yes ☐ No	1, 3, 4, 5, 7, 9, 10, 11, 14	☒ Yes ☐ No	Surrounding livestock pasutre provides signficant source of nutrients that could enter and potentially be removed by the wetland surrounding the stream.
8	☐ Yes ☒ No	4	☐ Yes ☒ No	Livestock have altered the vegetation and browse on vegetation that would otherwise be available to wildlife. Birds and deer may utilize the area occasionally.
9	☐ Yes ☒ No	2	☐ Yes ☒ No	The stream can be seen from a public road but is part of an active, private livestock pasture.
10	☒ Yes ☐ No	1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 14, 15, 16	☒ Yes ☐ No	Active livestock pasture provides a source of toxicants and sediments. The surrounding wetland can trap these items in runoff water and protect the perennial stream.
11	☒ Yes ☐ No	1, 3, 4, 7, 9, 15	☒ Yes ☐ No	The surrounding wetland helps stabilize the streambank. Livestock crossings of the stream and wetland create erosion.
12	☐ Yes ☒ No	NA	☐ Yes ☒ No	Not a unique stream system. Located on active, private pastureland.
13	☐ Yes ☒ No	NA	☐ Yes ☒ No	No public access. Located behind fence of active, private pastureland.
14	☐ Yes ☐ No	4, 6, 8, 17, 19	☐ Yes ☐ No	The fenced pastureland prevents some mammal use, but birds and insects likely utilize the surrounding wetland. Mostly devoid of fruit producing shrubs, but seed sources are present.

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

☒ Wildlife and vegetation diversity/abundance list.

☒ Photograph of wetland.

☒ 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.

Exhibit D

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.: Town of Fremont, NH

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: Livestock Pasture	
CONTIGUOUS UNDEVELOPED BUFFER ZONE PRESENT? ☐ Yes ☒ No	
DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT (in feet): 10	
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: Tom Tetreau, NHCWS #283	
DATE(S) OF SITE VISIT(S): 12/3/21	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):	

Exhibit D

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)	
WETLAND ID: W-01TTB	LOCATION: (LAT/ LONG) 43.017028°/-71.085795°
WETLAND AREA: Approx. 0.3 acres	DOMINANT WETLAND SYSTEMS PRESENT: emergent
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? 1	COWARDIN CLASS: PEM, PSS
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☒ No if not, where does the wetland lie in the drainage basin? Lower portion of drainage basin with approximately 4 acres of drainage basin above the existing road crossing.	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: potential fill associated with bridge replacement	PROPOSED WETLAND IMPACT AREA: TBD

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	Ecological Integrity from NH Method	☐ Yes ☒ No	Moderate ecological integrity; adjacent to road way and impacted by livestock. Performs several functions and values and associated with perennial stream, but not an uncommon wetland type.
2	☐ Yes ☒ No	NA	☐ Yes ☒ No	No public access.
3	☒ Yes ☐ No	4, 14, 16, 17	☐ Yes ☒ No	No fish or shellfish oberserved but the perennial stream may provide some habitat. Water quality likely impacted by surrounding livestock pasture. Limited shading due to overall lack of trees and shrubs.
4	☒ Yes ☐ No	5, 6, 7, 8, 9, 10, 13, 16	☒ Yes ☐ No	The wetland is located in a flat pasture area and associated with a perennial stream. Within the 100-year floodplain.
5	☒ Yes ☐ No	2, 4, 6, 7, 15	☒ Yes ☐ No	The wetland contains sandy soils with evidence of a high water table. Associated with a perennial stream.
6	☐ Yes ☒ No	NA	☐ Yes ☒ No	No rare species observed. Impacted by active livestock pasture.
7	☒ Yes ☐ No	1, 3, 4, 5, 7, 9, 10, 11, 14	☒ Yes ☐ No	Surrounding livestock pasutre provides signficant source of nutrients that could enter and potentially be removed within the wetland.
8	☐ Yes ☒ No	4	☐ Yes ☒ No	Livestock have altered the vegetation and browse on vegetation that would otherwise be available to wildlife. Birds and deer may utilize the area occasionally.
9	☐ Yes ☒ No	2	☐ Yes ☒ No	The wetland can be seen from a public road but is part of an active, private livestock pasture.
10	☒ Yes ☐ No	1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 14, 15, 16	☒ Yes ☐ No	Active livestock pasture provides a source of toxicants and sediments. The wetland can trap these items in runoff water and protect the associated perennial stream.

11	☒ Yes ☐ No	1, 3, 4, 7, 9, 15	☒ Yes ☐ No	The wetland helps stabilize the streambank of the associated perennial stream. Livestock crossings of the stream and wetland create erosion.
12	☐ Yes ☒ No	NA	☐ Yes ☒ No	Not a unique wetland class. Located on active, private pastureland.
13	☐ Yes ☒ No	NA	☐ Yes ☒ No	No public access. Located behind fence of active, private pastureland.
14	☒ Yes ☐ No	4, 6, 8, 17, 19	☐ Yes ☒ No	The fenced pastureland prevents some mammal use, but birds and insects likely utilize the wetland. Devoid of fruit producing shrubs, but seed sources are present.

SECTION 5 - VERNAL POOL SUMMARY (Env-Wt 311.10)

Delineations of vernal pools shall be based on the characteristics listed in the definition of "vernal pool" in Env-Wt 104.44. To assist in the delineation, individuals may use either of the following references:

- *Identifying and Documenting Vernal Pools in New Hampshire 3rd Ed.*, 2016, published by the New Hampshire Fish and Game Department; or
- The USACE *Vernal Pool Assessment* draft guidance dated 9-10-2013 and form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

All vernal pool ID numbers are to be displayed and located on the wetland delineation of the subject property.

"Important Notes" are to include documented reproductive and wildlife values, landscape context, and relationship to other vernal pools/wetlands.

Note: For projects seeking federal approval from the USACE, please attach a completed copy of The USACE "Vernal Pool Assessment" form dated 9-6-2016, Appendix L of the USACE New England District *Compensatory Mitigation Guidance*.

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)	LENGTH OF HYDROPERIOD	IMPORTANT NOTES
1					
2					
3					

4					
5					

SECTION 6 - STREAM RESOURCES SUMMARY

DESCRIPTION OF STREAM: Perennial, Piscassic River	STREAM TYPE (ROSGEN): E
HAVE FISHERIES BEEN DOCUMENTED? ☐ Yes ☒ No	DOES THE STREAM SYSTEM APPEAR STABLE? ☒ Yes ☐ No

OTHER KEY ON-SITE FUNCTIONS OF NOTE: The stream flows through an active livestock pasture.

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	Ecological Integrity from NH Method	☐ Yes ☒ No	Moderate ecological integrity; adjacent to road way and impacted by livestock and existing bridge/road impoundment. Performs several functions and values but is not an uncommon stream system.
2	☐ Yes ☒ No	NA	☐ Yes ☒ No	No public access.
3	☒ Yes ☐ No	4, 14, 16, 17	☐ Yes ☒ No	No fish or shellfish oberserved but the perennial stream may provide some habitat. Water quality likely impacted by surrounding livestock pasture. Limited shading due to overall lack of trees and shrubs.
4	☒ Yes ☐ No	5, 6, 7, 8, 9, 10, 13, 16	☒ Yes ☐ No	The perennial stream is located in a flat pasture area within the 100-year floodplain.
5	☒ Yes ☐ No	2, 4, 6, 7, 15	☒ Yes ☐ No	The surrounding wetland contains sandy soils with evidence of a high water table. Sandy substrate observed.
6	☐ Yes ☒ No	NA	☐ Yes ☒ No	No rare species observed. Impacted by active livestock pasture.

7	☒ Yes ☐ No	1, 3, 4, 5, 7, 9, 10, 11, 14	☒ Yes ☐ No	Surrounding livestock pasutre provides signficant source of nutrients that could enter and potentially be removed by the wetland surrounding the stream.
8	☐ Yes ☒ No	4	☐ Yes ☒ No	Livestock have altered the vegetation and browse on vegetation that would otherwise be available to wildlife. Birds and deer may utilize the area occasionally.
9	☐ Yes ☒ No	2	☐ Yes ☒ No	The stream can be seen from a public road but is part of an active, private livestock pasture.
10	☒ Yes ☐ No	1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 14, 15, 16	☒ Yes ☐ No	Active livestock pasture provides a source of toxicants and sediments. The surrounding wetland can trap these items in runoff water and protect the perennial stream.
11	☒ Yes ☐ No	1, 3, 4, 7, 9, 15	☒ Yes ☐ No	The surrounding wetland helps stabilize the streambank. Livestock crossings of the stream and wetland create erosion.
12	☐ Yes ☒ No	NA	☐ Yes ☒ No	Not a unique stream system. Located on active, private pastureland.
13	☐ Yes ☒ No	NA	☐ Yes ☒ No	No public access. Located behind fence of active, private pastureland.
14	☐ Yes ☐ No	4, 6, 8, 17, 19	☐ Yes ☐ No	The fenced pastureland prevents some mammal use, but birds and insects likely utilize the surrounding wetland. Mostly devoid of fruit producing shrubs, but seed sources are present.

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

☒ Wildlife and vegetation diversity/abundance list.

☒ Photograph of wetland.

☒ 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.

Exhibit D

July 19, 2022
Heidi Carlson, Town Administrator
Attachment

Reference: **Wetland and Watercourse Delineation and Wetland Functional Assessment, Piscassic River, Martin Road, Shelburne, New Hampshire**

Wildlife and Vegetation List

Observed December 3, 2021

Wildlife:

White-tailed deer (*Odocoileus virginianus*) – tracks
Wild turkey (*Meleagris gallopavo*)
Black-capped chickadee (*Poecile atricapillus*)
American crow (*Corvus brachyrhynchos*)

Vegetation:

speckled alder (*Alnus incana*)
pussy willow (*Salix discolor*)
broad-leaf meadowsweet (*Spiraea latifolia*)
uptight sedge (*Carex stricta*)
cottongrass bulrush (*Scirpus cyperinus*)
lamp rush (*Juncus effusus*),
reed canary grass (*Phalaris arundinacea*)
bluejoint (*Calamagrostis canadensis*)
Morrow's honeysuckle (*Lonicera morrowii*)
Rambler rose (*Rosa multiflora*)

Exhibit D

Stantec

Memo

To:	Dan Tatem Auburn NH Office	From:	Michael Chelminski Northampton MA Office
File:	195112878	Date:	July 8, 2022

Reference: DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire

Stantec Consulting Services Inc. (Stantec) performed a geomorphic characterization along the reach of Brown Brook adjacent to the Martin Road stream crossing of the brook in Fremont, New Hampshire. The purpose the geomorphic characterization is to provide information for use in design of a replacement stream crossing (Bridge) where Martin Road crosses Brown Brook and to provide information for completion of the New Hampshire Department of Environmental Services (NHDES) Wetlands Permit Application – Stream Crossing Worksheet (form NHDES-W-06-071).

Information presented in this memo includes observations and survey data collected during a site visit on Friday, December 3, 2021, and 2) a query of the U.S. Geological Survey (USGS) StreamStats (ver. 4.3.11) online software utility.

WATERWAY AT BRIDGE LOCATION

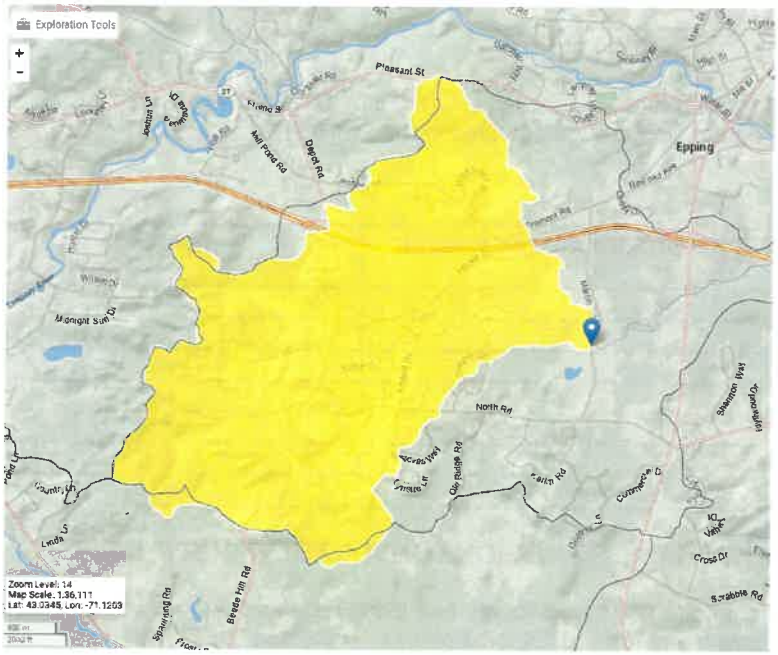
Brown Brook is a tributary to the Piscassic River and the tributary watershed is located to the west of Martin Road, including areas north of New Hampshire Route 101. Information obtained from the USGS StreamStats online tool indicates that the drainage area upstream from the Project site is 4.1 square miles, approximately 14 percent (%) of the watershed is characterized as wetlands, approximately 22% of the watershed has forested cover (deciduous and coniferous trees), and that the mean basin slope is approximately 3.8% as calculated from a 30-meter digital elevation model. StreamStats also identifies that 13.5% of the drainage area is classified as "developed (urban) land" and that areas of impervious covert account for approximately 2.7% of the drainage area.

Figure 1 was generated using StreamStats and depicts the location of the Bridge and the drainage area to Brown Brook.

Exhibit E

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

Figure 1. Bridge Location and Drainage Area



The drainage area of Brown Brook at the Martin Road Bridge is approximately 4.1 square miles (2,624 acres).

BRIDGE CLASSIFICATION

This section presents information on the classification of the Bridge based on New Hampshire Department of Transportation (NHDOT) and NHDES regulations. In accordance with Table 2.4.2 -1 of the NHDOT Bridge Manual[1], Martin Road would be classified as a Tier 5, Local Roadway adjacent to the proposed Bridge. In accordance with NHDES Env-Wt 904.04, the Bridge crossing of Brown Brook is a "Tier 3 stream crossing."

FLOOD HAZARDS

Potential flood hazards at and adjacent to the Project site were preliminarily evaluated for this geomorphic characterized by reviewing a Federal Emergency Management Agency (FEMA) "FIRMette" (attached) developed with FEMA's National Flood Hazard Layer (NFHL) Viewer online tool. Information presented on the FIRMette indicates that the FEMA Flood Insurance Rate Map (FIRM) from which the FIRMette was developed has an effective date of May 17, 2005, and that the Project area is designated as "Zone A". The Zone A designation reflects identification of the 100-year percent chance flood hazard by approximate methods.

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[1] New Hampshire Department of Transportation, Bureau of Bridge Design, Bridge Design Manual, Dated January 2015 (v2.0) and revised June 2020. (https://www.nh.gov/dot/org/projectdevelopment/bridgedesign/manual.htm)

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

DESKTOP STUDIES

PEAK DISCHARGES

Peak-flow statistics were developed for this memo using values reported by StreamStats. These values are provided in Table 1 for reference. Design peak flows are provided in the Project hydraulic study report.

Table 1. Peak Flow Statistics

Statistic (Annual Exceedance Probability)	Recurrence Interval (years)	Discharge
50%	2	60.4
20%	5	102
10%	10	137
4%	25	185
2%	50	226
1%	100	276
0.2%	500	404

PREDICTED CHANNEL GEOMETRY BASE ON REGIONAL HYDRAULIC CURVES

Predicted bankfull channel geometry characteristics were developed using regression equations of regional hydraulic curves[2] as required for preparation of form NHDES-W-06-071. Predicted bankfull channel characteristics developed using the regional hydraulic curve power equations based on a drainage area of 4.1 sq. mi. are presented in Table 2. Table 2 also includes the average bankfull flow velocity in feet per second (fps) that was derived as the quotient of the predicted bankfull flow (dividend) and bankfull area (divisor).

Table 2. Predicted Channel Geometry Values for Brown Brook at Martin Road Bridge

Parameter	Regression Coefficients		Predicted Value	Units
	Linear	Exponent		
Bankfull Width (W_{bkf})	12.469	0.4892	24.9	ft
Bankfull Depth (D_{bkf})	1.2952	0.2645	1.9	ft
Bankfull Area (A_{bkf})	16.024	0.7552	47	ft^2
Bankfull Flow (Q_{bkf})	44.195	0.9114	160	cfs*
Bankfull flow speed (V_{bkf})	n/a	n/a	3.4	fps**

[2] Schiff, R., J.G. MacBroom, and J. Armstrong Bonin, 2007, Guidelines for Naturalized River Channel Design and Bank Stabilization. NHDES-R-WD-06-37. Prepared by Milone & MacBroom, Inc. for the New Hampshire Department of Environmental Services and the New Hampshire Department of Transportation, Concord, N.H.

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

*"cfs" – cubic feet per second
**"fps" – feet per second

FIELD SURVEYS

Stantec performed a geomorphic reconnaissance site visit on Friday, December 3, 2021. Information obtained during the site visit included general observations and photographs, survey of three channel cross-sections, and observation of surficial substrates at each of the three cross sections. Pebble counts were not performed during the site visit due to cold weather (air temperatures below freezing) and water temperatures.

GENERAL OBSERVATIONS

The site visit included general observations of Brown Brook from approximately 160 ft upstream of the Martin Road Bridge to approximately 600 ft downstream from the bridge. The study reach of Brown Brook appears to be heavily influenced by cattle grazing in upstream and downstream from the Martin Road Bridge. Upstream from the bridge, the streambanks are poorly defined, apparently as a result of cattle entering the brook from the adjacent pasture, and woody vegetation is sparse adjacent to the channel. The downstream reach of the brook flows through a broad wetland complex with some areas of dense shrub vegetation and is sinuous with bifurcation of the channel in some locations. Reference photographs from the site visit are attached to this memo.

CHANNEL CROSS SECTION SURVEYS

Three channel cross-sections were surveyed along the study reach of Brown Brook using a tripod-mounted optical autolevel and graduated survey rod for elevation measurements and stationing obtained from layout of a 200-ft tape measure and the beginning and end of each transection field located with a global positioning system (GPS) receiver. Vertical measurements collected using the optical autolevel were referenced to a common vertical datum using two temporary vertical benchmarks located on the Martin Road Bridge. Vertical survey measurements were post-processed following the site visit and approximately rectified to the project vertical datum (NAVD88) using the two temporary vertical benchmarks on the bridge.

The locations of the three surveyed cross-sections were field located using a GPS receiver. The upstream cross-section (XSec A) crossed Brown Brook approximately 160 ft upstream from the Martin Road Bridge. The two downstream cross-sections (XSec B and XSec C) crossed the brook approximately 430 ft and 640 ft, respectively, downstream from the downstream side of the bridge.

The location of XSec A was selected as representative of the channel upstream from the Martin Road bridge and was located downstream from a small bridge that crosses the brook and upstream from an area where banks were marginally apparent due to apparent impacts from cattle. The locations of XSec B and XSec C were selected based on the locations being representative of adjacent sections of the channel. In addition, the location of XSec B was selected to provide a relatively clear line-of-site through shrub vegetation along the brook. Bankfull widths were measured as the distance between the top-of-bank measurements on both sides of the channel at each cross section.

Channel Cross Section Summary Table

Table 3 summarizes measured and derived characteristic values at the three surveyed cross sections, applicable ranges of values, and the predicted and derived characteristic values provided in Table 2. The

estimated bankfull flow speeds in Table 3 were developed based on observations during the site visit, including the dominance of sandy surficial substrates and are included for calculation of representative bankfull discharges for comparison with the derived statistics presented in Table 2. The estimated bankfull flow speed for the three surveyed cross section is 3 fps.

Table 3. Summary of Observed and Predicted Geomorphic Values for Brown Brook at Martin Road Bridge

Parameter	Reference (Surveyed) Cross Sections			Range	Predicted Value (Reference Table 2)
	XSec A	XSec B	XSec C		
Bankfull Width (ft)	20	17	17	17 - 20	24.9
Bankfull Area (ft²)	25.9	21.2	19.2	19.2 – 25.9	47
Mean Bankfull Depth (ft)	1.3	1.2	1.1	1.1 – 1.3	1.9
Width-to-Depth Ratio	15.4	13.6	15.1	13.6 – 15.4	-
Maximum Bankfull Depth (ft)	3.2	1.9	2.4	1.9 – 3.2	-
Flood Prone Width (ft)	>134	>200	>200	>130	-
Entrenchment Ratio	>6.7	>11.8	>11.8	>6.7	-
Estimated Bankfull Flow Speed (ft/s)	3	3	3	n/a	3.4
Estimated Bankfull Discharge (cfs)	78	64	57	57 - 78	160

The estimated bankfull discharge range of 57 to 78 cfs in Table 3 is less than half the predicted value of 160 cfs presented in Table 2 but bounds the estimated 2-year recurrence interval flow of 60.4 cfs in Table 3.

Channel Cross Section Descriptions

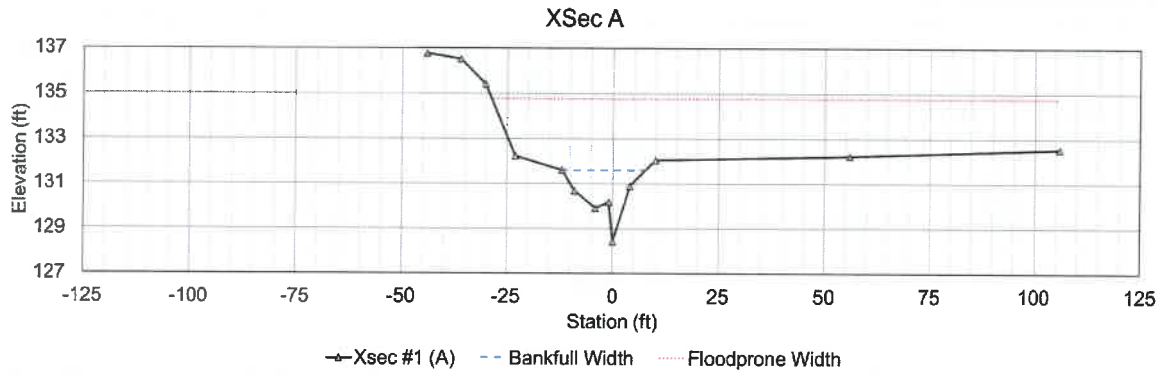
Following here are descriptions of the three surveyed channel cross sections along the project reach of Brown Brook from upstream to downstream. The cross-section figures are presented facing downstream with the section stationing centered on the apparent thalweg and include the estimated bankfull water surface elevation and the corresponding floodprone width elevation.

Cross Section XSec A

Cross section XSec A is located at a vegetated riffle crest approximately 160 ft upstream from Martin Road (approximately 170 ft upstream from the centerline of the bridge) and downstream from a small bridge that provides access for agricultural equipment across the brook. The banks and channel of the brook adjacent to XSec A are poorly defined due to apparent impacts from cattle. Sand was the primary observed substrate at XSec A. Rooted vegetation was present in most of the wetted area of the survey transect. XSec A is depicted in Figure 2.

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

Figure 2. Cross Section XSEC A



Cross Section XSEC B

Cross section XSec B is located in a run approximately 430 ft upstream from Martin Road (approximately 440 ft downstream from the centerline of the bridge). This cross-section crosses fringe wetlands with hummocks and some shrubs where there was standing water (with ice) during the site visit. Sand was the primary observed substrate at XSec B and there was some rooted vegetation in the wetted area of the survey transect. XSec B is depicted in Figure 3.

Figure 3. Cross Section XSEC B

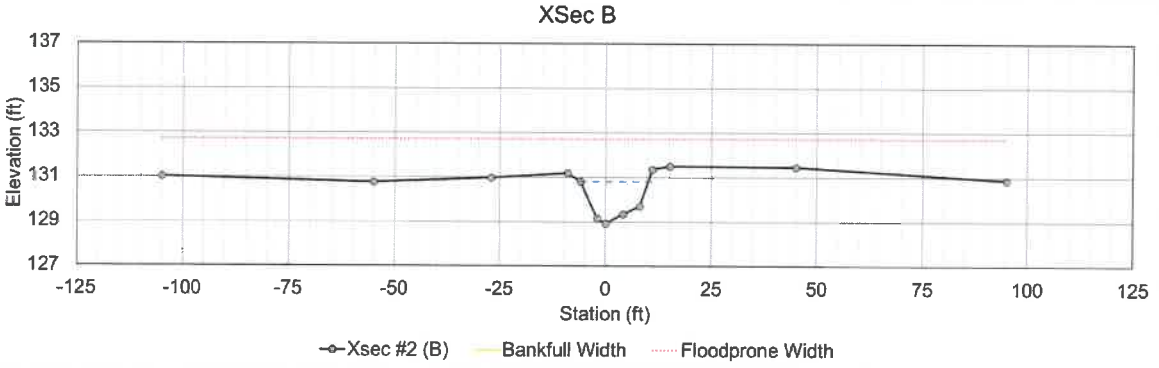


Exhibit E

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

Cross Section XSEC C

Cross section XSec C is located in a vegetated riffle crest/run approximately 640 ft upstream from Martin Road (approximately 650 ft downstream from the centerline of the bridge). Pasture with sparse vegetation is located along the left side of the brook and fringe wetlands with sparse shrubs and hummock are located along the right side of the brook along this survey transect. Sand was the primary observed substrate at XSec C and there was some rooted vegetation in the wetted area of the survey transect. XSec C is depicted in Figure 4.

Figure 4. Cross Section XSEC C

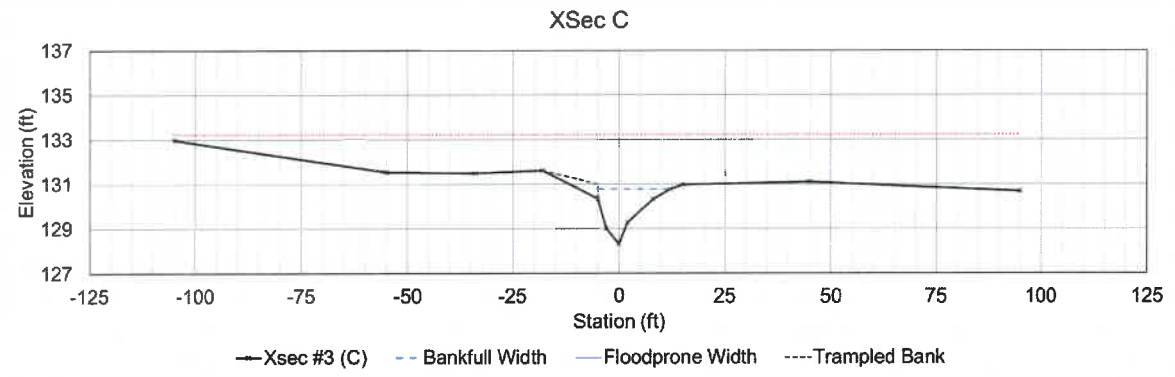


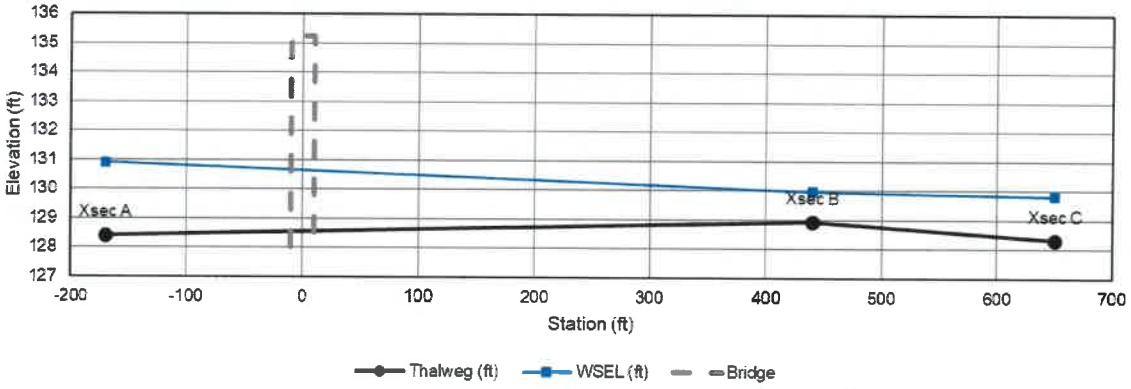
Exhibit E

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

LONGITUDINAL PROFILE

A longitudinal profile of the Project reach of Brown Brook was developed using thalweg and water surface elevation (WSEL) data collected at the three cross sections during the December 3, 2021, site visit. The longitudinal profile is depicted in Figure 5 and based on date collected at XSec A 160 ft upstream from the Project bridge (approximately 170 ft upstream from the roadway centerline on the bridge), XSec B approximately 440 ft downstream from the roadway centerline on the bridge, and XSec C approximately 650 ft downstream from the roadway centerline on the bridge. The representation of the bridge ("Bridge") in Figure 5 is approximate.

Figure 5. Longitudinal Profile Survey



The channel morphology varies substantially upstream and downstream from the bridge due to factors including cattle grazing and access to the stream and may contribute to the adverse thalweg slope moving downstream from XSec A to XSec B. The channel slope of the Project reach of Brown Brook based on the thalweg elevations at XSec A and XSec C is 0.0001. In comparison, the WSEL slope of is 0.0013 between XSec A and XSec C is approximately an order-of-magnitude greater than the channel slope of 0.0001.

Based on observations during the site visit and information presented in the longitudinal profile, Stantec's opinion is that the WSEL slope of 0.0013 between XSec A and XSec C is representative of the Project reach of Brown Brook. The existing bridge is backwatered and use of the WSEL slope (0.0013) is identified as reasonable and conservative relative to the channel slope of 0.0001.

SINUOUSITY

Sinuosity of the reference reach of Brown Brook was estimated as 1.2 based information obtained from aerial imagery extending approximately 500 ft upstream and downstream from the bridge. The total length of the reach used to estimate sinuosity is approximately 1,000 ft and well more than 20-times the maximum estimated bankfull width of 20 ft at XSec A.

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

REFERENCE REACH STREAM TYPE

The reference reach is the approximately 820-ft-long reach of Brown Brook from approximately 170 ft upstream to approximately 650 downstream from the Martin Road bridge centerline. Land adjacent to the reference reach of the brook upstream from the Martin Road bridge is active pasture and impacts from cattle grazing and unhindered access to the brook were apparent during the site visit. In general, the upstream section of the reference reach has a single-thread channel with a sand bed. Active pasture is located along the left side of the reference reach downstream from the Martin Road Bridge but there are bounding areas of wetlands with shrubs and hummocks along both sides of the brook.

For the purpose of providing information on form NHDES-W-06-071, Stantec assigned a Rosgen classification of "D_A5" based on dominance of the sand bed, an entrenchment ratio greater than "4", a width/depth ratio less than "4", and a slope of less than 5%.

RECOMMENDED DESIGN CRITERIA

The recommended bankfull width design criteria is 17 ft. The basis for identification of this bankfull width is that it is the estimated bankfull width at two of the three reference cross sections (XSec B and XSec C) and that the larger bankfull width of 20 ft at XSec A is located where the channel of the brook appears to be impacted by cattle access and grazing.

Stantec Consulting Services Inc.

Michael Chelminski (he/him/his) P.E. (CT, MA, ME, NH)
Principal, Environmental Services

Phone: 207-837-2937
michael.chelminski@stantec.com

Attachment: Site Photographs
FIRMette

Exhibit E

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

SITE PHOTOGRAPHS

Exhibit E

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

Photo 1. Facing downstream along Brown Brook with XSec A in near-ground and project bridge in background

Photo 2. Facing upstream along Brown Brook from small bridge upstream from XSec A

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

Photo 3. Transect along XSec A with brook and small bridge in background (flow from left to right)

Photo 4. Transect along XSec A with brook and small bridge in background (flow from right to left)

Exhibit E

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

Photo 5. Brook channel along XSec A (flow from left to right)

Photo 6. Flow (bottom to top) along left side of channel at XSec A

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

Photo 7. Facing downstream along Brown Brook from XSec B

Photo 8. Facing upstream along Brown Brook from XSec B

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

Photo 9. Transect along XSec B (flow from right to left)

Photo 10. Right overbank along Brown Brook facing XSec B (brook is behind photographer and flow is from right to left)

Exhibit E

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

Photo 11. Left overbank at Xsec B (flow is from left to right)

Photo 12. Channel bottom at XSec B (flow is from left to right)

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

Photo 13. Facing downstream along Brown Brook from XSec C

Photo 14. Facing upstream along Brown Brook from XSec C

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

Photo 15. Transect along XSec C (flow from right to left)

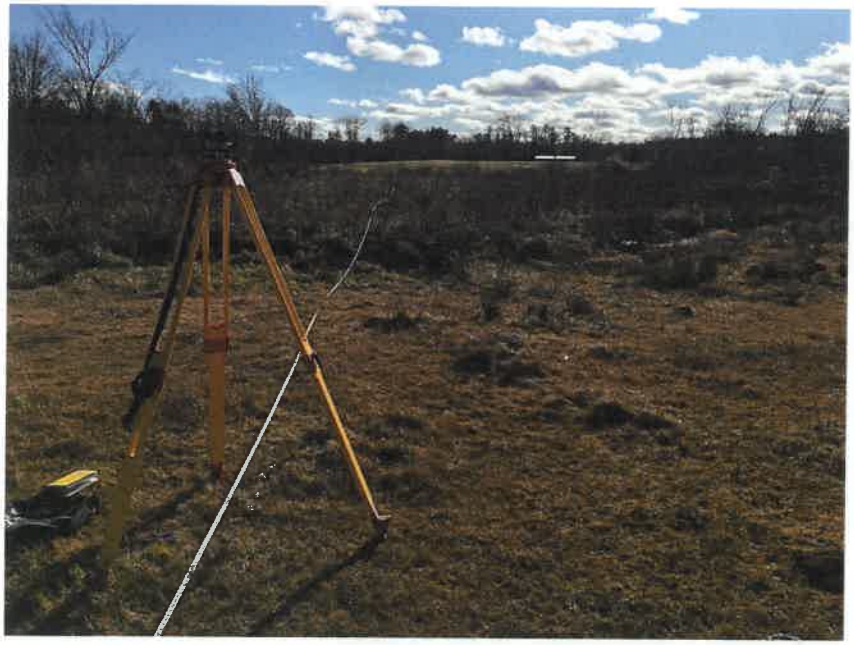


Photo 16. Transect along XSec C (flow from left to right)

Reference: **DRAFT Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire**

Photo 17. Brown Brook channel at XSec C (flow is from right to left)

Photo 18. Martin Road stream crossing (flow is from left to right)

NHDES-W-06-071

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

WETLANDS PERMIT APPLICATION
STREAM CROSSING WORKSHEET

Land Resources Management
Wetlands Bureau

RSA 482-A/ Env-Wt-900

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

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:	_____ 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
- ☐ On a watercourse that is listed on the surface water assessment 305(b) report
- ☒ Within a 100-year floodplain (see *section 2* below)
- ☒ In a jurisdictional area having any protected species or habitat (NHB DataCheck)
- ☐ In or within 100 feet of a Prime Wetland

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 = _____A_____

- ☐ Elevation of the 100-year floodplain at the inlet: _____n/a_____ feet (FEMA El. or Modeled El.)

3. Calculating Peak Discharge

Existing 100-year peak discharge (Q) calculated in cubic feet per second (CFS): ___276_____ CFS	Calculation method: _USGS StreamStats_
Estimated Bankfull discharge at the crossing location: 57 to 78 CFS	Calculation method: _Survey Data

➡ ***Note: If Tier 1 then skip to Section 10*** ⬅

4. Predicted Channel Geometry based on Regional Hydraulic Curves

*For **Tier 2** and **Tier 3** Crossings Only*

Bankfull Width: ___24.9____ feet	Mean Bankfull Depth: ____1.9____ feet
Bankfull Cross Sectional Area: ____47____ square feet	

5. Cross Sectional Channel Geometry: Measurements of the Existing Stream within a Reference Reach

*For **Tier 2** and **Tier 3** Crossings Only*

Describe the reference reach location: _**Adjacent to Bridge**_

Reference reach watershed size: _____**621**_____ acres

Parameter	**Cross Section 1** Describe bed form **Riffle (XSec A)** *(e.g. pool, riffle, glide)*	**Cross Section 2** Describe bed form **Run (XSec B)** *(e.g. pool, riffle, glide)*	**Cross Section 3** Describe bed form **Riffle/Run (XSec C)** *(e.g. pool, riffle, glide)*	**Range**
Bankfull Width	_____**20**____ feet	_____**17**____ feet	_____**17**_____ feet	____**17 - 20**__ feet
Bankfull Cross Sectional Area	_____**25.9**_____ SF	_____**21.2**_____ SF	_____**19.2**_____ SF	__**19.2 - 25.9**____ SF
Mean Bankfull Depth	_____**1.3**_____ feet	_____**1.2**____ feet	_____**1.1**_____ feet	__**1.1-1.3**____ feet
Width to Depth Ratio	_____**15.4**____	_____**13.6**____	_____**15.1**____	____**13.6 - 15.4**____
Max Bankfull Depth	_____**3.2**____ feet	_____**1.9**____ feet	_____**2.4**_____ feet	____**1.9 - 3.2**____ feet
Flood Prone Width	_____**>134**____ feet	____**>200**_____ feet	_____**>200**_____ feet	____**>134**____ feet
Entrenchment Ratio	_____**>6.7**_____	_____**>11.8**____	_____**>11.8**_____	____**>6.7**___

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

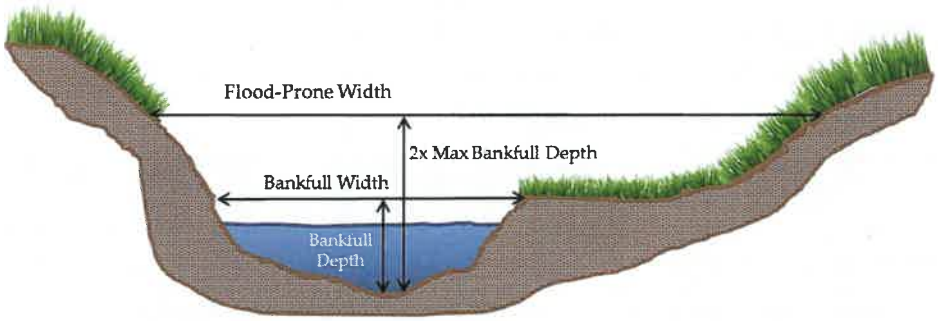


Figure 1: Determining the Reference Reach Attributes

6. Longitudinal Parameters of the Reference Reach and Crossing Location

*For **Tier 2** and **Tier 3** Crossings Only*

Average Channel Slope of the Reference Reach: ____**0.0013**____

Average Channel Slope at the Crossing Location: ___**0.0013**_____

7. Plan View Geometry

*For **Tier 2** and **Tier 3** Crossings Only*

Sinuosity of the Reference Reach: _**1.2**_

Sinuosity of the Crossing Location: _____**1.2**_____

Note: Sinuosity is measured a distance of at least 20 times bankfull width, or 2 meander belt widths

8. Substrate Classification based on Field Observations *For **Tier 2** and **Tier 3** Crossings Only*	
% of reach that is *bedrock*	_____0_____ %
% of reach that is *boulder*	_____0_____ %
% of reach that is *cobble*	_____0_____ %
% of reach that is *gravel*	_____0_____ %
% of reach that is *sand*	_____>50_____ %
% of reach that is *silt*	_____~50_____ %

9. Stream Type of Reference Reach *For **Tier 2** and **Tier 3** Crossings Only*	
Stream Type of Reference Reach:	_____DA5_____

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

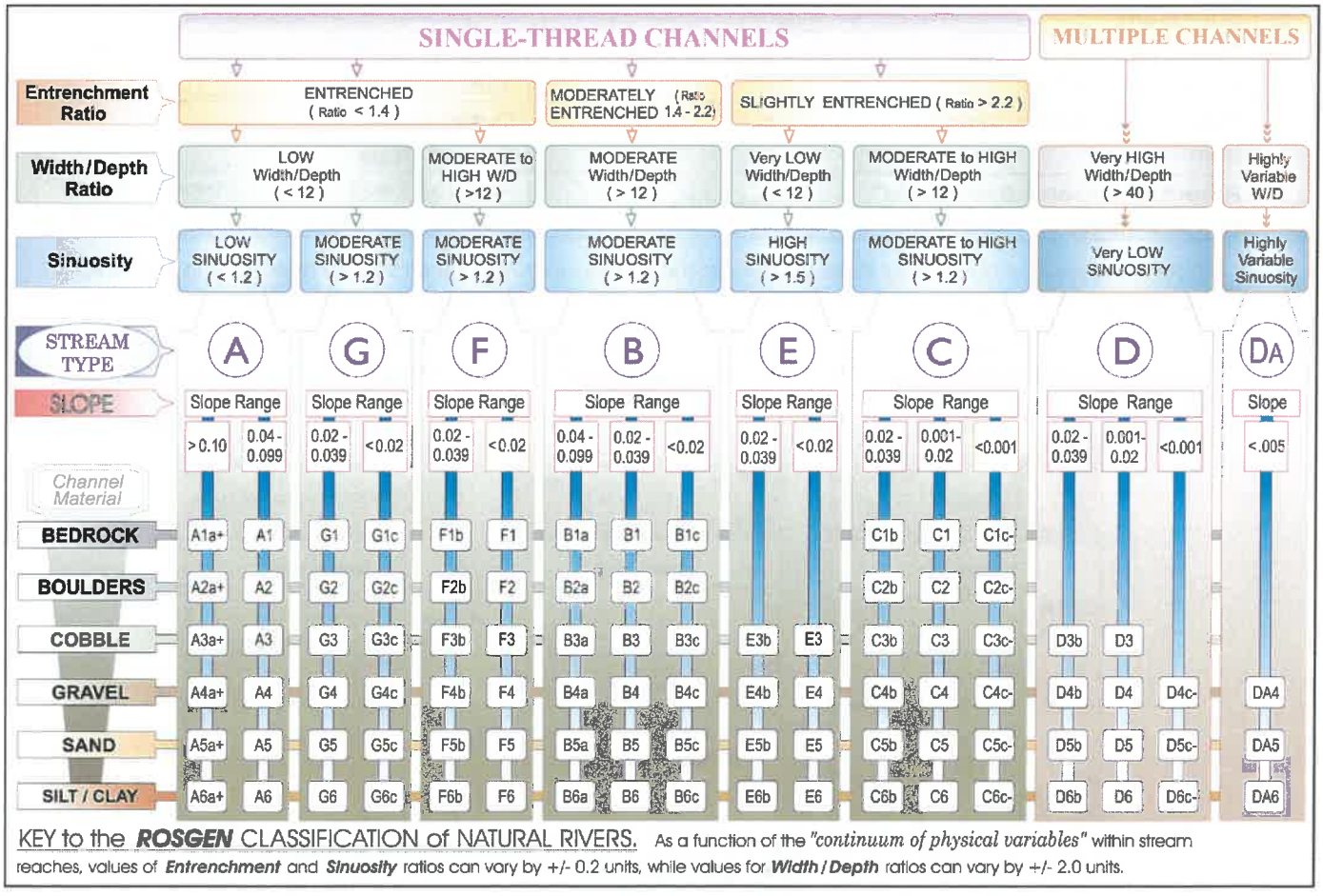


Figure 2. Reference from Applied River Morphology, Rosgen, 1996

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)*	10.2 feet	**Culvert Diameter** _____ feet **Inlet Elevation** _____
Existing Crossing Length *(parallel to flow)*	20.5 feet	**Outlet Elevation** _____ **Culvert Slope** _____

Proposed Conditions

Proposed Structure Type:	**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 *(perpendicular to flow)*	22 feet	**Culvert Diameter** _____ feet **Inlet Elevation** _____
Proposed Structure Length *(parallel to flow)*	26 feet	**Outlet Elevation** _____ **Culvert Slope** _____
Proposed Entrenchment Ratio* *For **Tier 2** and **Tier 3** Crossings Only*	1.3	*Note: 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 904.09*

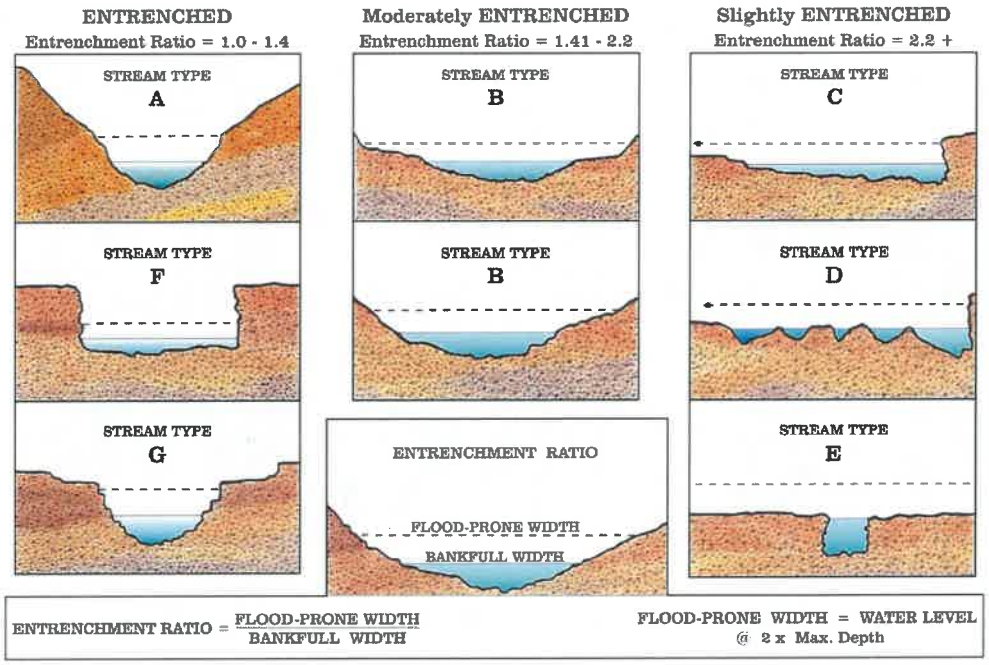


Figure 3. Reference from Applied River Morphology, Rosgen, 1996

11. Crossing Structure Hydraulics

	Existing	Proposed
100 year flood stage elevation at inlet	133.0	131.8
Flow velocity at outlet in feet per second (FPS)	9.8	4.1
Calculated 100 year peak discharge (Q) for the proposed structure in CFS		280
Calculated 50 year peak discharge (Q) for the proposed structure in CFS		230

12. Crossing Structure Openness Ratio

*For **Tier 2** and **Tier 3** Crossings Only*

Crossing Structure Openness Ratio = 4.23

Openness box culvert = (height x width)/length

Openness round culvert = (3.14 x radius^2)/length

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.
- ☒ Preserve watercourse connectivity where it currently exists.
- ☒ Restore watercourse connectivity where:
  (1) Connectivity previously was disrupted as a result of human activity(ies); and
  (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both.
- ☒ Not cause erosion, aggradation, or scouring upstream or downstream of the crossing.
- ☒ Not cause water quality degradation.

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.

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 904.09.

☒ I have submitted an alternative design and addressed each requirement listed in Env-Wt 904.09

TOWN OF FREMONT COPY DO NOT REMOVE

Town of Fremont
Wetland Evaluation Report

Prepared for:

Town of Fremont, NH
Conservation Commission

September 2007

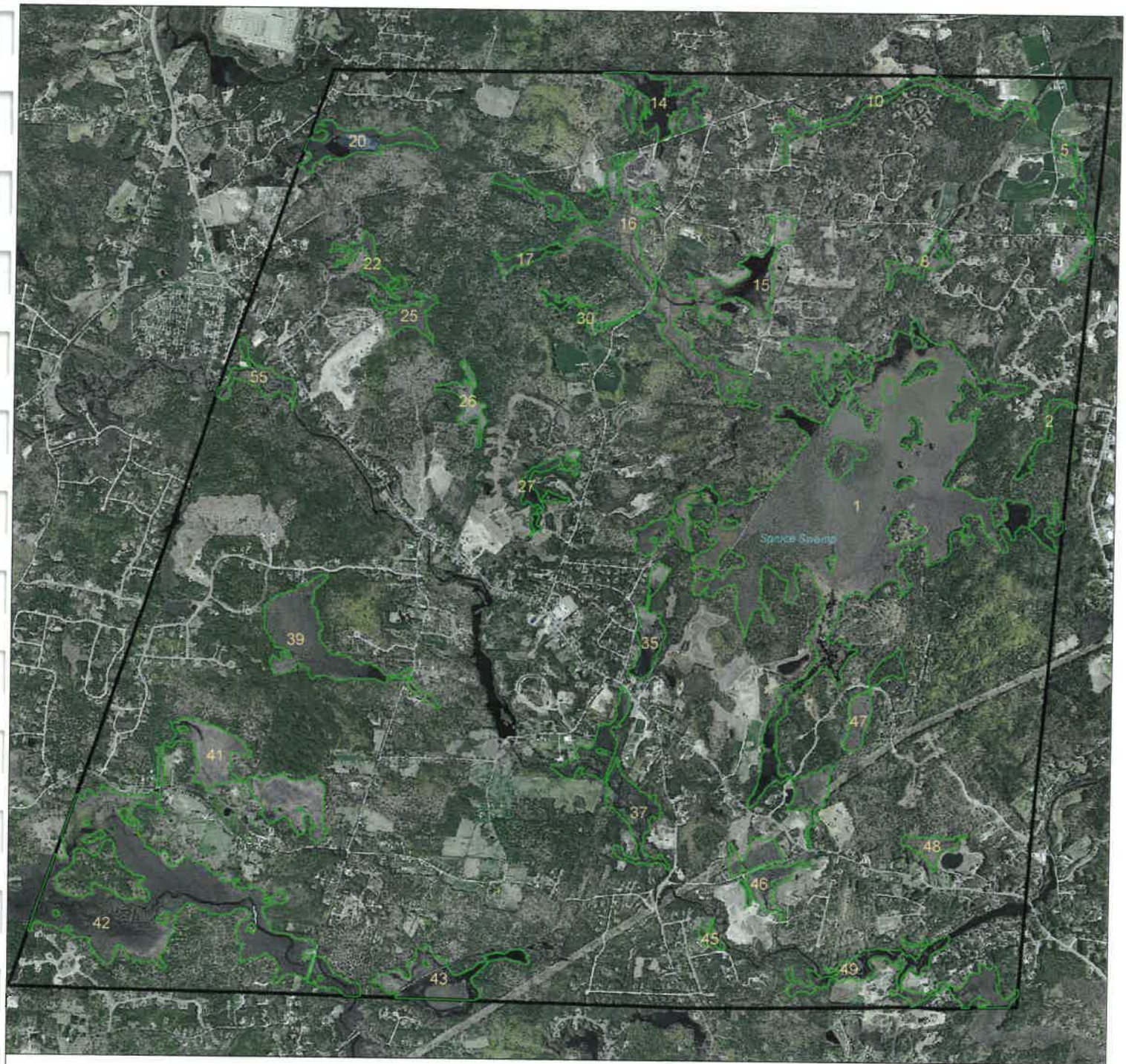
Prepared by:

WEST ENVIRONMENTAL
122 Mast Road, Suite 6, Lee, NH 03861

with assistance from

NewHampshire Estuaries Project

Exhibit G



Fremont Prime Wetlands Map

Wetlands delineated by:

Legend

- Prime Wetland Boundary
- Town Boundary

WEST ENVIRONMENTAL INC

122 Mast Road, Suite 6, Lee, NH 03824
603-659-0416 Fax 603-659-0418 mark@westenv.net

July 2008

1 inch equals 1,250 feet

N

0 0.25 0.5 0.75 1 Miles

Map Prepared by:

Neatline Associates
63A Nottingham Road
Deerfield, NH 03037
603.735.6083

Data Sources:
Aerial photos flown by Sandborn in 2005
Funded by NH Department of Transportation

Exhibit G

Table 1

Fremont Freshwater Wetlands Ranking

Wetland ID	Size(acres)	#PF	WVs	Total Score	Rank
2	13.3 x	6	+ 7	= 86.8	23
3	4.4	6	5	31.4	41
4	4.7	6	5	33.2	40
5	18.2	6	8	117.2	17
6	N/A - 50% hydric A soils				
7	7.6	7	7	60.2	32
8	13.7	6	6	88.2	22
9	22.2	3	3	69.6	29
10	38.9	6	7	240.4	10
11	9.1	6	5	59.6	33
12	6.0	7	6	48.0	37
13	8.0	6	5	53.0	35
14	34.9	6	7	216.4	13
15	81.1	7	9	576.7	3
16	67.5	7	5	477.5	5
17	18.0	6	6	114.0	18
18/19	6.0	1	3	9.0	49
20	61.0	7	9	436.0	6
21	12.0	4	5	53.0	34
22	20.6	4	4	86.4	25
23	4.6	5	5	28.0	43
24	9.8	2	3	22.6	44
25	19.3	6	7	122.8	15
26	16.2	7	5	118.4	16
27	14.0	7	5	103.0	20
28	4.5	4	3	21.0	46
29	9.8	6	3	61.8	30
30	12.0	7	6	90.0	21
31/32	13.0	5	8	73.0	28
33	7.5	6	4	49.0	36
34	6.0	5	6	36.0	39
35	28.0	6	9	177.0	14
36	8.3	5	3	44.5	38

#PF = Number of Principal Functions WVs = Wetland Value score

Exhibit G

Table 4

Tier Three
All wetlands with a score over 75 and under 150

Wetland ID	Size	Score	Rank
25	19.3	122.8	15
26	16.2	118.4	16
5	18.2	117.2	17
17	18.0	114.0	18
48	20.0	105.0	19
27	14.0	103.0	20
30	12.0	90.0	21
8	13.7	88.2	22
2	13.3	86.8	23
47	13.6	86.6	24
22	20.6	86.4	25
45	12.8	83.8	26
Total acres	191.7		

Exhibit G


MAR.27,2006
500
24933-4
To the Pascassic
Brown Brook
PUSH
©2006 COL-EAST
RTH ADAMS, MA
1-800-FLY-TOPO

Exhibit G

WETLAND INVENTORY DATA FORM

WETLAND ID: #5 | **CLASSIFICATION: PEM1E/SS1E** | **ACREAGE: 18.2**

WEI PROJECT #: 06-076NH | **SCIENTIST: Earle Chase** | **DATE: August 2007**

WETLAND TYPE:

☐ WOODED SWAMP	☐ Deciduous	☐ Evergreen	☒ Scrub-Shrub
☒ MARSH	☒ Freshwater Shallow	☐ Freshwater Deep	☐ Tidal
☒ WET MEADOW	☐ Ditched	☐ Grazed	
☐ RIVER	☐ Upper Perennial	☐ Lower Perennial	Order:
☒ STREAM	☒ Perennial	☐ Intermittent	
☐ POND	Name: Brown Brook		
☐ LAKE	Name:		
☐ VERNAL POOL	☐ Documented	☐ Potential	
☐ HUMAN MADE or OTHER	Description:		

WETLAND DESCRIPTION

This wetland is bisected by Brown Brook, a perennial stream. It is comprised chiefly of wet meadow, shallow marsh, and scrub-shrub components. The stream flows in a southeasterly direction. This wetland's position adjacent several large fields increases its ecological diversity and overall uniqueness.

WETLAND PLANT COMMUNITY DATA

TREE LAYER	*SAPLING LAYER*	*SHRUB LAYER*	*HERBACEOUS LAYER*
		Speckled alder	**Tussock sedge**
			Soft rush
			Buttercup (spp.)
			Swamp milkwood
			Lurid sedge
			Red top grass
			Boneset

WETLAND SOILS DATA

The wetland soil is mapped as a (538A) Squamscott fine sandy loam, a poorly drained soil with inclusions of Maybid and Scitico. Soil auguring in the wetland revealed a 4-6" "O" layer. A sulfur smell was evident.

WETLAND HYDROLOGY DATA:

Surface water flowage drained in a southeasterly direction, perennial in character. Adjacent wetlands are saturated to the soil surface.

WILDLIFE SIGNIFICANCE / ADDITIONAL NOTES:

- Red-wing blackbird
- Killdeer
- Whirlygig beetles (in brook)
- Water strider (in brook)
- The speckled alder shrub layer within this wetland provides excellent habitat for woodcock. The adjacent field areas (some of them wet meadow) provide critical nesting habitat to several species of songbird requiring large open tracts.

Exhibit G

1. Wetland #5 consists of a wet meadow – emergent marsh – scrub-shrub plant community. Brown Brook, a perennial stream, flows in a southeasterly direction through the wetland.

2. It appears that earlier flood events have caused disturbance (sediment deposition) in a section of this wetland where an access road was overtopped with water.

Exhibit G

West Environmental, Inc.
Town of Fremont Inventory Functional/Value Assessment Data Form

Wetland ID: #5 Size: 18.2 Date: 8/07 WEI Project # 06-076NH
Classification: PEM1/SS1E Aerial Photograph #: 24933-4-32

Wetland Functions

Groundwater Recharge/Discharge — **Principal Function**

Geology
Restrictive layer present (y) n
Subsoil type: sandy loam
Other geologic features:
Function Present (y) n

Hydrology
Groundwater relationship present (y) n
Variable water levels observed (y) n
Springs or seeps observed y (n)
Contains only inlet or outlet y (n) (Yes) No

Floodflow Alteration

Watershed Information
Land cover in catchment area? field
Watershed position H (M) L
Other catchment storage (y) n nearby ponds
Watercourse associated (y) n
Contains hydric A soils (y) n
Function Present (y) n

Topographic Information
Topography of watershed: relatively flat
Topography of wetland: (same)
Constricted outlet y (n)
High degree of impervious surfaces in wetland watershed y (n)
Provides downstream protection (y) n (Yes) No

Sediment/Toxicant/Pathogen Retention

Soils
Organic Soils (y) n
Broad boundary transition (y) n

Vegetation
Herbaceous vegetation (y) n
Dense vegetation (y) n
Function Present (y) n

Setting & Hydrology
Upstream sources of pollution (y) n adjacent fertilized fields
Erosion/sedimentation observed (y) n storm drain right next to road
Diffuse flow/slow moving water (y) n
Does wetland flood (y) n occasionally
Long water retention (y) n
(Yes) No

Nutrient Removal/Retention Transformation

Hydrology
Open water present (y) n
Slow moving water (y) n
Nutrients upslope (y) n
Function Present (y) n

Transformers
Organic soils (y) n
Aquatic vegetation (y) n
Abundant vegetation (y) n
(Yes) No

Production Export

Vegetation
Density H (M) L
Interspersion H (M) L
Diversity H (M) L
Food source (y) n
Function Present (y) n

Export
Detritus y (n)
Aquatic plants y (n)
Berry producing shrubs y (n)
Nectar sources (y) n
Seed/mast sources y (n) Yes (No)

Sediment/Shoreline Stabilization
Is wetland associated with surface water? (if no, stop) (Perennial) or intermittent

Characteristics of Stream
Elevation change present y (n)
High seasonal flows (y) n
Channelized flow (y) n
Open water fetch y (n)

Function Present (y) n

Description of Bank
Bank present (y) n
Bank vegetated (y) n
Bank eroded (y) n
Steep bank y (n)
Stabilized Bank y (n)
(Yes) No

Exhibit G

Wetland ID: #6

Wildlife Habitat

Existing Critical Habitat (y) n Type: Scrub/shrub habitat **Principal Function**
Extensive adjacent grasslands

Critical Habitat Features (y) n Specific Features: potential habitat for spotted & Blandings turtles, several bird species, green snake and northern leopard frog

Diversity Features
- Aquatic insect habitat (y) n
- Amphibian habitat (y) n
- Fisheries habitat y n (?)
- Cavity trees y (n)
- Food sources (y) n
- Cover (y) n

Connectivity
- Wildlife Corridor (through or adjacent) y n
- Wetland connectivity (y) n
- Upland connectivity (y) n

Strengths of Upland Habitat: The size of the extensive grasslands

Function Present y n (Yes) No

Vegetated Buffer
- Type: Field Width: 500+
- Buffer stream or wetland (y) n
- Does buffer provide shade y (n)
- Does buffer adequately safeguard wetland (y) n

Habitat Degradation
- Percentage of wetland buffer with encroachment: (5%)
- Activities that adversely affect wildlife function:
- Existing structure(s) that obstruct animal movement (y) n
- Significant disturbance y (n)
- Proximity to beaver, mink, or otter habitat y (n)
- Other:

Brown Brook/wetland is bisected by Martin Road. The southern section of this wetland is also bisected by a field access road

Wetland Values

Recreational Value
- Parking available (y) n
- Watercraft access y (n)
- Fishing available y (n)
- Hunting permitted (y) n
- Walking/biking trails y (n)

Value H (M) L

Restoration Stabilization Potential
(y) n
Restoration area size: Recent storm events have caused some sedimentation in the southern wetland/seasonal stream; some evident degradation by cows

H2O Degradation
Present y (n)

Educational/Scientific Value
- Unique habitats/plant species (y) n
- Diverse wildlife habitat (y) n
- Parking/access (y) n
- Value (H) M L

Invasive Species Present: y (n)
Type:

Uniqueness/Heritage
- Urban upland/proximity (y) n
- Rapid development upland y n
- Critical habitat/threatened or endangered species (y) n
- Archaeological sites (y) n
- Stonewalls present y (n)
- Historic sites (y) n
- Ecological health/vigor (y) n
- Value (H) M L

Comments/Notes
nearby cemetery

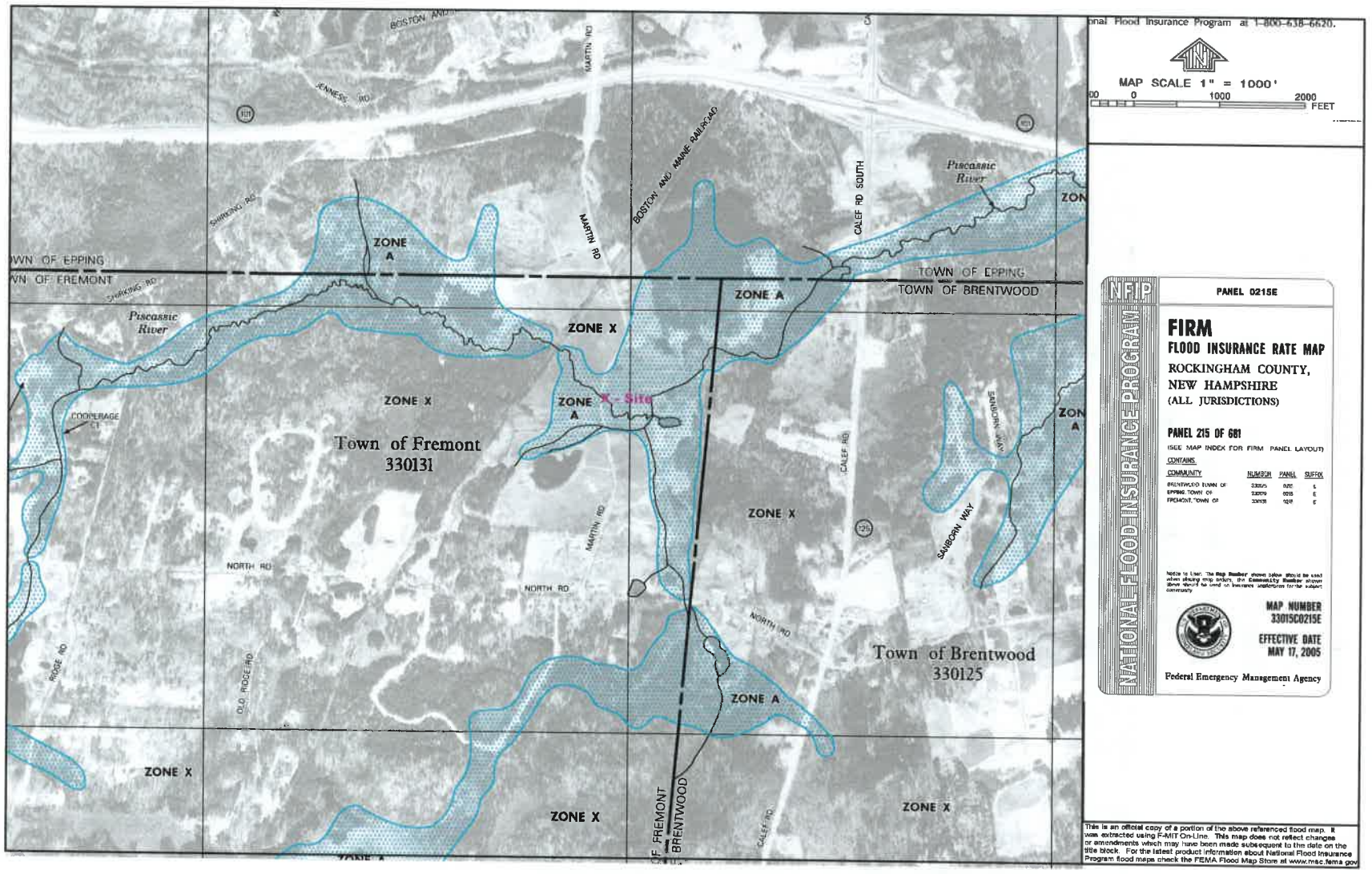

MAP SCALE 1" = 1000'
0 1000 2000 FEET
PANEL 0215E
FIRM
FLOOD INSURANCE RATE MAP
ROCKINGHAM COUNTY, NEW HAMPSHIRE
(ALL JURISDICTIONS)
PANEL 215 OF 681
MAP NUMBER 33015C0215E
EFFECTIVE DATE MAY 17, 2005
Federal Emergency Management Agency
Town of Fremont 330131
Town of Brentwood 330125
X - Site
ZONE A
ZONE X
TOWN OF EPPING
TOWN OF BRENTWOOD
Piscassic River
MARTIN RD
BOSTON AND MAINE RAILROAD
CALEF RD SOUTH
SHIRKING RD
JENNESS RD
NORTH RD
SANBORN WAY
COOPERAGE CT
RIDGE RD
OLD RIDGE RD
CALEF RD

Exhibit H

HYDRAULIC STUDY REPORT

Martin Road over Brown Brook

Fremont, New Hampshire

Bridge No. 155/133

October 2022

Stantec

Prepared for:

Town of Fremont

Prepared by:

Stantec Consulting Services, Inc.

5 Dartmouth Drive, Suite 200

Auburn, NH 03032

Exhibit I

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1.0 Introduction

The purpose of this report is to present the results of a study to evaluate the hydraulic performance of the bridge at Martin Road over Brown Brook in the Town of Fremont. The study was conducted in a manner consistent with the American Association of State Highway Officials (AASHTO), Federal Highway Administration (FHWA), and New Hampshire Department of Transportation (NHDOT) Bridge Design Manual v.2.0 (**Reference 1**) for preparation of hydraulic studies at bridge sites.

The scope of this investigation consisted of hydrologic analysis for Brown Brook at the project site and a detailed hydraulic analysis including scour analysis and scour mitigation design. Data collected, hydrologic analysis, hydraulic model input/output and scour calculations are presented in the appendices of this report. A narrative discussion of the existing and proposed structures, engineering methods, as well as conclusions of the hydraulic study follows.

2.0 Project Description

The bridge is located on Martin Road over Brown Brook just upstream of the confluence with the Piscassic River in the Town of Fremont in Rockingham County, New Hampshire **(Figure 2-1)**. Many references note Brown Brook as the Piscassic River at and upstream of the bridge location, however the NHDES has designated the reach above the confluence as Brown Brook.

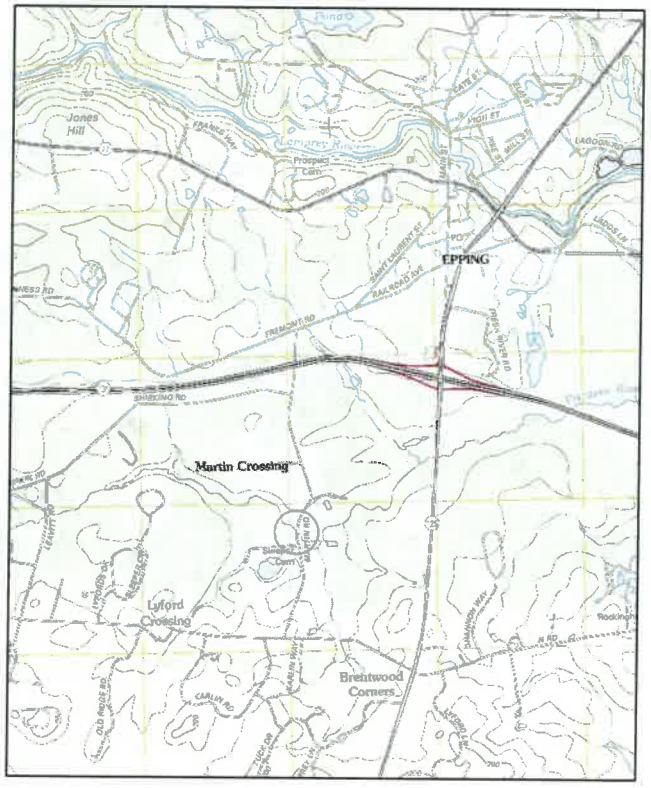


Figure 2-1: Bridge Location

The work related to the bridge is associated with a Town project with funding through the NHDOT Bridge Aid program. The NHDOT bridge inventory number is 155/133.

2.1 Existing Structure

The bridge is located in the Town of Fremont in Rockingham County, New Hampshire. It is designated as Bridge No. 155/133 in the State's inventory. Martin Road connects Fremont Road and North Road and runs north to south. The existing bridge is located about 2,500' north of North Road, which runs east to west. The Martin Road Bridge over Brown Brook (**see Figure 2.2 below**) is a single span structure originally constructed in 1930. The structure consists of a cast-in-place concrete deck on steel girders, which are set on reinforced concrete abutments. The original structure is approximately 21'-6" feet wide (out-to-out). The bridge clear span is skewed and is 12'-3" at the inlet and 10'-2" at the outlet. The height varies along the length between 4'-0" and 4'-5". A fence gate, presumably to prevent farm animals from entering the waterway, is located at the upstream side of the bridge.

Figure 2-2: Existing Bridge

Figure 2-3: Roadway Crossing at Bridge (looking north)

The roadway alignment of Martin Road is on a short tangent section between horizontal curves which both curve to the east. The roadway varies in width at approximately 18-19 feet north and south of the bridge. The existing pavement is in very poor condition. There is a gravel driveway located at the southwest quadrant just south of the bridge.

The latest NHDOT Bridge Inspection Report is dated December 21, 2021. The report lists the 2020 AADT as 520 with 4% trucks. (**Reference 2**). While the superstructure is rated as satisfactory, the deck is rated as poor and substructure rated as serious. The weight limit is posted as 15 tons. The sufficiency rating is 16%. The channel notes of the report indicate bank slumping, riprap to be in fair condition, and debris to be present. The bridge is on NHDOT's municipal Red List.

No record plans are available for the existing bridge.

2.1.1 Waterway at the Bridge Location

Brown Brook rises in the Town of Fremont near Leavitt Road and flows to the east under Martin Road. Brown Brook reaches the confluence with the Piscassic River approximately 600 feet downstream of Martin Road. The Piscassic River then flows east under Route 125 then under Route 101, and eventually merges with the Fresh River then the Lamprey River, which discharges into Great Bay. The drainage area of Brown Brook at the crossing site is about 4.1 square miles (**Figure 2-4**).

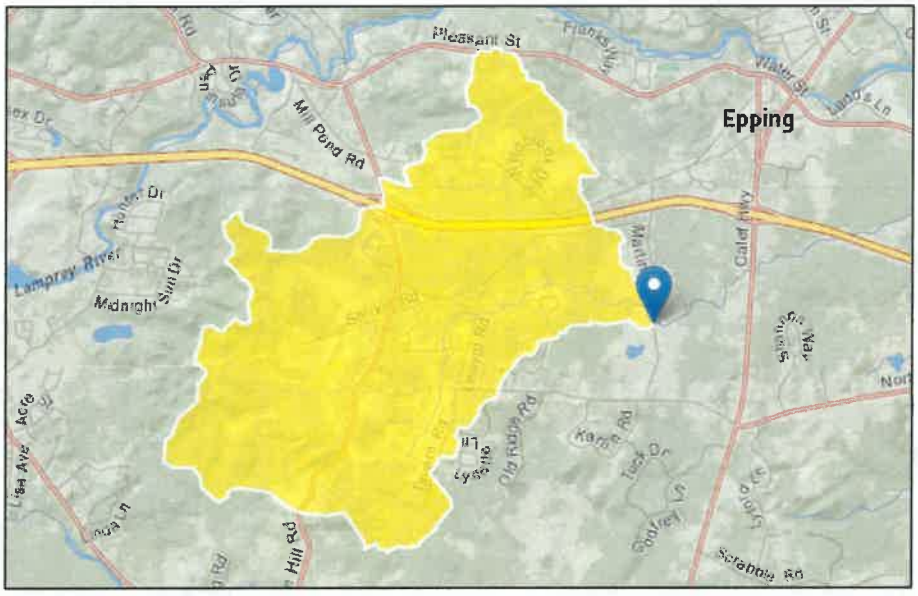


Figure 2-4: Drainage Area at Bridge Crossing

2.1.2 Highway Classification

Martin Road is classified as Urban Local and NH Bridge Tier 5. The average daily traffic (ADT) reported is about 520 vehicles per day, 4% of which is noted as trucks.

2.1.3 Land Use in the Vicinity of the Bridge

The terrain and floodplain of Brown Brook is relatively gentle with a main channel slope at approximately 10.5 feet per mile. The watershed is a mix of open fields and forested areas with some residential development within the watershed. The land use is agricultural along Martin Road with farm cattle using the fields in the vicinity of the bridge (**Figure 2-5**).

Figure 2-5: Land Use near the Bridge Crossing

Exhibit I

2.1.4 Special Site Considerations

The Piscassic River is not studied by detailed methods under the National Flood Insurance Program (NFIP) in the Flood Insurance Study for Rockingham County, which covers the Town of Fremont (**Reference 3**). Brown Brook is labeled as the Piscassic River in the study and is designated as Zone A in the vicinity of the project location (**Figure 2-6**) and shows the approximate limits of the 100-year floodplain.

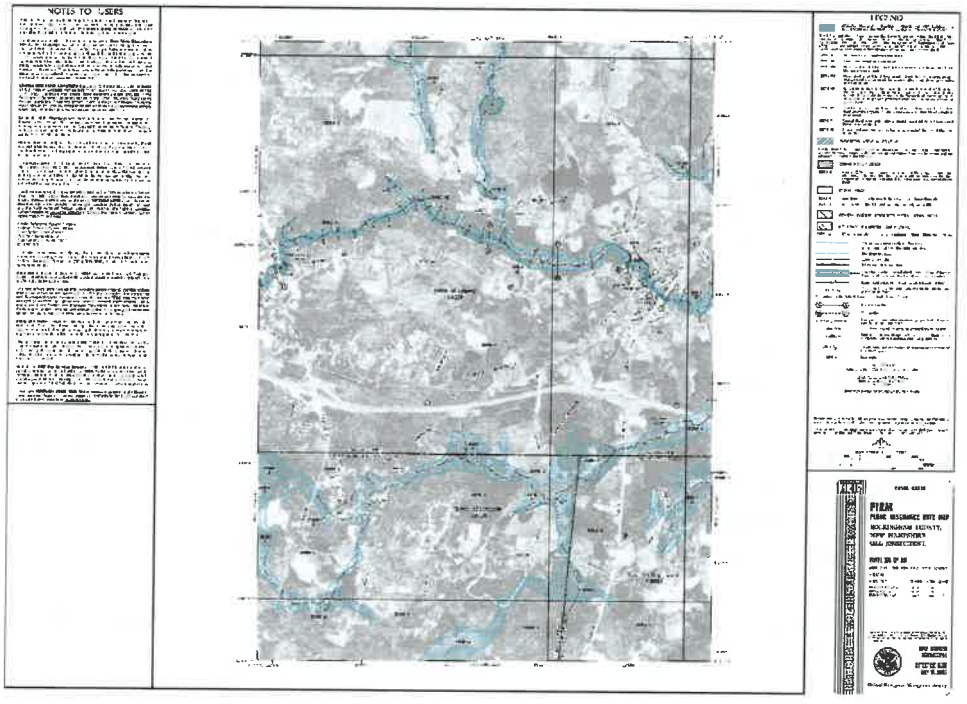


Figure 2-6: Flood Insurance Rate Map

The bridge is located in the middle of a large cattle farm field. Historically, the cattle have had access to the river immediately upstream and downstream of the bridge and have used these two areas as "watering holes". Over the years, the stream banks have been significantly modified by the farming activities, causing the banks to be much wider and flatter than the adjacent upstream and downstream reaches. According to historical information, the project location along Martin Road is not subject to significant flooding from Brown Brook.

2.2 Proposed Bridge Replacement

The project objectives are to replace the existing bridge and to address existing minor scour and erosion issues in the vicinity of the bridge crossing.

Stantec conducted a Geomorphic Investigation in the vicinity of the stream crossing for Brown Brook at Martin Road (**Reference 4**). The geomorphic field review indicates a stream bank full

width of 17 feet. Using the New Hampshire Stream Crossing Rules, the estimated required clear span is approximately 22 feet (**Reference 5**). The existing bridge has a clear span of approximately 10.2 to 12.3 feet. The required width of 22 feet to meet the Stream Crossing Rules is significantly larger than the maximum existing clear span of 12.3 feet.

The poor condition of the bridge deck and serious condition of the substructure suggests that a full bridge replacement is warranted. The existing abutment walls are mis-aligned which results in a narrower opening at the outlet side at 10.2 feet than the inlet side at 12.3 feet. This configuration appears to result in some minor scour at the outlet side of the bridge and some minor deposition upstream of the inlet side of the bridge. Bridge replacement allows for an increase in the hydraulic opening along with correction of the mis-alignment of the existing abutments.

This hydraulic study provides analyses for a clear span of 16 feet as well as the required clear span of 22 feet to meet the stream crossing rules. The clear span of 16 feet was retained from the initial worked conducted in 2014 for the bridge and indicates a 16' span can meet hydraulic capacity but will not meet the stream crossing rules.

The Engineering Study report for this project considers alternative bridge designs for replacement of the existing bridge. The combination of alternatives consider various approaches to the work such as a rigid frame structure with spread footings versus a box culvert, and traffic control with alternating one-way traffic versus a roadway closure. For hydraulic design purposes however, the alternatives are based upon two concepts:

- Box culvert with a 22' clear span
- Three-sided rigid frame structure with a 22' clear span

The 22' span structure as modeled in this report is representative of the box culvert or 3-sided rigid frame with a 5-foot clear height.

3.0 Data Collection

The following references and reports pertinent to the study area were available and were reviewed for the hydraulic and hydrologic analyses of this report:

- Flood Insurance Study, Rockingham County, New Hampshire (All Jurisdictions), effective date May 11, 2005 (**Reference 3**).

4.0 Engineering Methods

Hydrologic and hydraulic analyses were conducted to estimate the peak discharge and water surface elevation respectively, at the bridge location. The following sections briefly describe the methodology.

4.1 Hydrologic Analysis

The watershed area was delineated using USGS StreamStats (**Reference 6**) as shown in **Figure 2-4**. The watershed area at the bridge crossing is approximately 4.1 square miles.

Exhibit I

Peak flow discharges were calculated using four (4) different methodologies including USGS Streamstats, the FHWA 5-Parameter analysis, the New England Hill and Lowland-AWM method, and using a USGS equation for the transfer of peak flow by drainage area comparison using the published FEMA – Flood Insurance Study flows for the Piscassic River at Cuba Road with a drainage area of 9.0 square miles. A comparison of the computed peak flows using each method is presented in Table 4-1 below.

Table 4-1: Summary of Peak Flood Discharges

Method	Drainage Area (Square Miles)	2-yr (CFS)	5-yr (CFS)	10-yr (CFS)	25-yr (CFS)	50-yr (CFS)	100-yr (CFS)	500-yr (CFS)
USGS Streamstats	4.1	61	102	140	185	230	280	405
FHWA 5-Parameter				236		391	455	
AWM Method				95		165		
Transfer of FEMA FIS Peak Flows				115		180	210	285

Considering the above analysis, the USGS Streamstats results were adopted for use in this report following the guidance from the NHDOT Bridge Design Manual.

The hydrologic computations are provided in **Appendix 7-1**.

4.2 Hydraulic Analyses

Water surface profiles for 10-year, 50-year, 100-year and 500-year peak discharge events were developed in a manner consistent with the standards used to develop water surface profiles under the National Flood Insurance Program (NFIP). USACE HEC-RAS Version 6.1 was used to develop flood elevation profiles for the various return events at the project location (**Reference 8**).

Since the bridge does not fall under an NFIP regulatory floodplain, a detailed floodway (no rise) analysis was not performed with this study.

The stream profile developed from the field survey indicates a slight scour hole along the channel through the existing bridge opening with higher channel invert elevations both downstream and upstream of the bridge crossing. For the proposed condition with the bridge replacement, the stream channel through the bridge opening was assumed to maintain the same channel profile.

4.2.1 Existing Condition Analysis

The existing conditions analysis was developed by incorporating relevant cross section data upstream and downstream of the subject bridge from the base plan field survey information. The model parameters such as channel and overbank roughness coefficients (Manning's 'n') were determined from aerial maps and from the site visit photography. The existing bridge was modeled without a skew but accounting for the existing 10.2 foot clear span width at the downstream side and the 12.3 foot clear span width at the upstream side of the bridge crossing. The HEC-RAS model cross section locations are shown in **Figure 4-1**.

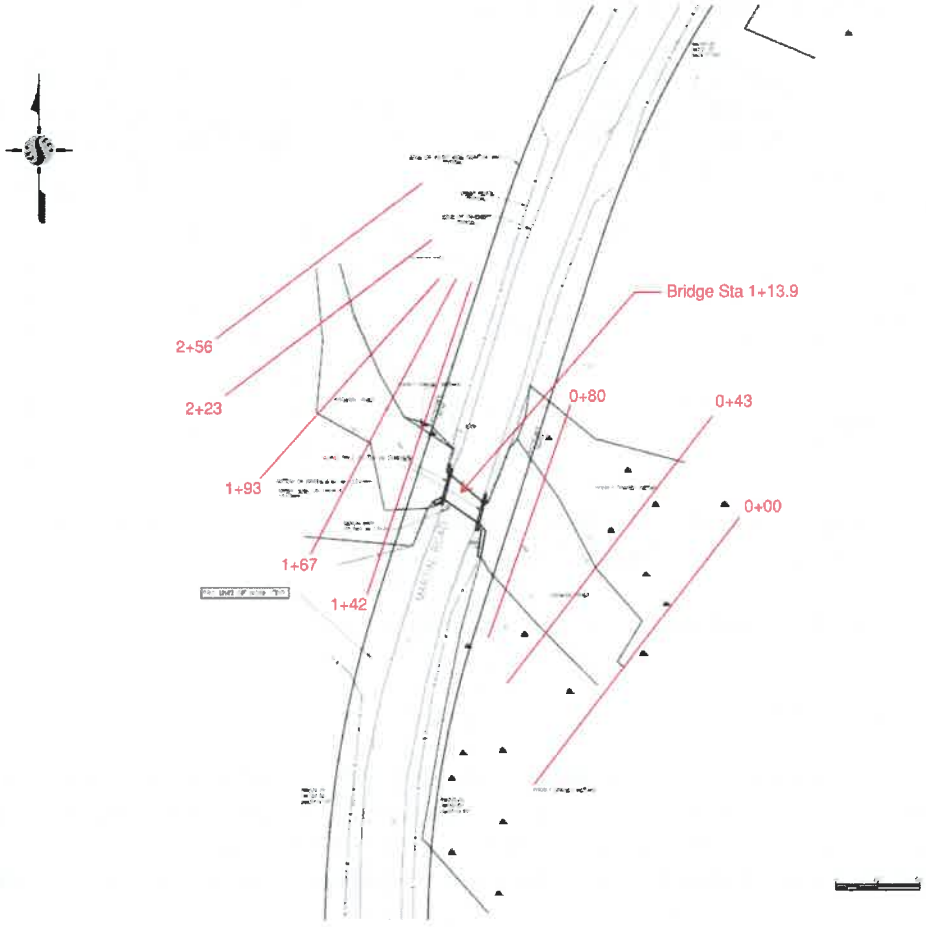


Figure 4-1: HEC-RAS Cross Section Location Plan

All flood simulations performed in the HEC-RAS models were run in a mixed flow mode with the peak flows estimated using USGS Streamstats listed in Table 4-1. Normal depth was used as upstream and downstream boundary conditions.

At the upstream bridge face, the existing condition analysis yielded a 50-year elevation of 133.00 and 100-year elevation of 133.00 versus a low chord elevation of 133.00. This provides for no freeboard above the 100-year storm elevation under the existing condition. The 50-year elevation at the approach cross section 167 is 133.52 with a channel depth of 4.2 feet which compared to the upstream face at the bridge is approximately 0.15 foot below the low chord of the opening.

Exhibit I

Appendix 7.2 contains the results of HEC-RAS modeling for the existing bridge.

4.2.2 Proposed Condition Analysis

The proposed condition analysis was performed for the bridge replacement structures as described under Section 2.2. The proposed structures were modeled with a total face to face width of 16 feet and 22 feet respectively. The peak discharges, boundary conditions and cross section locations from the existing model were not changed for the proposed model.

The summary of existing and proposed condition HEC-RAS analysis is presented in **Table 4-2** for the upstream approach cross section at the bridge.

Table 4-2: Summary of Hydraulic Performance at the Approach Cross Section – Upstream of Bridge

Location	Flood Event	Discharge (CFS)	WSEL (Feet, NAVD)	Channel Velocity (Ft/s)
Existing Condition *(Cross Section 167)*	10-yr	140	132.00	1.86
	50-yr	230	133.52	1.18
	100-yr	280	133.83	1.22
	500-yr	405	134.33	1.37
Proposed Structure 16 foot Span *(Cross Section 167)*	10-yr	140	131.64	2.56
	50-yr	230	132.28	2.48
	100-yr	280	132.66	2.35
	500-yr	405	133.62	1.96
Proposed Structure 22 foot Span *(Cross Section 167)*	10-yr	140	131.54	2.81
	50-yr	230	132.04	2.97
	100-yr	280	132.29	3.01
	500-yr	405	132.91	2.90

Exhibit I

The proposed structure with a 16 foot clear span assumes a design low chord elevation of 134.00. At the upstream bridge face, the proposed condition analysis yielded a 50-year elevation of 131.83 and 100-year elevation of 132.12. This provides for approximately 1.9 feet of freeboard above the 50-year storm elevation at the bridge face. The 50-year elevation at the approach cross section 167 is 132.28 with a channel depth of approximately 3.0 feet which compared to the upstream face at the bridge which has an opening height of approximately 5.4 feet.

The proposed structure with a 22 foot clear span assumes a design low chord elevation of 133.50. At the upstream bridge face, the proposed condition analysis yielded a 50-year elevation of 131.64 and 100-year elevation of 131.84. This provides for approximately 1.9 feet of freeboard above the 50-year storm elevation at the bridge face. The 50-year elevation at the approach cross section 167 is 132.29 with a channel depth of approximately 3.0 feet which compared to the upstream face at the bridge which has an opening height of approximately 4.9 feet.

Appendix 7.3 contains the results of HEC-RAS modeling for the proposed conditions with the bridge replacement assuming a clear span of 16 feet. **Appendix 7.4** contains the results of HEC-RAS modeling for the proposed conditions with the bridge replacement assuming a clear span of 22 feet.

A conceptual plan for the bridge replacement is presented in **Figure 4-2.**

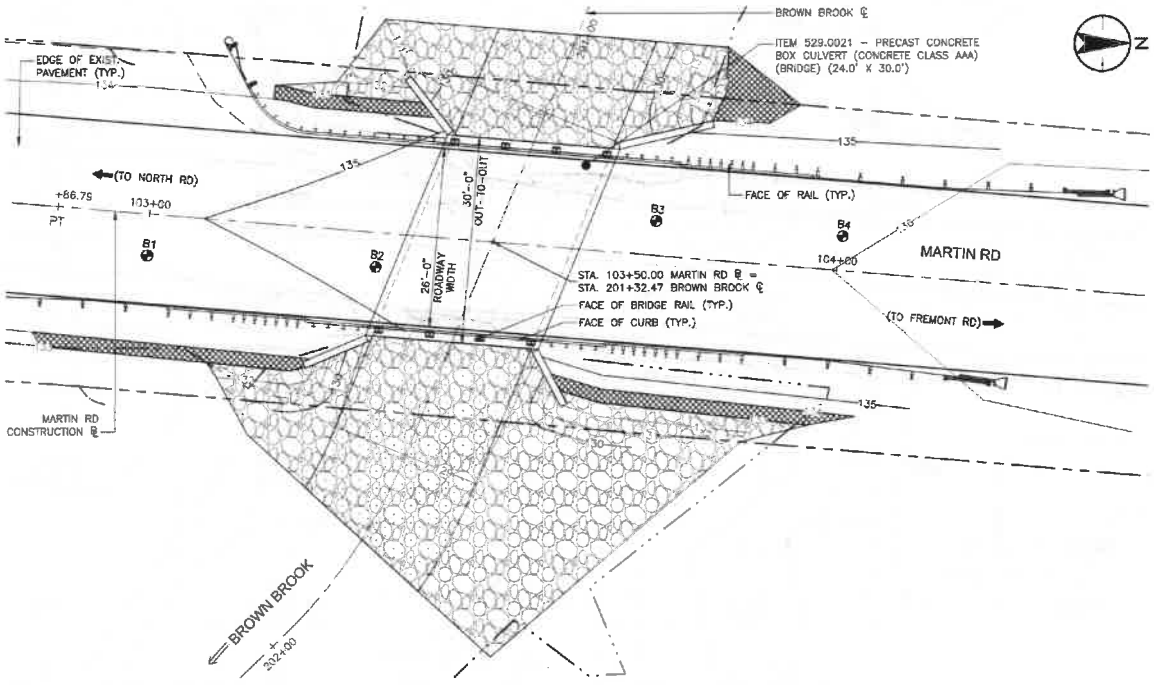


Figure 4-2: Conceptual Plan and Layout for Prop Replacement Bridge – 22' Clear Span Fremont 155/133

Exhibit I

4.3 Scour Analysis

Scour potential at the crossing site under existing and proposed conditions was analyzed using the Hydraulic Design – Bridge Scour functions in HEC-RAS (**Reference 8**) and in accordance with the NHDOT Bridge Manual – Sections 2.7.6 and 2.7.7 (**Reference 1**). In accordance with Section 2.7.6 of the NHDOT Bridge Manual, FHWA Technical Advisory T5140.23, requires all bridges be designed to resist scour from a 100-year flood event and be checked against a 500-year flood event.

Site specific soil information from soil borings at the project site was not available with the Geotechnical Engineering Report for the project dated October 31, 2014. Stantec used the NRCS Soils Report for Rockingham county to obtain soil data in the vicinity of the bridge noted as 538A – Squamscott, fine sandy loam. For a depth of 19 to 65 inches, the soil is noted as a silt loam, silty clay loam for which the D_{50} grain size was estimated to range from 0.007 mm to 0.05 mm. This range of D_{50} grain size was used for the contraction scour analyses of this report.

Using the assumed D_{50} range in grain size, a summary of computed 100-year and 500-year flood scour depths under existing and proposed site conditions is presented in **Table 4-3**. See **Appendix 7-5** for the detailed scour calculations.

Table 4-3 – Summary of Calculated Scour

Bridge	Return Frequency (year)	Left (North) Abutment Scour Depth (ft)	Right (South) Abutment Scour Depth (ft)	Contraction Scour Depth (ft)	Total Scour Depth (ft)	Location of Maximum Scour (ft)
Existing Condition	100-yr	0.0	9.0	7.4	16.4	Right (South) Abutment
	500-yr	0.0	19.3	0.5	19.8	Right (South) Abutment
Proposed Bridge Replacement with 22' Span	100-yr	5.7	2.5	0.0	5.7	Left (North) Abutment
	500-yr	6.5	4.7	0.9	7.3	Left (North) Abutment

The latest NHDOT Bridge Inspection report dated December 21, 2021 for the existing bridge indicates the following National Bridge Inventory (NBI) ratings:

Item 113 Rating – Bridge Scour Critical Status: 8 – Stable Above Footing

Item 71 Rating – Waterway Adequacy: 6 – Equal Desirable

Item 61 Rating – Channel and Channel Protection: 6 – Bank Slumping

Exhibit I

The report also notes the abutments are undermined and the north abutment has settled. Channel scour and bank slumping are also noted.

4.4 Scour Countermeasure Design

The analyses indicate the total scour depth is estimated at 5.7 feet for the 100-year event and 7.3 feet for the 500-year event for the proposed bridge replacement. The analyses also indicate this will be a significant reduction in scour as compared to the existing condition.

It is anticipated the new bridge replacement will be constructed on a skew with a 22-foot clear span with a reconstructed channel aprons at the bridge opening consisting of a buried heavy riprap blanket section spanning both banks and the channel. Riprap protection was evaluated using two methodologies including HEC-23 Guideline #14 for Riprap at Bridge Abutments and Guideline #4, the US Army Corps of Engineers EM-1601 Guideline for Riprap Revetment **(Reference 7)**. The analyses based upon HEC-23 indicate a minimum D_{50} stone size of 0.5 feet (6-inch diameter stone) is required for channel protection at the 100-year storm event. Based upon field observation, there are signs of distress along the channel and stream banks, and therefore bank and channel protection is proposed in the vicinity of the bridge.

In addition to the channel protection measures, the scour countermeasure design should include extending the base of the cutoff walls and wingwall footings below the estimated depth of scour for the 100-year storm event.

5.0 Conclusions and Recommendations

5.1 Conclusions

1. Analysis performed with this hydraulic study also indicates that the proposed bridge replacement will not result in any increase in flooding within the community during the 100-year base flood elevation (BFE) event.

5.2 Recommendations

1. The recommended replacement structure is a 22-foot wide by 5-foot high (clear opening) culvert.

2. The information in **Table 5-1** below for the proposed structure should be presented within the Hydraulic Data Table in the General Notes of the Bridge Sketch Plan and Construction Plan sets.

3. A two (2) foot thick layer of Item 583.3 – Class III Riprap is proposed for lining the aprons adjacent to the bridge openings and extending up the banks to one (1) foot above the 100-year storm elevation. A two (2) foot thick layer of Item 585.3401 - Simulated Streambed Material is proposed on top of the riprap along the channel bottom and through the culvert.

Exhibit I

4. The calculated 100-year event scour depth presented in Table 4-3 for the proposed structure should be considered for use as a culvert foundation condition in the LRFD strength and service limit state foundation stability determination. It is recommended that the base of the cutoff walls and wingwall footings extend below the estimated depth of scour.

Table 5-1: Hydraulic Design Table for Bridge General Plan (Proposed Structure - 22' Clear Span)

Hydraulic Design Data	
Drainage Area:	4.1 Square miles
Design Flood Discharge (50-year):	230 cfs
Design Flood Elevation (50-year):	131.6 at bridge
Design Flood Velocity (50-year):	3.6 fps at bridge
Scour Check Discharge (500-year):	405 cfs
Anticipated Depth of Scour (100-year):	5.7 Feet at North Abutment
Anticipated Depth of Scour (500-year):	7.3 Feet at North Abutment
Bridge Full Waterway Opening + to River:	108 Square Feet

6.0 References

6.1 Data Sources

1. New Hampshire Department of Transportation (NHDOT) Bridge Design Manual v.2.0, revised August 2018.
2. NHDOT Bridge Inspection Report, Fremont 155/133, dated December 21, 2021.
3. Flood Insurance Study, Rockingham County, New Hampshire (All Jurisdictions) effective date May 11, 2005
4. Geomorphic Characterization, Martin Road over Brown Brook, Fremont, New Hampshire, Stantec Consulting Services, Inc., July 8, 2022.
5. University of New Hampshire, New Hampshire Stream Crossing Guidelines, May 2009.
6. United States Geological Survey (USGS), USGS Streamstats in New Hampshire website: http://water.usgs.gov/osw/streamstats/new hampshire.html
7. Federal Highway Administration (FHWA), Hydraulic Engineering Circular No. 23 "Bridge Scour and Stream Instability Countermeasures: Experience, Selection and Design Guidance – Third Edition", Volume 2, September 2009.

6.2 Data Applications

8. US Army Corps of Engineer (USACOE), Hydrologic Engineering Center, HEC-RAS River Analysis System, Version 6.1

Exhibit I

7.0 Appendices

7.1 Hydrologic Analyses

7.1.1 Peak Flow Estimation - USGS Streamstats
7.1.2 Peak Flow Estimation – FHWA 5-Parameter
7.1.3 Peak Flow Estimation – FEMA-FIS Transfer
7.1.4 Peak Flow Estimation – New England Hill and Lowland – AWM Method

7.2 Hydraulic Analyses – Existing Bridge

7.2.1 Existing Condition - Bridge Cross Section
7.2.2. Existing Condition - Channel Profile
7.2.3 Existing Condition - Analysis Summary Table

7.3 Hydraulic Analyses – Proposed Bridge – 16' Span

7.3.1 Proposed Condition - Bridge Cross Section
7.3.2 Proposed Condition - Channel Profile
7.3.3 Proposed Condition - Analysis Summary Table

7.4 Hydraulic Analyses – Proposed Bridge – 22' Span

7.4.1 Proposed Condition - Bridge Cross Section
7.4.2 Proposed Condition - Channel Profile
7.4.3 Proposed Condition - Analysis Summary Table

7.5 Scour Calculations

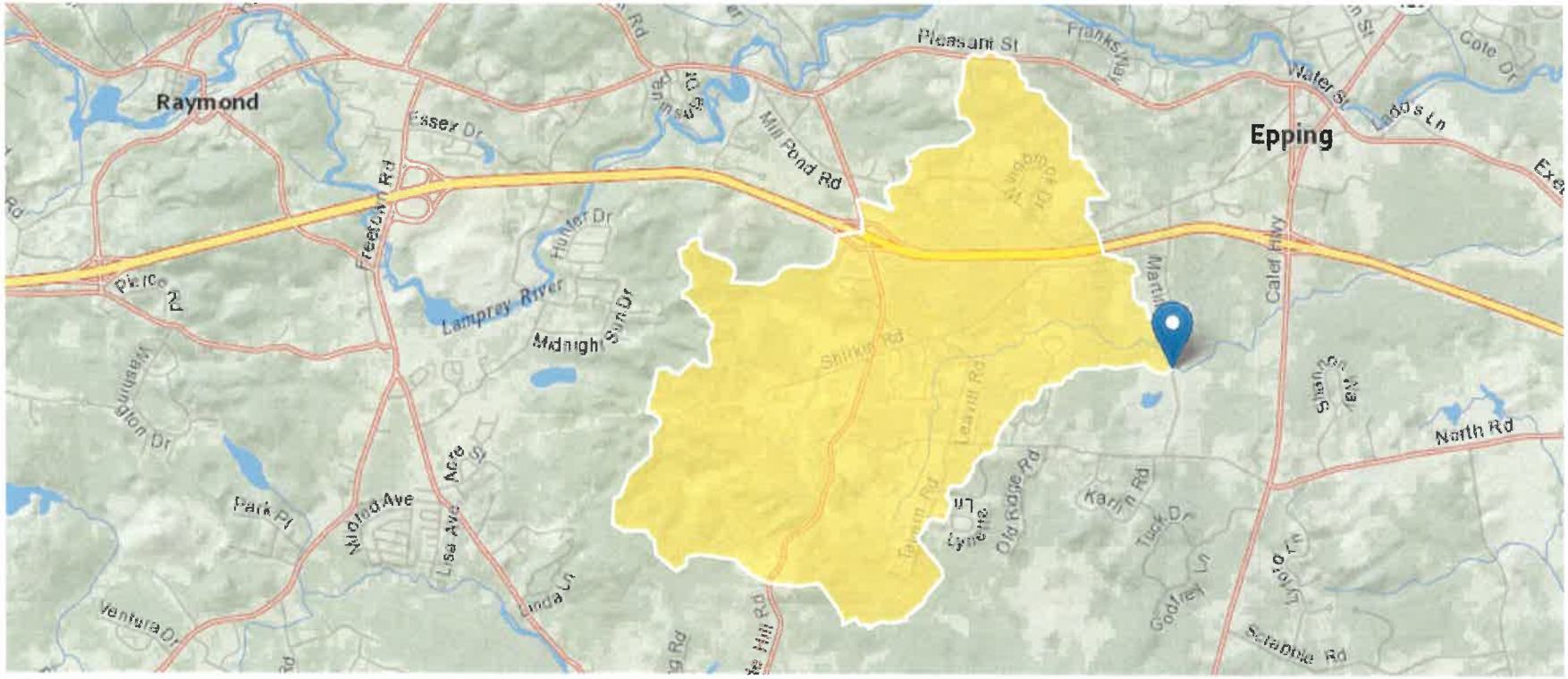
7.5.1 Scour Sediment Data
7.5.2 Scour Calculations
7.5.3 Scour Mitigation Calculations

7.1 Hydrologic Analyses

7.1.1 Peak Flow Estimation - USGS Streamstats
7.1.2 Peak Flow Estimation – FHWA 5-Parameter
7.1.3 Peak Flow Estimation – FEMA-FIS Transfer
7.1.4 Peak Flow Estimation – New England Hill and Lowland – AWM Method

StreamStats Report - Piscassic River at Martin Road - Fremont

Region ID: NH
Workspace ID: NH20220801185616997000
Clicked Point (Latitude, Longitude): 43.01700, -71.08560
Time: 2022-08-01 14:56:37 -0400



Collapse All

Exhibit I

> Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
APRAVPRE	Mean April Precipitation	4.186	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	10.5	feet per mi
DRNAREA	Area that drains to a point on a stream	4.1	square miles
WETLAND	Percentage of Wetlands	14.8062	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	4.1	square miles	0.7	1290
APRAVPRE	Mean April Precipitation	4.186	inches	2.79	6.23
WETLAND	Percent Wetlands	14.8062	percent	0	21.8
CSL10_85	Stream Slope 10 and 85 Method	10.5	feet per mi	5.43	543

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

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

Statistic	Value	Unit	PII	PIu	ASEp	Equiv. Yrs.
50-percent AEP flood	60.4	ft^3/s	36.6	99.6	30.1	3.2
20-percent AEP flood	102	ft^3/s	60.9	171	31.1	4.7

Statistic	Value	Unit	PII	PIu	ASEp	Equiv. Yrs.
10-percent AEP flood	137	ft^3/s	80.1	234	32.3	6.2
4-percent AEP flood	185	ft^3/s	104	328	34.3	8
2-percent AEP flood	226	ft^3/s	123	414	36.4	9
1-percent AEP flood	276	ft^3/s	145	524	38.6	9.8
0.2-percent AEP flood	404	ft^3/s	196	834	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/)

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

Exhibit I

Stantec

Martins Road Bridge
Fremont, NH

2-28-14

FHWA 5- Parameter Equation NH = Zone 9

$$Q_{10} = 7.7165\ A^{0.5814}\ R^{0.0547}\ DH^{0.3865}\ L^{0.099}\ P_{60}^{0.8217}$$

$$Q_{50} = 1.45962\ Q_{10}^{1.02342}$$

$$Q_{100} = 1.64380\ Q_{10}^{1.02918}$$

A = 4.1 sq mi
R = 96
DH = High = 228
Low = 136
DH = 92
L = 4.6 mi
P_{60} = 1.75

$$Q_{10} = 7.7165\ (4.1)^{0.5814}\ 96^{0.0547}\ 92^{0.3865}\ 4.6^{0.099}\ 1.75^{0.8217}$$

$$= 7.7165\ (2.27)\ (1.28)\ (5.74)\ (1.16)\ (1.58)$$

$$= 236 \text{ cfs}$$

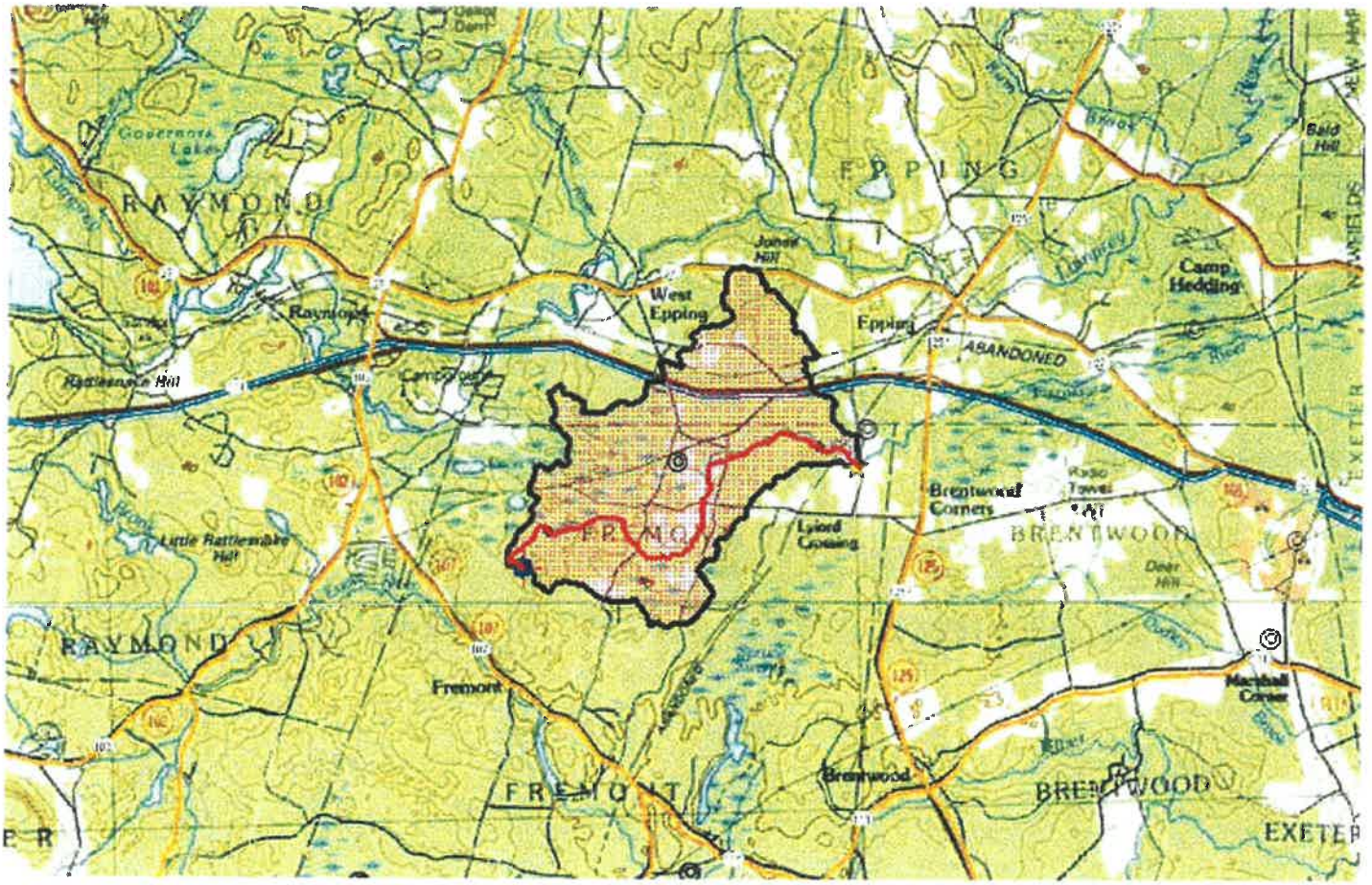
$$Q_{50} = 1.45962\ (236)^{1.02342} = 391 \text{ cfs}$$

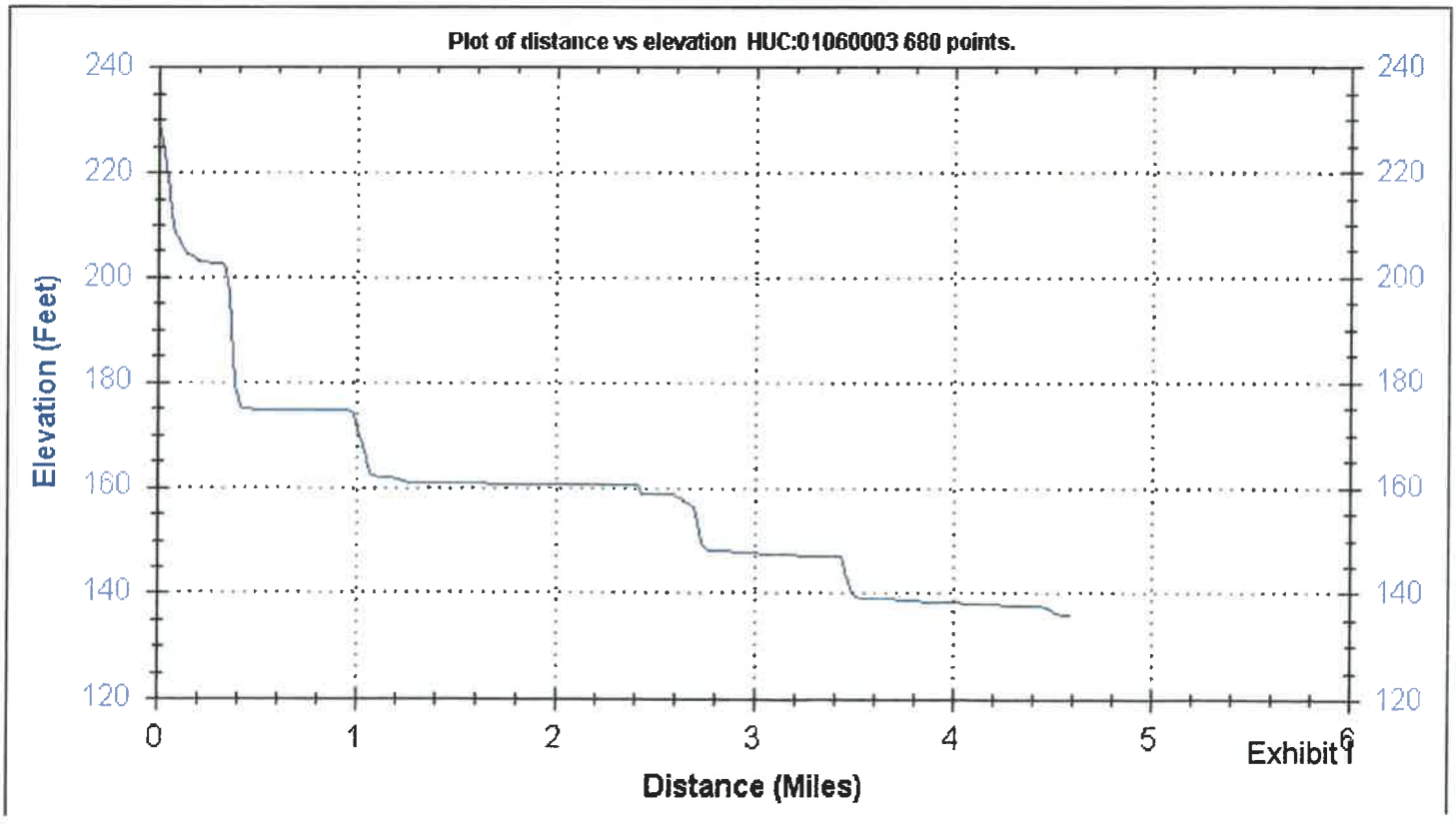
$$Q_{100} = 1.64380\ (236)^{1.02918} = 455 \text{ cfs}$$

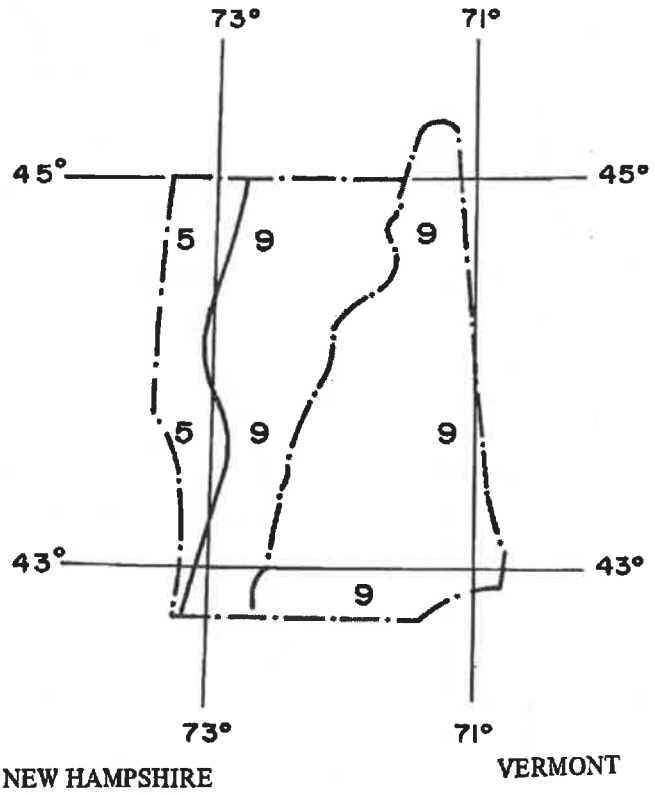
Exhibit I

Designed by:

Checked by:

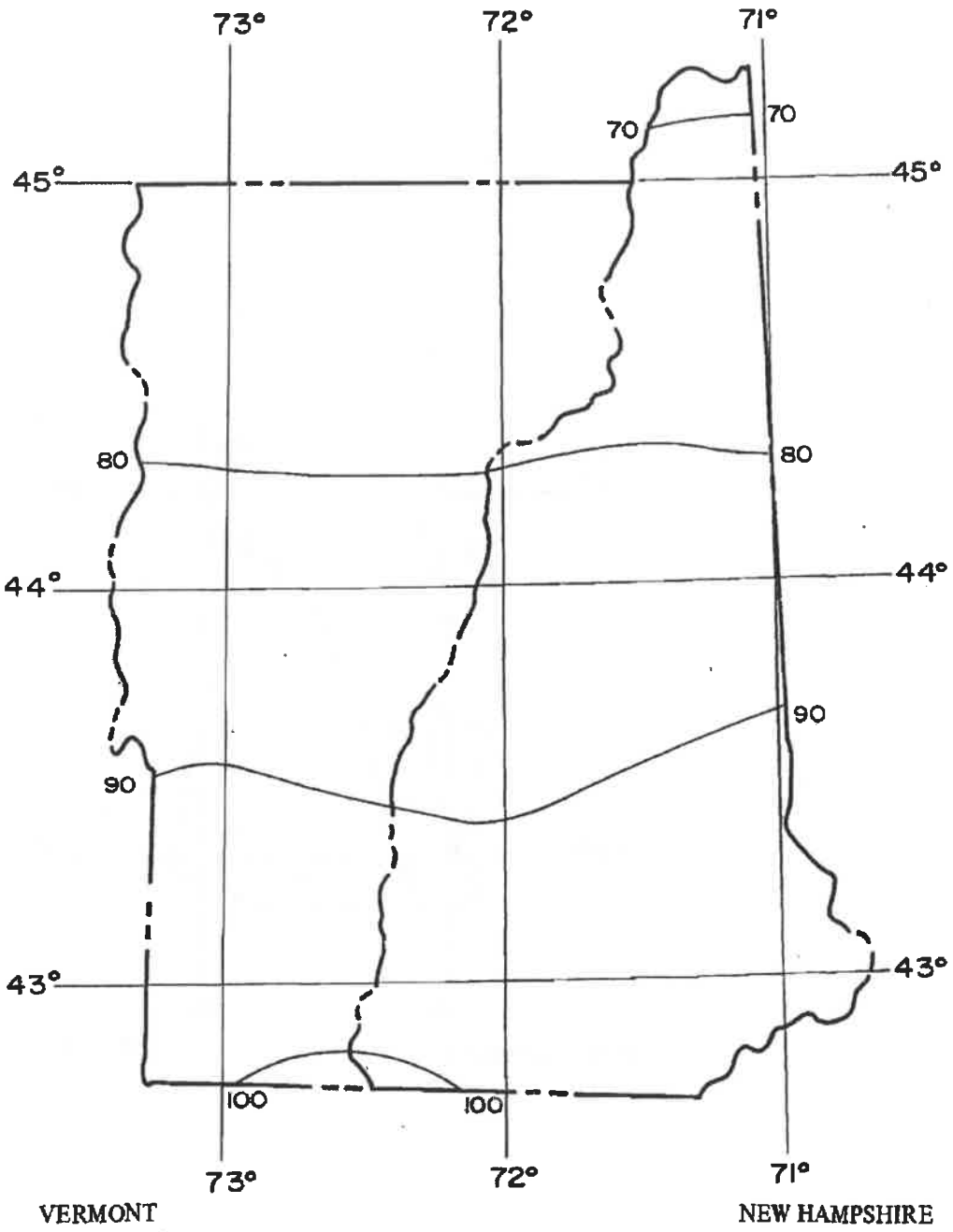

RAYMOND
EPPING
West Epping
Epping
ABANDONED
Camp Hedding
Brentwood Corners
BRENTWOOD
Lyford Crossing
Little Rattlesnake Hill
Fremont
Marshall Corner
Brentwood
EXETER


Plot of distance vs elevation HUC:01060003 680 points.
Elevation (Feet)
240
220
200
180
160
140
120
0
1
2
3
4
5
6
Distance (Miles)
Exhibit 1



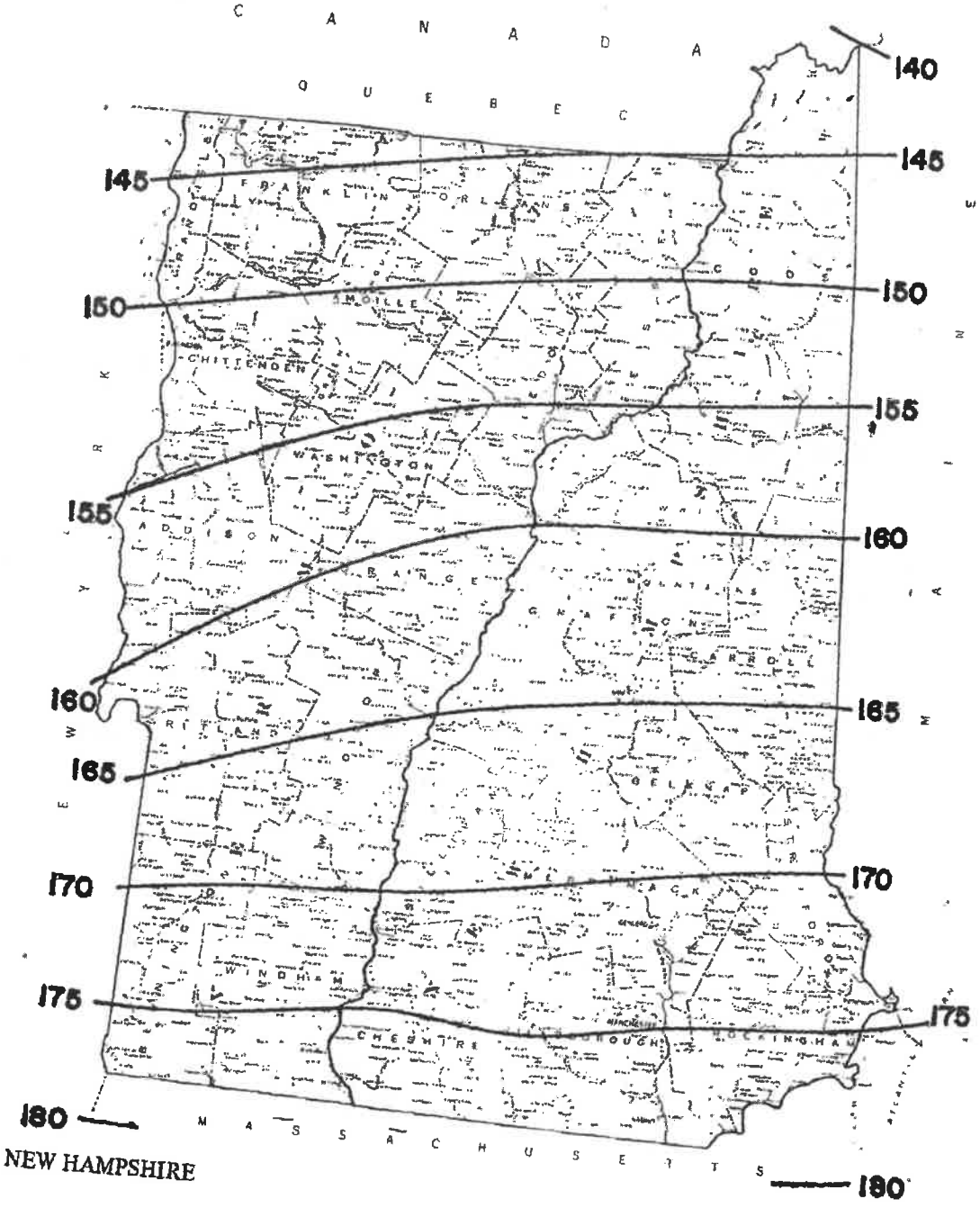
Appendix B-33. Hydrophysiographic zones of New Hampshire.
Appendix B-50. Hydrophysiographic zones of Vermont.

Exhibit I



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

Exhibit I



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.

Exhibit I

Stantec

Martins Road Bridge
Fremont, NH

2-28-14

From FEMA - Flood Insurance Study
Rockingham County, NH
May 17, 2005

Table 4 - Summary of Discharges

	DA Sq Mi	10-YR	50-YR	100-YR	500-YR
Piscassic River at Cuba Road	9.0	206	318	371	503

using equation: $Q_1/Q_2 = (A_1/A_2)^{0.75}$

at Martin Road	4.1	115	178	208	282

Exhibit I

Designed by:

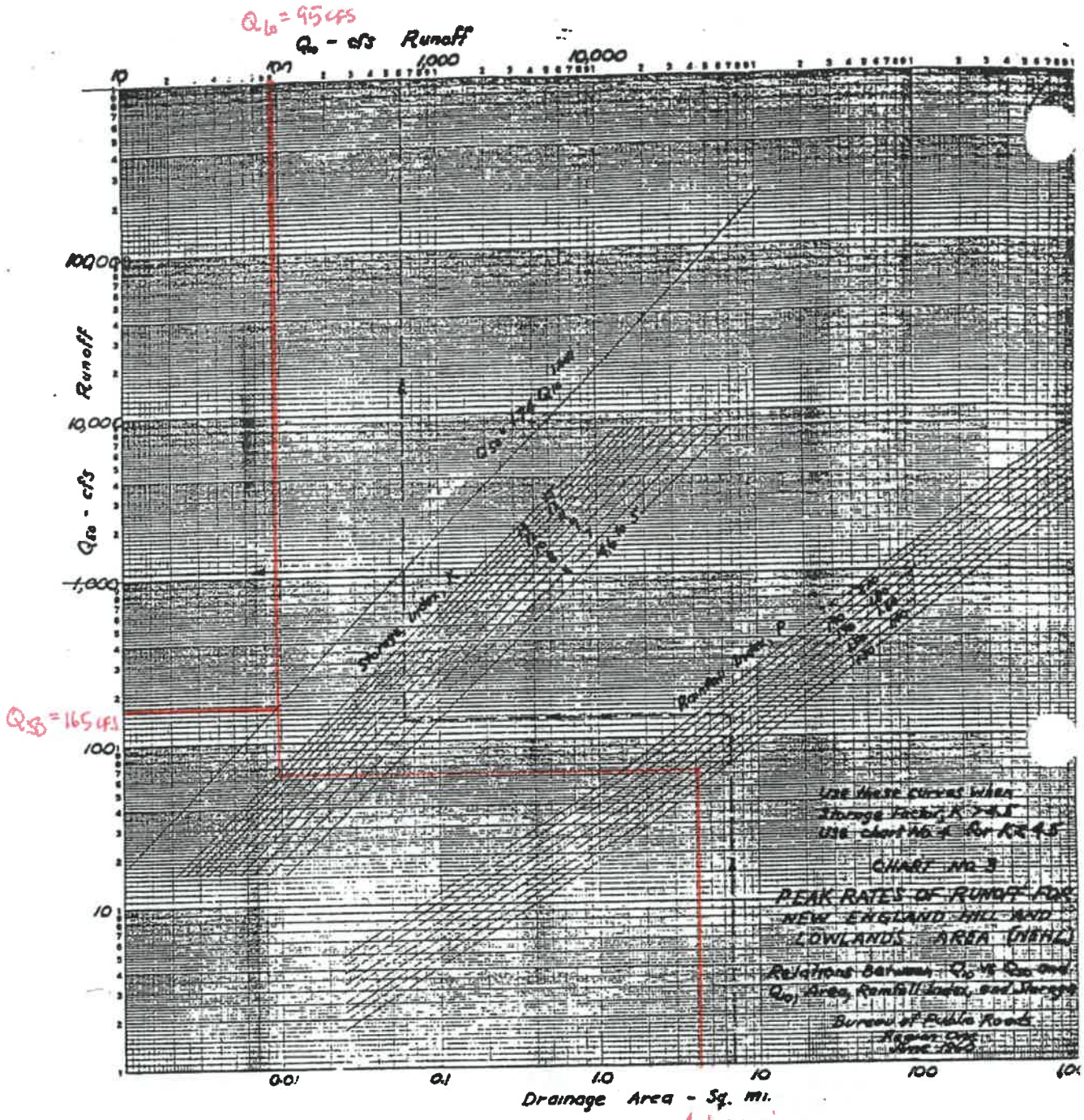
Checked by:

TABLE 4 – SUMMARY OF DISCHARGES – continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
PICKERING BROOK					
At Portsmouth Avenue (State Route 151)	2.45	39	48	53	62
At access road	0.80	*	*	86.54	*
PISCASSIC RIVER					
At Ice Pond	13.8	312	480	560	760
At Cuba Road	9.0	206	318	371	503
POLICY BROOK					
At Rockingham Park Inlet	5.9	350	550	660	880
At State Route 28	5.2	250	390	460	620
At a point approximately 2,000 feet above State Route 28	5.0	180	290	330	440
At a point approximately 700 feet below Main Street	4.8	100	190	210	260
UNNAMED BROOK					
At the State Route 97 bridge	0.7	70	100	120	170
PORCUPINE BROOK					
At Interstate Route 93	3.1	*	*	650	*
At Old Causeway	2.2	*	*	450	*
PORCUPINE BROOK TRIBUTARY					
At Quill Lane	0.8	*	*	210	*
POWWOW RIVER					
At Lake Gardiner Dam in Amesbury, Massachusetts	49.1	*	*	1,720	*
Downstream reach at corporate limits near Lake Gardiner	48.3	*	*	1,700	*
At Tuxbury Pond Dam in Amesbury, Massachusetts	45.9	*	*	1,640	*
Upstream reach at corporate limits in Tuxbury Pond	41.4	*	*	1,540	*

*Data not available

Exhibit I



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

Exhibit I

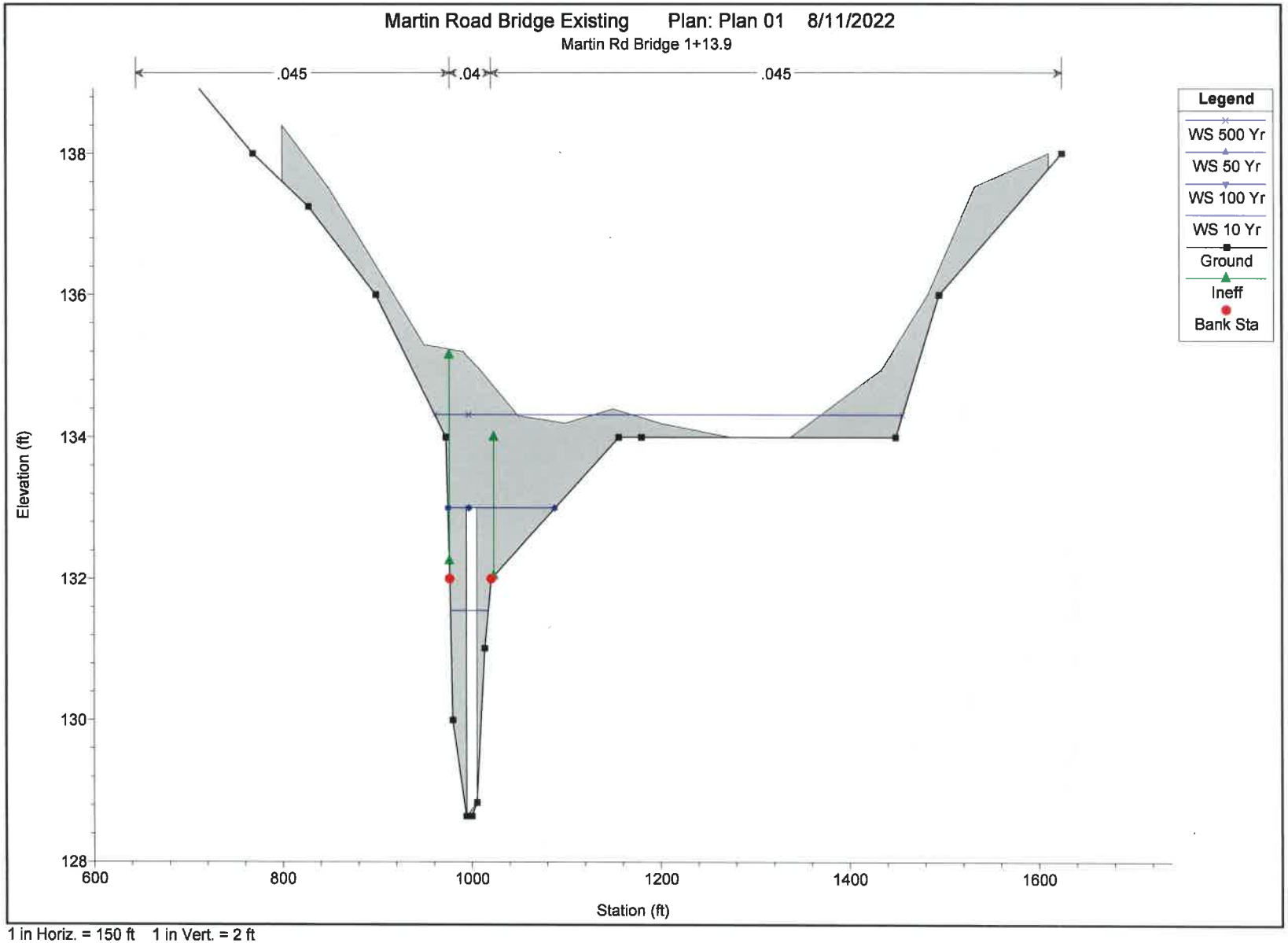
FIGURE 2-8

7.2 Hydraulic Analyses – Existing Bridge

7.2.1 Existing Condition - Bridge Cross Section
7.2.2. Existing Condition - Channel Profile
7.2.3 Existing Condition - Analysis Summary Table

Exhibit I

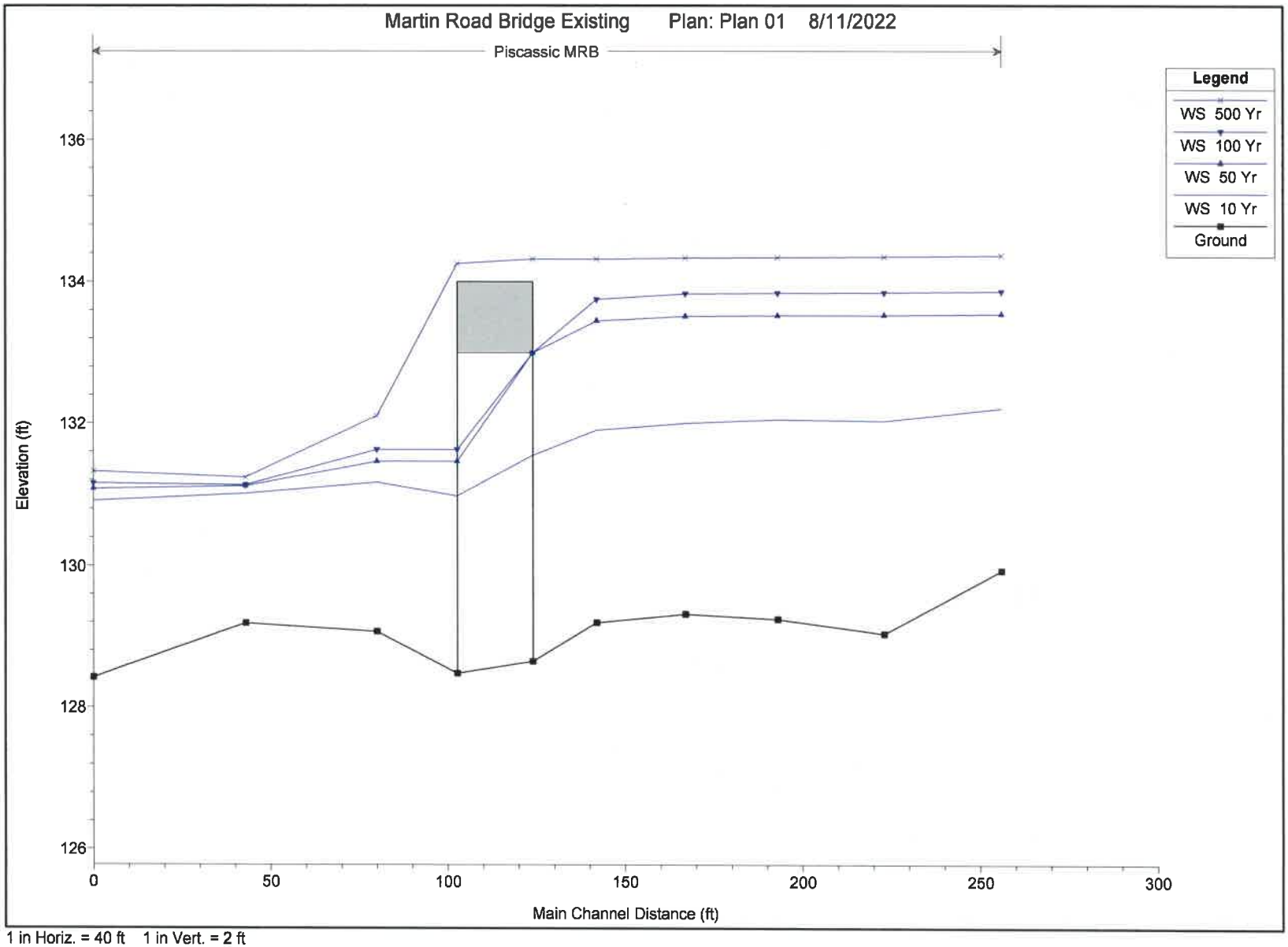
Existing Bridge (approx 10' Span)



1 in Horiz. = 150 ft 1 in Vert. = 2 ft

Exhibit I

Existing Bridge (approx 10' Span)



1 in Horiz. = 40 ft 1 in Vert. = 2 ft

Exhibit I

Existing Bridge (approx 10' Span)

HEC-RAS Plan: Plan 01 River: Piscassic Reach: MRB

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
MRB	256	10 Yr	140.00	129.94	132.22	131.79	132.31	0.004609	2.48	71.40	155.08	0.44
MRB	256	50 Yr	230.00	129.94	133.55	132.20	133.56	0.000229	0.98	321.57	221.51	0.11
MRB	256	100 Yr	280.00	129.94	133.87	132.29	133.88	0.000192	0.98	394.11	237.32	0.11
MRB	256	500 Yr	405.00	129.94	134.37	132.44	134.38	0.000216	1.16	666.20	650.17	0.12
MRB	223	10 Yr	140.00	129.04	132.04		132.18	0.002790	3.08	50.47	103.31	0.37
MRB	223	50 Yr	230.00	129.04	133.53		133.55	0.000337	1.41	251.15	165.49	0.14
MRB	223	100 Yr	280.00	129.04	133.85		133.87	0.000302	1.39	305.94	178.74	0.13
MRB	223	500 Yr	405.00	129.04	134.35		134.37	0.000375	1.68	535.96	581.66	0.15
MRB	193	10 Yr	140.00	129.25	132.06		132.10	0.001209	1.63	87.34	88.81	0.24
MRB	193	50 Yr	230.00	129.25	133.53		133.54	0.000203	1.07	269.37	159.26	0.11
MRB	193	100 Yr	280.00	129.25	133.84		133.86	0.000193	1.12	322.38	174.51	0.11
MRB	193	500 Yr	405.00	129.25	134.34		134.36	0.000217	1.30	542.09	564.76	0.12
MRB	167	10 Yr	140.00	129.32	132.00		132.06	0.002002	1.86	75.11	62.29	0.30
MRB	167	50 Yr	230.00	129.32	133.52		133.53	0.000271	1.18	238.30	153.70	0.13
MRB	167	100 Yr	280.00	129.32	133.83		133.85	0.000251	1.22	290.27	172.96	0.12
MRB	167	500 Yr	405.00	129.32	134.33		134.36	0.000258	1.37	502.40	553.41	0.13
MRB	142	10 Yr	140.00	129.20	131.91	130.91	132.00	0.002065	2.39	58.53	43.78	0.32
MRB	142	50 Yr	230.00	129.20	133.45	131.27	133.51	0.000709	1.98	116.13	115.35	0.21
MRB	142	100 Yr	280.00	129.20	133.75	131.43	133.83	0.000779	2.18	128.52	129.99	0.22
MRB	142	500 Yr	405.00	129.20	134.32	131.82	134.35	0.000497	1.35	303.13	165.90	0.16
MRB	113.9		Bridge									
MRB	080	10 Yr	140.00	129.07	131.17	130.17	131.24	0.001466	2.05	68.20	49.02	0.27
MRB	080	50 Yr	230.00	129.07	131.46	130.46	131.59	0.002361	2.89	79.62	50.48	0.36
MRB	080	100 Yr	280.00	129.07	131.63	130.60	131.79	0.002687	3.25	86.19	53.37	0.39
MRB	080	500 Yr	405.00	129.07	132.11	130.93	132.34	0.002912	3.86	104.99	76.25	0.42
MRB	043	10 Yr	140.00	129.19	131.01		131.14	0.004200	2.79	50.25	39.97	0.44
MRB	043	50 Yr	230.00	129.19	131.12		131.40	0.008879	4.23	54.43	40.60	0.64
MRB	043	100 Yr	280.00	129.19	131.13		131.54	0.012698	5.08	55.07	40.70	0.77
MRB	043	500 Yr	405.00	129.19	131.24	131.24	131.96	0.021177	6.83	59.33	41.34	1.00
MRB	000	10 Yr	140.00	128.42	130.91	130.81	130.97	0.002703	2.69	119.07	338.36	0.36
MRB	000	50 Yr	230.00	128.42	131.08	130.91	131.14	0.002703	2.84	176.88	352.58	0.36
MRB	000	100 Yr	280.00	128.42	131.16	130.99	131.21	0.002702	2.92	204.59	361.40	0.36
MRB	000	500 Yr	405.00	128.42	131.33	131.05	131.38	0.002701	3.08	266.66	380.42	0.37

Exhibit I

7.3 Hydraulic Analyses – Proposed Bridge – 16' Span

Proposed Bridge (16' Span)

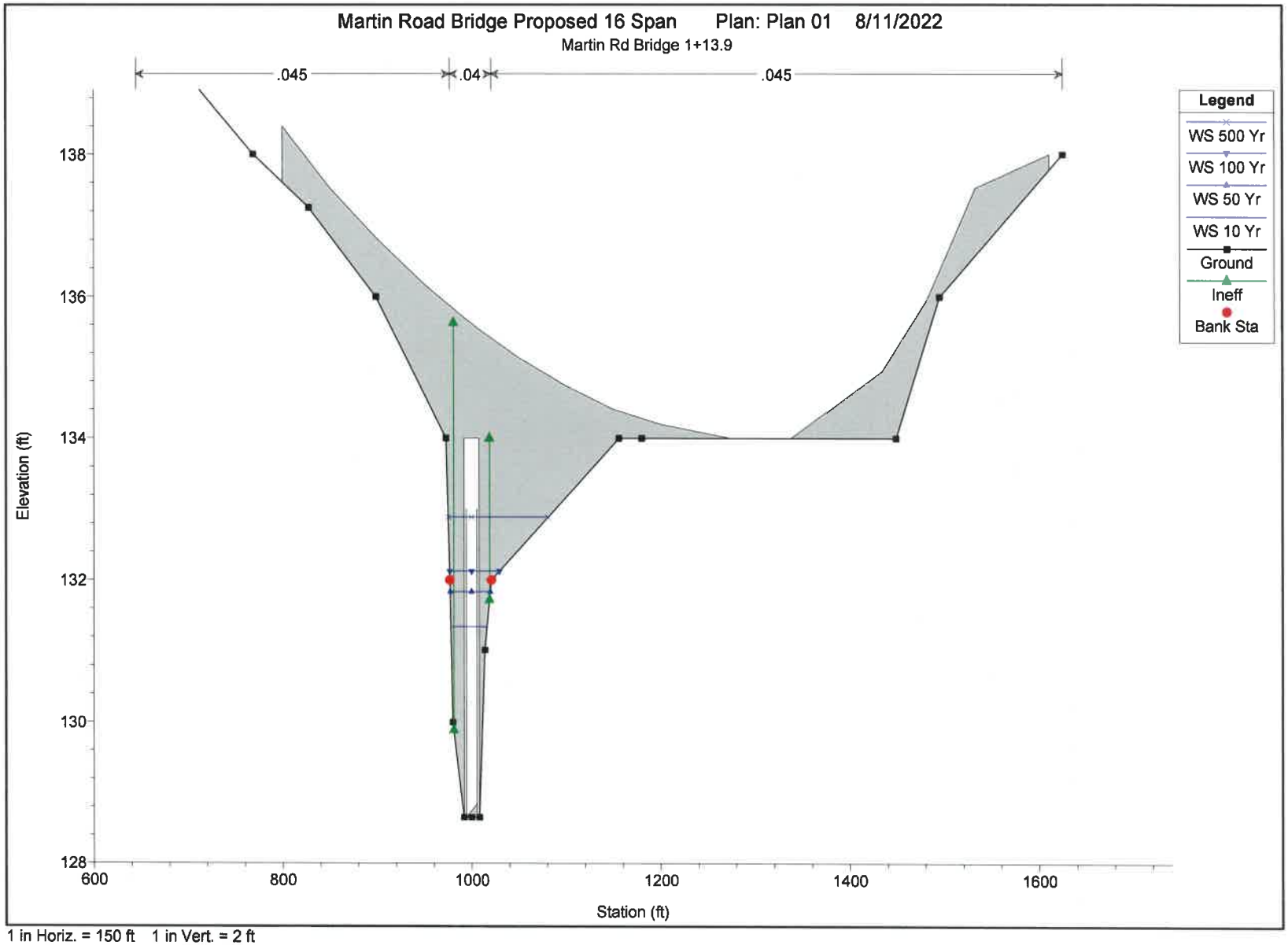
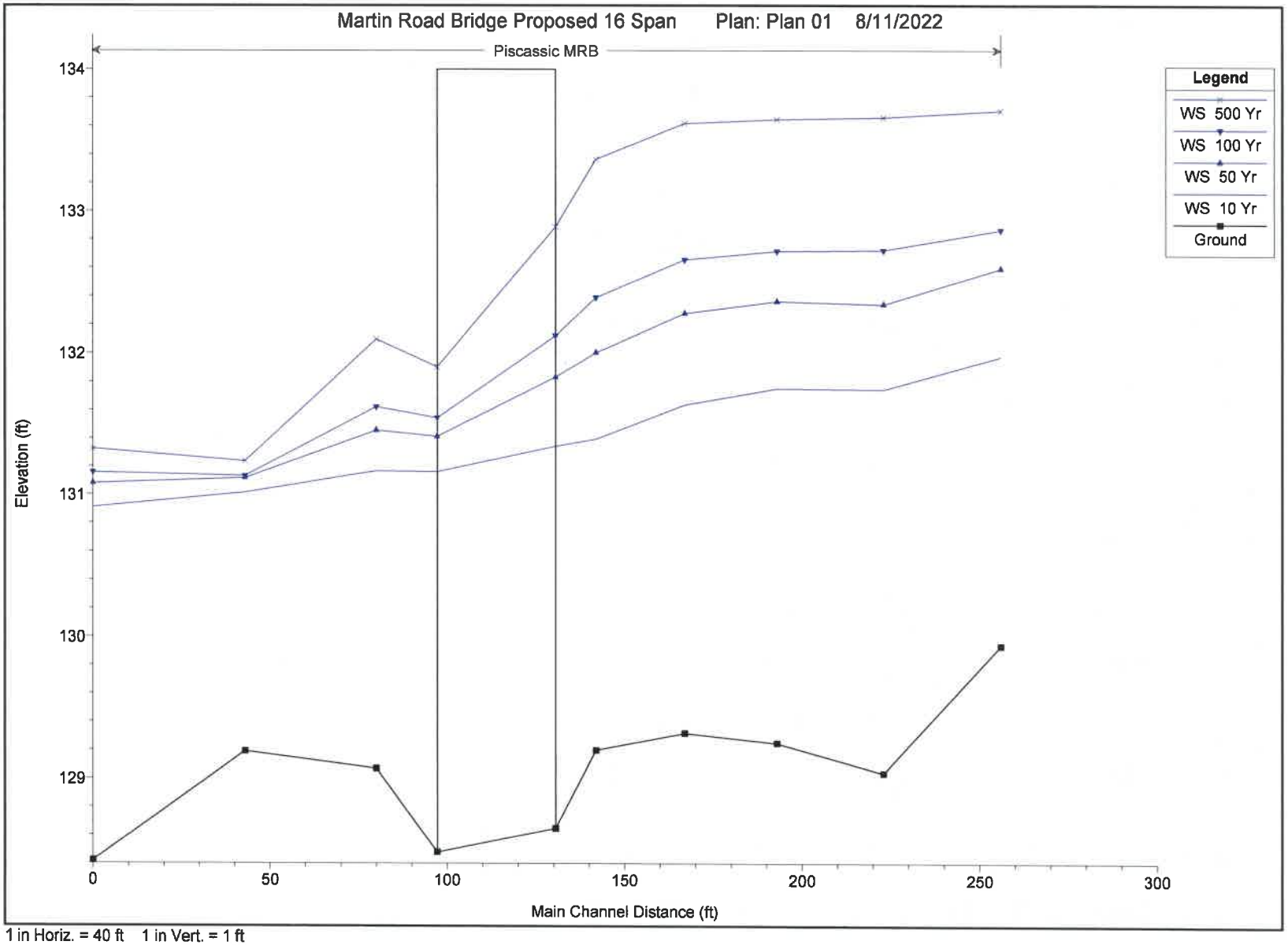


Exhibit I

Proposed Bridge (16' Span)



1 in Horiz. = 40 ft 1 in Vert. = 1 ft

Exhibit I

Proposed Bridge (16' Span)

HEC-RAS Plan: Plan 01 River: Piscassic Reach: MRB

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
MRB	256	10 Yr	140.00	129.94	131.98	131.79	132.20	0.015022	3.76	37.22	49.05	0.76
MRB	256	50 Yr	230.00	129.94	132.60	132.20	132.66	0.002630	2.32	132.97	173.80	0.35
MRB	256	100 Yr	280.00	129.94	132.87	132.28	132.92	0.001648	2.08	182.38	187.48	0.29
MRB	256	500 Yr	405.00	129.94	133.71	132.44	133.73	0.000528	1.55	357.86	229.51	0.17
MRB	223	10 Yr	140.00	129.04	131.75		131.95	0.004374	3.59	39.04	20.18	0.45
MRB	223	50 Yr	230.00	129.04	132.34		132.54	0.003785	3.84	83.98	116.04	0.44
MRB	223	100 Yr	280.00	129.04	132.73		132.85	0.002331	3.25	131.29	131.93	0.35
MRB	223	500 Yr	405.00	129.04	133.66		133.71	0.000843	2.27	273.29	170.97	0.22
MRB	193	10 Yr	140.00	129.25	131.76		131.82	0.002083	2.04	68.62	51.53	0.31
MRB	193	50 Yr	230.00	129.25	132.36		132.43	0.001610	2.14	116.68	103.48	0.29
MRB	193	100 Yr	280.00	129.25	132.72		132.78	0.001156	2.05	156.51	120.53	0.25
MRB	193	500 Yr	405.00	129.25	133.65		133.69	0.000529	1.77	289.13	165.11	0.18
MRB	167	10 Yr	140.00	129.32	131.64		131.74	0.004283	2.56	54.75	49.53	0.43
MRB	167	50 Yr	230.00	129.32	132.28		132.38	0.002695	2.48	94.67	79.03	0.36
MRB	167	100 Yr	280.00	129.32	132.66		132.74	0.001787	2.35	126.67	101.79	0.30
MRB	167	500 Yr	405.00	129.32	133.62		133.67	0.000718	1.98	254.53	159.97	0.21
MRB	142	10 Yr	140.00	129.20	131.40	130.89	131.60	0.006288	3.64	38.46	36.69	0.54
MRB	142	50 Yr	230.00	129.20	132.01	131.29	132.27	0.005420	4.10	56.03	45.32	0.53
MRB	142	100 Yr	280.00	129.20	132.39	131.48	132.66	0.004521	4.12	67.93	64.01	0.50
MRB	142	500 Yr	405.00	129.20	133.37	131.91	133.62	0.002980	4.02	100.66	111.32	0.42
MRB	113.9		Bridge									
MRB	080	10 Yr	140.00	129.07	131.17	130.18	131.24	0.001539	2.11	66.31	49.01	0.28
MRB	080	50 Yr	230.00	129.07	131.46	130.47	131.60	0.002496	2.98	77.26	50.46	0.37
MRB	080	100 Yr	280.00	129.07	131.62	130.62	131.80	0.002848	3.35	83.56	53.20	0.40
MRB	080	500 Yr	405.00	129.07	132.10	130.95	132.35	0.003105	3.99	101.61	75.36	0.43
MRB	043	10 Yr	140.00	129.19	131.01		131.14	0.004200	2.79	50.25	39.97	0.44
MRB	043	50 Yr	230.00	129.19	131.12		131.40	0.008879	4.23	54.43	40.60	0.64
MRB	043	100 Yr	280.00	129.19	131.13		131.54	0.012698	5.08	55.07	40.70	0.77
MRB	043	500 Yr	405.00	129.19	131.24	131.24	131.95	0.021177	6.83	59.33	41.34	1.00
MRB	000	10 Yr	140.00	128.42	130.91	130.81	130.97	0.002703	2.69	119.07	338.36	0.36
MRB	000	50 Yr	230.00	128.42	131.08	130.91	131.14	0.002703	2.84	176.88	352.58	0.36
MRB	000	100 Yr	280.00	128.42	131.16	130.99	131.21	0.002702	2.92	204.59	361.40	0.36
MRB	000	500 Yr	405.00	128.42	131.33	131.05	131.38	0.002701	3.08	266.66	380.42	0.37

Exhibit I

7.4 Hydraulic Analyses – Proposed Bridge – 22' Span

7.4.1 Proposed Condition - Bridge Cross Section
7.4.2 Proposed Condition - Channel Profile
7.4.3 Proposed Condition - Analysis Summary Table

Exhibit I

Proposed Bridge (22' Span)

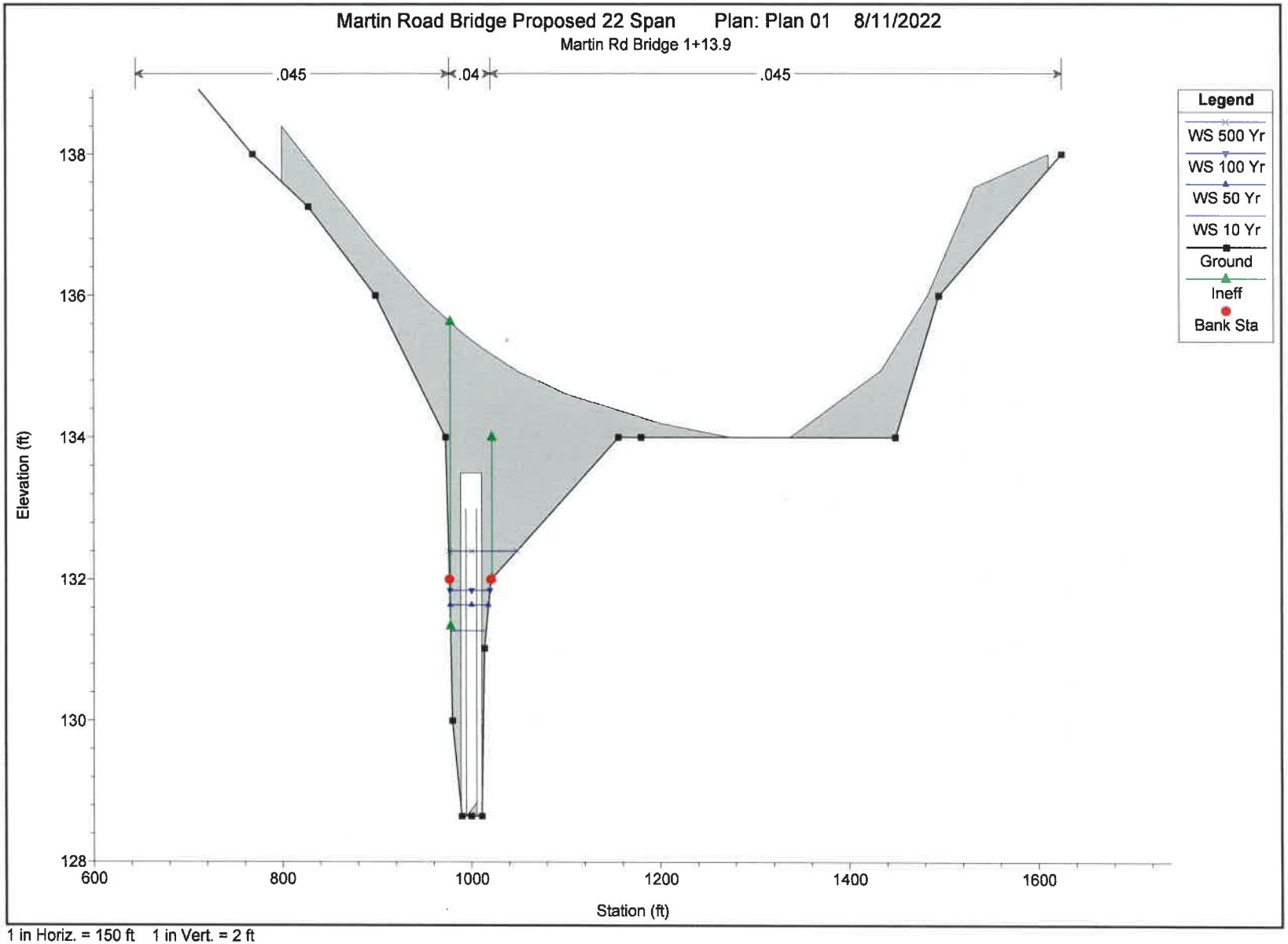
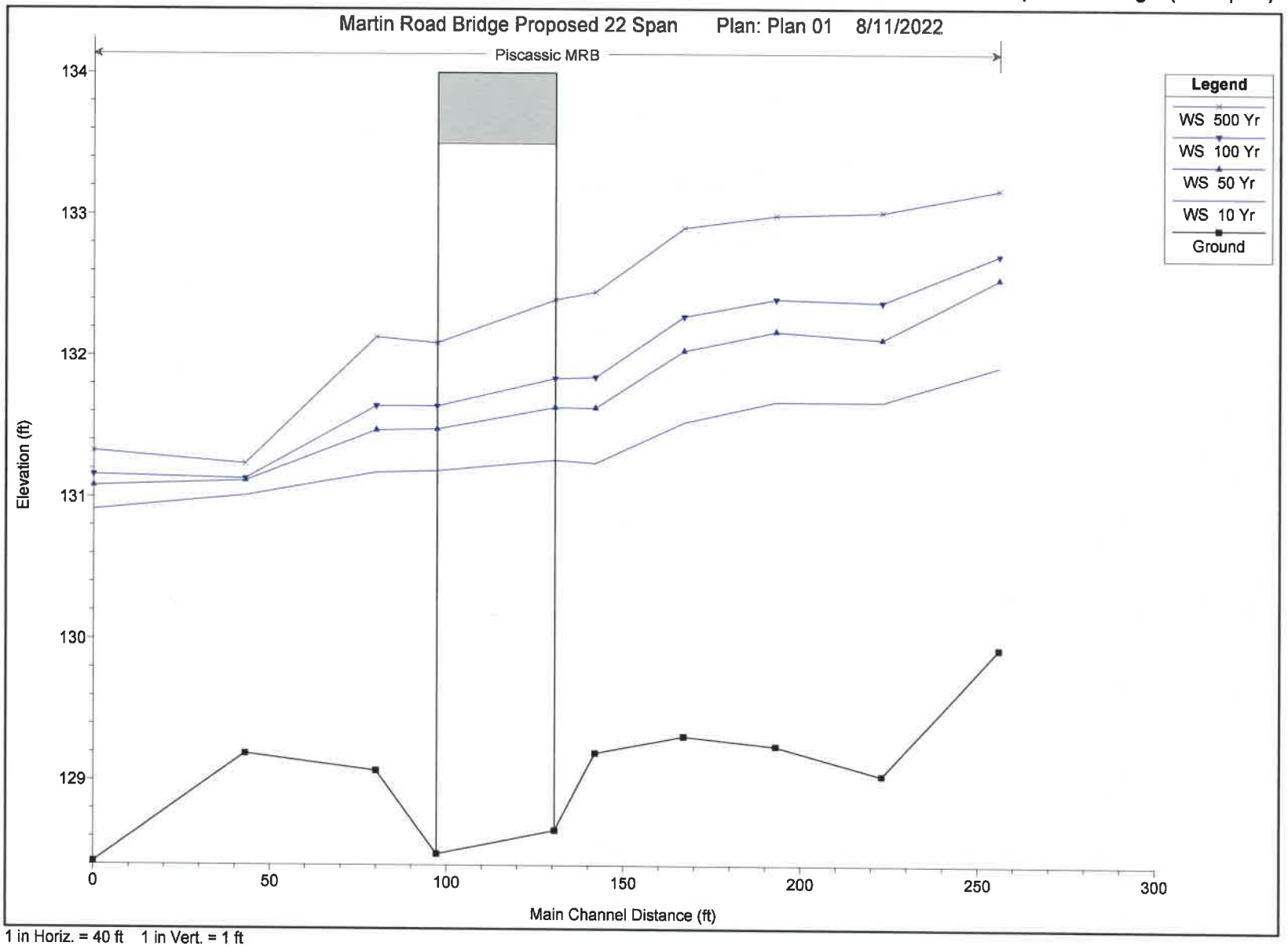


Exhibit I

Proposed Bridge (16' Span)



1 in Horiz. = 40 ft 1 in Vert. = 1 ft

Exhibit I

Proposed Bridge (16' Span)

HEC-RAS Plan: Plan 01 River: Piscassic Reach: MRB

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
MRB	256	10 Yr	140.00	129.94	131.93	131.79	132.18	0.017581	4.02	34.86	46.82	0.82
MRB	256	50 Yr	230.00	129.94	132.55	132.20	132.62	0.003088	2.46	125.20	171.55	0.38
MRB	256	100 Yr	280.00	129.94	132.72	132.28	132.79	0.002576	2.44	154.94	180.01	0.35
MRB	256	500 Yr	405.00	129.94	133.18	132.44	133.23	0.001558	2.27	242.61	202.91	0.29
MRB	223	10 Yr	140.00	129.04	131.68		131.89	0.004875	3.72	37.63	20.03	0.48
MRB	223	50 Yr	230.00	129.04	132.12	131.37	132.46	0.006307	4.72	59.41	106.85	0.56
MRB	223	100 Yr	280.00	129.04	132.39		132.65	0.005067	4.48	89.01	117.83	0.51
MRB	223	500 Yr	405.00	129.04	133.02		133.16	0.002631	3.64	172.19	144.26	0.38
MRB	193	10 Yr	140.00	129.25	131.68		131.75	0.002350	2.16	64.81	48.90	0.33
MRB	193	50 Yr	230.00	129.25	132.18		132.27	0.002447	2.45	98.34	94.57	0.35
MRB	193	100 Yr	280.00	129.25	132.41		132.51	0.002157	2.52	121.54	105.70	0.33
MRB	193	500 Yr	405.00	129.25	133.00		133.09	0.001458	2.51	192.07	133.95	0.29
MRB	167	10 Yr	140.00	129.32	131.54		131.66	0.005323	2.81	49.80	45.93	0.48
MRB	167	50 Yr	230.00	129.32	132.04		132.18	0.004888	2.97	77.45	64.52	0.47
MRB	167	100 Yr	280.00	129.32	132.29		132.43	0.003950	3.01	95.05	79.32	0.43
MRB	167	500 Yr	405.00	129.32	132.91		133.04	0.002308	2.90	156.45	117.14	0.35
MRB	142	10 Yr	140.00	129.20	131.25	130.90	131.48	0.008624	3.87	36.15	34.62	0.62
MRB	142	50 Yr	230.00	129.20	131.64	131.26	131.99	0.009618	4.78	48.10	39.99	0.68
MRB	142	100 Yr	280.00	129.20	131.85	131.45	132.25	0.009407	5.08	55.08	43.02	0.69
MRB	142	500 Yr	405.00	129.20	132.46	131.84	132.91	0.007564	5.36	75.54	67.38	0.64
MRB	113.9		Bridge									
MRB	080	10 Yr	140.00	129.07	131.18	130.16	131.23	0.001281	1.88	74.33	49.05	0.26
MRB	080	50 Yr	230.00	129.07	131.48	130.44	131.58	0.002013	2.63	87.42	50.55	0.33
MRB	080	100 Yr	280.00	129.07	131.65	130.57	131.78	0.002267	2.95	94.92	53.83	0.35
MRB	080	500 Yr	405.00	129.07	132.13	130.87	132.32	0.002406	3.48	116.37	78.69	0.38
MRB	043	10 Yr	140.00	129.19	131.01		131.14	0.004200	2.79	50.25	39.97	0.44
MRB	043	50 Yr	230.00	129.19	131.12		131.40	0.008879	4.23	54.43	40.60	0.64
MRB	043	100 Yr	280.00	129.19	131.13		131.54	0.012698	5.08	55.07	40.70	0.77
MRB	043	500 Yr	405.00	129.19	131.24	131.24	131.96	0.021177	6.83	59.33	41.34	1.00
MRB	000	10 Yr	140.00	128.42	130.91	130.81	130.97	0.002703	2.69	119.07	338.36	0.36
MRB	000	50 Yr	230.00	128.42	131.08	130.91	131.14	0.002703	2.84	176.88	352.58	0.36
MRB	000	100 Yr	280.00	128.42	131.16	130.99	131.21	0.002702	2.92	204.59	361.40	0.36
MRB	000	500 Yr	405.00	128.42	131.33	131.05	131.38	0.002701	3.08	266.66	380.42	0.37

Exhibit I

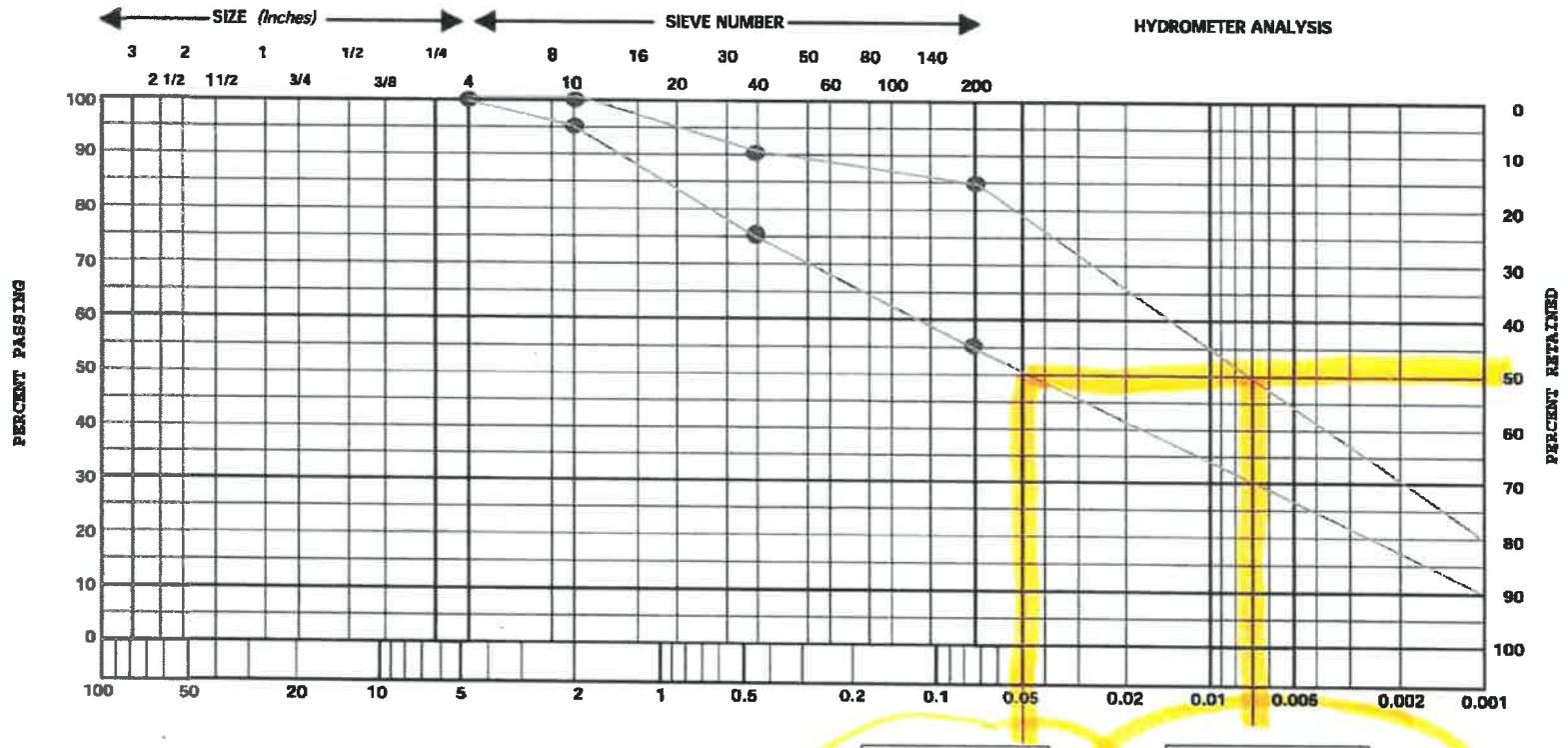
7.5 Scour Calculations

7.5.1 Scour Sediment Data
7.5.2 Scour Calculations
7.5.3 Scour Mitigation Calculations

GRAIN SIZE DISTRIBUTION GRAPH - AGGREGATE GRADATION CHART

1. PROJECT	2. DATE

SIEVE ANALYSIS - US STANDARD SIEVE SIZES



EXCAVATION NUMBER	SAMPLE NUMBER	LL	PL	PI	Cu (D_{60}/D_{10})	Cc ($(D_{30})^2/(D_{60} \times D_{10})$)	SOIL DESCRIPTION/REMARKS	CLASSIFICATION (USCS)

3. TECHNICIAN *(Signature)*	4. PLOTTED BY *(Signature)*	5. CHECKED BY *(Signature)*

DD FORM 1207, DEC 1999 PREVIOUS EDITION IS OBSOLETE.

Adobe Professional 7.0

Exhibit I

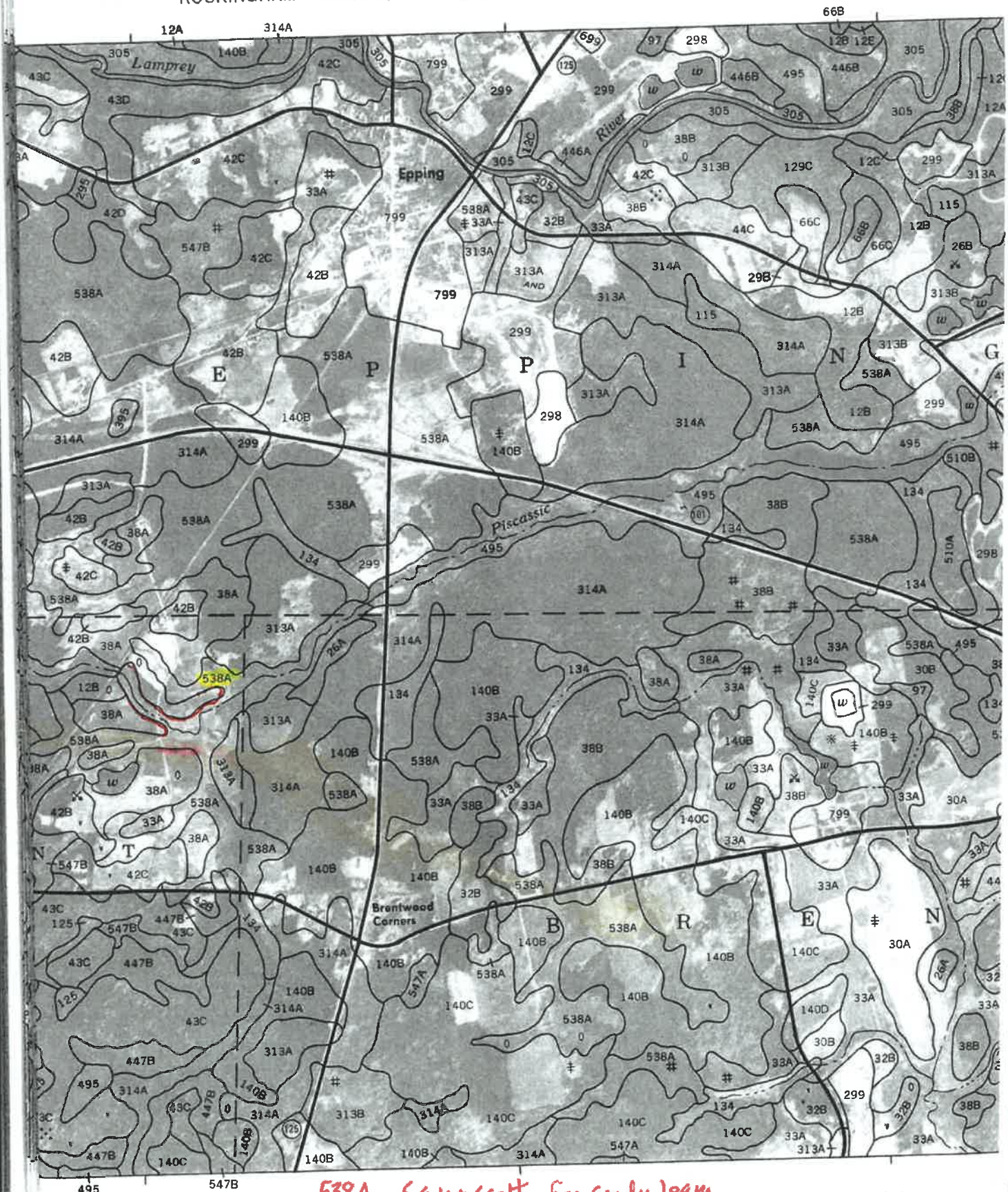
TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
533----------	0-6	Silt loam--------	ML, CL-ML	A-4	0	100	95-100	80-100	55-95	<25	NP-5
Raynham	6-16	Silt loam, silt, very fine sandy loam, loamy very fine sand.	ML, CL-ML	A-4	0	100	95-100	80-100	55-95	<25	NP-5
	16-60	Silt loam, silt, very fine sandy loam.	ML, CL-ML	A-4	0	100	95-100	80-100	70-95	<25	NP-5
538A----------	0-4	Loamy fine sand, fine sandy loam.	SM, SW-SM, SP-SM	A-2, A-3, A-4	0	100	95-100	50-85	15-45	---	NP
Squamscott	4-12	Loamy sand, loamy fine sand, fine sand.	SM, SP-SM	A-2, A-3	0	100	95-100	50-85	5-40	---	NP
	12-19	Sand, fine sand, loamy sand.	SM, SP-SM	A-1, A-2, A-3	0	100	95-100	50-85	5-35	---	NP
	19-65	Silt loam, silty clay loam.	ML, CL-ML	A-4	0	100	95-100	75-90	55-80	<30	NP-5
546A----------	0-7	Very fine sandy loam.	SM, ML	A-2, A-4	0-5	90-100	75-100	55-90	25-60	<25	NP-3
Walpole	7-16	Sandy loam, fine sandy loam, gravelly sandy loam.	SM	A-2, A-4	0-5	85-100	60-100	40-85	20-50	---	NP
	16-60	Stratified loamy fine sand to very gravelly coarse sand.	SP, SM, GP, GM	A-1, A-2, A-3	0-20	55-100	50-100	25-80	2-30	---	NP
547A, 547B----------	0-7	Very fine sandy loam.	SM	A-2, A-4	5-10	90-100	75-100	55-85	25-50	<25	NP-3
Walpole	7-16	Sandy loam, fine sandy loam, gravelly sandy loam.	SM	A-2, A-4	0-5	85-100	60-100	40-85	20-50	---	NP
	16-60	Stratified loamy fine sand to very gravelly coarse sand.	SP, SM, GP, GM	A-1, A-2, A-3	0-20	55-100	50-100	25-80	2-30	---	NP
597----------	0-38	Hemic material---	PT	A-8	0	---	---	---	---	---	NP
Westbrook	38-60	Silt loam, silty clay loam, sandy loam.	SM, ML, CL	A-4, A-6	0	90-100	85-100	65-100	40-100	<40	NP-25
599*:											
Urban land.											
Hoosic----------	0-8	Gravelly fine sandy loam.	GM, SM, ML	A-1, A-2, A-4	5-10	55-80	50-70	30-70	15-60	30-45	2-10
	8-15	Gravelly sandy loam, very gravelly fine sandy loam, gravelly loam.	GM, SM, GP-GM, SP-SM	A-1, A-2, A-4	5-10	40-75	35-65	20-60	10-45	20-30	2-8
	15-60	Very gravelly coarse sand, very gravelly loamy sand.	GM, GP, SP, SM	A-1	10-15	35-65	30-50	15-40	2-20	---	NP

See footnote at end of table.

Exhibit I

ROCKINGHAM COUNTY, NEW HAMPSHIRE — SHEET NUMBER 19



538A - Squamscott, fine sandy loam typical at 3-4 feet, silt loam

Exhibit I

Contraction Scour

		Left	Channel	Right
Input Data				
	Average Depth (ft):	0.14	1.49	0.14
	Approach Velocity (ft/s):	0.56	3.01	0.57
	Br Average Depth (ft):		3.14	
	BR Opening Flow (cfs):		280.00	
	BR Top WD (ft):		22.01	
	Grain Size D50 (mm):	0.007	0.007	0.007
	Approach Flow (cfs):	0.16	278.59	1.25
	Approach Top WD (ft):	2.00	62.00	15.32
	K1 Coefficient:	0.690	0.690	0.690
Results				
	Scour Depth Ys (ft):		0.00	
	Critical Velocity (ft/s):		0.34	
	Equation:		Live	

Abutment Scour

		Left	Right
Input Data			
	Station at Toe (ft):	988.90	1011.10
	Toe Sta at appr (ft):	995.90	1036.10
	Abutment Length (ft):	13.91	25.22
	Depth at Toe (ft):	3.07	3.20
	K1 Shape Coef:	1.00 - Vertical abutment	
	Degree of Skew (degrees):	54	68
	K2 Skew Coef:	0.94	0.96
	Projected Length L' (ft):	11.25	23.38
	Avg Depth Obstructed Ya (ft):	1.47	0.29
	Flow Obstructed Qe (cfs):	55.29	7.91
	Area Obstructed Ae (sq ft):	20.38	7.30
Results			
	Scour Depth Ys (ft):	5.74	2.51
	Qe/Ae = Ve:	2.71	1.08
	Froude #:	0.39	0.35
	Equation:	Froehlich	Froehlich

Exhibit I

Contraction Scour

		Left	Channel	Right
Input Data				
	Average Depth (ft):	0.46	2.12	0.46
	Approach Velocity (ft/s):	0.93	2.90	0.94
	Br Average Depth (ft):		3.70	
	BR Opening Flow (cfs):		405.00	
	BR Top WD (ft):		22.02	
	Grain Size D50 (mm):	0.007	0.007	0.007
	Approach Flow (cfs):	2.71	381.41	20.87
	Approach Top WD (ft):	6.38	62.00	48.76
	K1 Coefficient:	0.690	0.690	0.690
Results				
	Scour Depth Ys (ft):		0.86	
	Critical Velocity (ft/s):		0.36	
	Equation:		Live	

Abutment Scour

		Left	Right
Input Data			
	Station at Toe (ft):	988.90	1011.10
	Toe Sta at appr (ft):	995.90	1036.10
	Abutment Length (ft):	18.28	58.66
	Depth at Toe (ft):	3.67	3.81
	K1 Shape Coef:	1.00 - Vertical abutment	
	Degree of Skew (degrees):	54	68
	K2 Skew Coef:	0.94	0.96
	Projected Length L' (ft):	14.79	54.39
	Avg Depth Obstructed Ya (ft):	1.66	0.57
	Flow Obstructed Qe (cfs):	78.95	41.36
	Area Obstructed Ae (sq ft):	30.44	33.51
Results			
	Scour Depth Ys (ft):	6.48	4.70
	Qe/Ae = Ve:	2.59	1.23
	Froude #:	0.35	0.29
	Equation:	Froehlich	Froehlich

Combined Scour Depths

Left abutment scour + contraction scour (ft):	7.34
Right abutment scour + contraction scour (ft):	5.56

Exhibit I

Project: 195112878
Date: 8/17/2022
Designed By:
Checked By: GJF

Bridge Scour Mitigation Analysis
Martin Road over Piscassic River
Fremont, NH

Stantec

Equations: **HEC-23 - EM-1601 Guideline #4 for Rip Rap Revetment:**

$D_{30} = Y\ (S_F \times C_S \times C_V \times C_T) \times [V_{DES}/(\sqrt{(K_i \times (S_g-1) \times g \times Y)}]^{2.5}$

$V_{DES} = V_{AVG} \times (1.74 - 0.52 \times \log R_c/W)$

$D_{50} = 1.2 \times D_{30}$

Note:
This spreadsheet is based on the US Army Corps of Engineers Methodology

A limitation to Equation 4.1 is that the longitudinal slope of the channel should not be steeper than 2.0% (0.02 ft/ft). For steeper channels, the riprap sizing approach for overtopping flows should be considered and the results compared with Equation 4.1 (see Design Guide 5).

Design Storm: **100 Year Event - USGS Streamstats**

														RIP RAP Stone Size			
Location (STA./STRUCT.)	FLOW (CFS)	VAVG (FT/S)	Rc (FT)	W (FT)	VDES (FT/S)	Y (FT)	SF	CS	CV	CT	Ki	Sg	g (FT/S^2)	Stone Size (D30 - FEET)	Stone Size (D30 - INCHES)	Stone Size (D50 -FEET)	Stone Size (D50 - INCHES)
Approach Section 167	280	2.97	80.00	79.00	5.16	3.00	1.40	0.38	1.28	1.00	0.87	2.69	32.20	0.25	3	0.30	4

Check Storm: **500 Year Event - USGS Streamstats**

														RIP RAP Stone Size			
Location (STA./STRUCT.)	FLOW (CFS)	VAVG (FT/S)	Rc (FT)	W (FT)	VDES (FT/S)	Y (FT)	SF	CS	CV	CT	Ki	Sg	g (FT/S^2)	Stone Size (D30 - FEET)	Stone Size (D30 - INCHES)	Stone Size (D50 -FEET)	Stone Size (D50 - INCHES)
Approach Section 167	405	3.01	80.00	117.00	5.50	3.60	1.40	0.38	1.32	1.00	0.87	2.69	32.20	0.29	3	0.34	4

Exhibit I

Project: 195112878
Date: 8/17/2022
Designed By:
Checked By: GJF

Bridge Scour Mitigation Analysis
Martin Road over Piscassic River
Fremont, NH

Stantec

Equations:

HEC-23 Guideline#14 for Rip Rap at Bridge Abutments:
$D_{50} = Y \times (K/(S_{g-1})) \times ((V^2)/(g \times Y))$
IF $V/(g \times y)^{1/2} < 0.80$
$D_{50} = Y \times (K/(S_{g-1})) \times ((V^2)/((g \times Y)^{0.14})$
IF $V/(g \times y)^{1/2} > 0.80$

Note:
HEC-RAS 23 Guideline#14 for Rip Rap at Bridge Abutments.

Design Storm: **100 Year - USGS Streamstats**

								RIP RAP Stone Size Fr>.8		RIP RAP Stone Size Fr<.8	
Location (STA./STRUCT.)	FLOW (CFS)	Fr	V (FT/S)	Y (FT)	K	Sg	g (FT/S^2)	Stone Size (D50 -FEET)	Stone Size (D50 - INCHES)	Stone Size (D50 -FEET)	Stone Size (D50 - INCHES)
Bridge Upstream Face	280	0.40	4.05	3.19	1.02	2.69	32.20	1.49	18	0.31	4

Check Storm: **500 Year - USGS Streamstats**

								RIP RAP Stone Size		RIP RAP Stone Size Fr<.8	
Location (STA./STRUCT.)	FLOW (CFS)	Fr	V (FT/S)	Y (FT)	K	Sg	g (FT/S^2)	Stone Size (D50 -FEET)	Stone Size (D50 - INCHES)	Stone Size (D50 -FEET)	Stone Size (D50 - INCHES)
Bridge Upstream Face	405	0.45	4.97	3.75	1.02	2.69	32.20	1.81	22	0.46	6

Exhibit I

Project: 195112878
Date: 8/17/2022
Designed By:
Checked By: GJF

Bridge Scour Mitigation Analysis
Martin Road over Piscassic River
Fremont, NH

Equations:

HEC-23 Guideline#14 for Rip Rap at Bridge Abutments:
$D_{50} = Y \times (K/(S_{g-1})) \times ((V^2)/(g \times Y))$
IF $V/(g \times y)^{1/2} < 0.80$
$D_{50} = Y \times (K/(S_{g-1})) \times ((V^2)/((g \times Y)^{0.14})$
IF $V/(g \times y)^{1/2} > 0.80$

Note:
HEC-RAS 23 Guideline#14 for Rip Rap at Bridge Abutments.

Design Storm: **100 Year - USGS Streamstats**

Location (STA./STRUCT.)	FLOW (CFS)	Fr	V (FT/S)	Y (FT)	K	Sg	g (FT/S^2)	RIP RAP Stone Size Fr>.8 Stone Size (D50 -FEET)	RIP RAP Stone Size Fr>.8 Stone Size (D50 - INCHES)	RIP RAP Stone Size Fr<.8 Stone Size (D50 -FEET)	RIP RAP Stone Size Fr<.8 Stone Size (D50 - INCHES)
Bridge Downstream Face	280	0.40	4.06	3.17	1.02	2.69	32.20	1.48	18	0.31	4

Check Storm: **500 Year - USGS Streamstats**

Location (STA./STRUCT.)	FLOW (CFS)	Fr	V (FT/S)	Y (FT)	K	Sg	g (FT/S^2)	RIP RAP Stone Size Stone Size (D50 -FEET)	RIP RAP Stone Size Stone Size (D50 - INCHES)	RIP RAP Stone Size Fr<.8 Stone Size (D50 -FEET)	RIP RAP Stone Size Fr<.8 Stone Size (D50 - INCHES)
Bridge Downstream Face	405	0.48	5.14	3.61	1.02	2.69	32.20	1.77	21	0.50	6

Exhibit I

BUREAU OF ENVIRONMENT
CONFERENCE REPORT

Final

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: January 18, 2023
LOCATION OF CONFERENCE: Virtual meeting held via Zoom

ATTENDED BY:

NHDOT
Matt Urban
Andrew O'Sullivan
Jon Evans
Marc Laurin
Rebecca Martin
Dillan Schmidt
Chris Carucci
Dillan Schmidt
John Sargent
Meli Dube

ACOE
Mike Hicks

USCG
Gary Croot

EPA
Jean Brochi

NHDES
Karl Benedict
Mary Ann Tilton

NHB
Absent

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
Brooke Stubbs
Michael Leach
Gerard Fortin
Alanna Gerton
Peter Walker
Stephen Hoffmann
Christine Perron
Sam White

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

Table of Contents:

Exhibit J

Mary Anne (NHDES): I'll defer to Karl on the stream crossing designs, I thought he had some good questions on that and agree with his analysis. The one thing I will say is part of the mitigation accounting and generally impact tracking, we are looking more carefully at how projects are classified. We are seeing folks' mis-classify projects that are really wetlands and streams. So, make sure you look not just at the NWI or the NHD as when we did the updates for NWI it did not account for narrow stream systems of less than 15 feet. USFWS had a memo on that so I would look to the State definition of water course which looks at defined scouring, and evidence of sediment transport for continuous channel. That's how we are defining streams, so it would kick into riverine on the NWI classification system. We are also looking at each of the different types of wetlands and what their predominant functions are. So that's something that we are going to be requiring a more detailed accounting when we update our forms. In terms of the wildlife corridor, is that something you're proposing a wildlife shelf at that crossing?
Chris Carucci (NHDOT): There is not a wildlife shelf. This crossing has relatively low base flow, the bottom would be kind of a V shaped, so low flows would be concentrated in the center so there would be dry edges within that crossing.
Mary Anne (NHDES): Okay, do you know what types of wildlife would be using that crossing?
Chris Carucci (NHDOT): We don't have any specific species.
Mary Anne (NHDES): Okay, the other thing to be aware of is I don't know if you've looked at the new NWI that's been published since November of a year ago actually, we have just published on the WPPT a function layer which is computer generated so that might be a good screening layer. It can't be relied on without field verification but that's something on these large-scale projects that you can start to look at. That's a computer-generated function, it's called NWI+ on the WPPT so I just wanted to let you know about that and that's all I have.
Mike Dionne (NHFG): No comments from me, seems like a good project and we appreciate the upsizing for better wildlife passage.
Kevin Newton (NHFG): No comments, we don't have any records according to the NHB DataCheck.
Mike Hicks (ACOE): No comment other than to make sure the historical components are squared away, and the bats, and I believe it was the Lynx, just make sure we address that and other than that, it looks fine.
Jeanie Brochi (EPA): Great discussion, I have no additional comments thank you.
Gary Croot (USCG): No navigable waterways impacted so we have no comment.
Brook Stubbs (USDA-NRCS): So, I have no additional comments I just appreciate the opportunity to watch the presentation. Looks like a great project and we will be looking forward to receiving a draft copy of the agreement (in relation to the NEPA analysis and draft Subordination Agreement that needs to be provided by the project proponent to NRCS for review) so we can get that paperwork done and it looks like you guys have everything under consideration for the evaluation of the resources so no further comment, thank you.

Fremont, # 23793 (Non-Fed)

This is the initial presentation to the Natural Resources meeting. Jerry Fortin introduced the Stantec project team to the meeting attendees, and noted this project is being presented on behalf of the Town of Fremont then began the presentation regarding Fremont 23793 – Culvert Replacement Project at Martin Road over Brown Brook. He reviewed the existing condition of the site:

- Located at the Eastern side of Fremont

- Brown Brook (Tier 3 Stream) crosses under existing bridge
- Existing bridge is a 1930 cast in place concrete deck on steel beams
- 10' w x 4.5' h x 18' l
- Brown Brook is backwatered thru culvert to depth approximately 2 feet
- 9-10' travel lanes along Martin Road
- 520 AADT (2020)
- The project is adjacent to Prime Wetland

The wetland delineation plan and photos of the inlet and outlet were presented along with photos of the existing bridge. Jerry noted the existing bridge is on the State's Municipal Red List due to the poor condition of the deck and serious condition of the substructure. The abutments are poorly aligned with the channel and the recent bridge inspection report dated December 21, 2021, notes the abutments are undermined and the north abutment has settled about 3 inches. The preferred alternative cross section was presented of a 22' span x 7' rise x 30' long precast concrete box with simulated channel bottom. Jerry noted the gravel fill material beneath the culvert to address the unsuitable material found during the geotechnical survey conducted for the project. A profile of the preferred alternative along the stream channel was presented showing the limits of work and intent to maintain backwater in the proposed channel under the bridge. A preferred alternative plan view was presented next showing the limits of riprap.
A color plan was presented of the entire work area that provided a visualization of the stream limits, wetland limits, roadway improvement limits, proposed riprap, and the 100' prime wetland buffer line.
The stream crossing worksheet information was presented noting the stream type as DA5 along with noting:

- Entrenchment Ratio, ranges 6.7 min to 11.9 max
- Bridge Width using 6.7 min = (17 x 6.7 + 2) = 116' bridge width
- Width not necessary for hydraulic design and is not practicable
- Would be cost prohibitive (bridge would be much larger and substantially more expensive)
- Requires additional impacts to stream and floodplain
- Requires additional property impacts
- Extensive time for roadway closure and earthwork to accomplish large bridge construction
- Additional Floodplain alteration (bridge may require raising the roadway)

A construction phase plan view for the bridge replacement was presented showing a temporary 48" diversion pipe, temporary upstream and downstream coffer dams would be used during the removal of
the existing structure and installation of the box culvert, grading and installation of the stream channel material. Martin Road would be closed temporarily during the 2-3 weeks needed to complete the installation of the new box culvert.
Jerry turned the presentation over to Mike Leach, who presented a wetland summary plan for the stream and wetland and noted the project overall impacts of 11, 395 SF of temporary and permanent impacts to the stream, wetlands, prime wetlands and 100' prime wetland buffer. A separate plan was presented showing the temporary and permanent impacts to the 100' prime wetland buffer. Mitigation for the project was presented and notes as:

- Culvert sizing based on 1.2 x bank full width + 2' equal to 22 feet which is an increase in width of greater than 200%.
- Increases opening for aquatic passage by 2.1 times from existing.

- Will provide simulated stream bottom material.
- Will pass 100-year storm for Brown Brook with more than 1 foot freeboard.
- Reduces 100-year floodplain elevation by approximately 1.5 feet of the bridge.
- Maintains approximately 2 foot depth of water through opening under normal flow conditions to promote aquatic passage.
- A waiver will be requested for the impacts to the Prime Wetland and 100-foot buffer.

Mike noted the results of the NH Natural Heritage Bureau data check received in December of 2022 were the American Eel and Blanding's Turtle. At this point, the presentation was opened to questions.
Karl Benedict of NHDES stated this project should be reviewed for compliance with the alternative design requirements. Since the project is in a priority resource area, mitigation would be required. Karl asked if the existing water velocities necessitated the extensive riprap layout, and if the limit of the proposed riprap could be minimized or revegetated. In response, Jerry noted the average stream velocities at both the upstream and downstream face of the proposed 22-ft span box culvert are nearly half the existing values. Additionally, the proposed riprap layout helps mitigate the existing unsuitable material that will need to be over-excavated and improves scour protection. Jerry said Stantec will review the riprap layout and minimize the limits of construction where possible.
Karl noted the 48" diversion pipe should be designed for a 2-year storm; Jerry acknowledged and will confirm the pipe size is adequate.
Karl noted the length of the stream work was not noted. He suggested that a mitigation worksheet be prepared for the project.
Mary Ann Tilton of NHDES said for the Department to process the prime wetland waiver, Stantec will need to provide evidence the proposed culvert design does not impact the functions and values of the prime wetland as established by the Town of Fremont. Stantec will reach out to the Town for their prime wetland report. Mary Ann asked if the proposed culvert design meets AOT floodplain requirements; Jerry responded the proposed design lowers the floodplain as established in our hydraulic study.
Michael Dionne of NH F&G reiterated the request to review and minimize the proposed riprap layout.
Kevin Newton of NH F&G noted the angular surface of the riprap makes it difficult for species migrating through the area, and asked Stantec to review the extent of the riprap layout.
Michael Hicks of USACE had no comment on the presentation.
Jean Brochi of the EPA had no comments on the presentation.
Gary Croot of the USCG had no comments on the presentation since Brown Brook is not a navigable waterway so the USCG has no jurisdiction.

Jaffrey, #16307 (X-A001(234))

Pete Walker presented VHB's current design plans for Jaffrey downtown. Main traffic movement through downtown is from north to south on US 202 through a "dog-leg" intersection. This project proposes a new bridge spanning the Contoocook River to improve traffic flow and safety, with minor repairs to the existing Main Street bridge. An NHDES Wetland Application will be filed shortly. The project proposes permanent impacts to two small wetlands, one of which is a Priority Resource Area as it is within the floodplain of the river, as well as impacts to the bed and banks of the Contoocook River. Permanent wetland impacts are currently estimated

to be about 4,500 sq ft, with about 4,000 sq ft/470 ln ft of impact within the river. The revised bridge design proposes to place rip-rap within the river to ensure that the new bridge is protected from scour. Because this reach is impounded, the river impoundment will be drawn down for installation of the rip-rap with a turbidity curtain or sand bag type cofferdams installed. At the Main Street bridge, temporary impacts include sediment removal to reinstall a trash rack at an existing mill race, as well as impacts beneath the bridge for temporary staging for concrete repairs. No permittee responsible mitigation was suggested by the Town of Jaffrey and furthermore there are no suitable potential sites due to the urban nature of the project area. As such an ARM fund mitigation payment for the permanent impacts is proposed.

Comment Period

Andy O'Sullivan (NHDOT) questioned whether an Alternative Design Report is required, due to the challenge of finding an appropriate reference reach. Andy believes the 92-ft span complies with the stream rules. Karl Benedict (NHDES) agreed with the methodology used by VHB for estimating bankfull width, and believes that the ADR process is the appropriate method to present the required stream crossing design information.

Pete Walker explained that geomorphic assessment completed in 2022 found that the downstream reference reach was classified as a Rosgen C5 channel, which would have a minimum entrenchment ratio of 2.2. The current design provides a entrenchment ratio of 1.7. The design complies with all stream rule requirements except that minimum ratio. Andy added that the ratio was calculated at a reference reach far downstream of the actual project area and therefore is not a representative reference reach. Karl responded that the project can be approved under the ADR process, the ADR narrative would need to explain that there is not a chance for a representative reference reach in the immediate project vicinity.

Karl Benedict NHDES agrees the Department would classify Wetland 1 as a Priority Resource Area. The design should also meet standards for stormwater under AoT rules and shoreland protection requirements. Karl believes an ARM Fund payment would be appropriate mitigation.

Pete Walker mentioned that one issue needing resolution is how to calculate the mitigation credit for the wildlife shelves below the proposed bridge. Prior indication from NHDES was that mitigation is not necessary for these impacts but VHB needs further guidance on how to partition the impacts, since there does not appear to be a clear way to separate these impacts in the ARM Fund calculator. Pete suggested a working meeting with Andy O'Sullivan and Karl Benedict. Karl suggested it may be worthwhile including NHDES mitigation staff if needed.

Mary Ann Tilton (NHDES) commented that NHDOT should review and consider the DES self-mitigation rule for the wildlife shelves.

Mike Dionne (NHFGD) asked whether a mussel survey had been completed in the area. Pete confirmed that the NHNHB database search did not identify endangered mussels, no survey had been requested and therefore no survey has been conducted. Mike suggested that even common mussels should be relocated during the drawdown, regardless of whether they are identified by NHB. Further, drawdown should be completed at a rate of no more than 6 inches per day and completed before cold weather, approximately by mid-October.

Mike further asked whether it is known where the mill race leads. Greg Goodrich replied that the missing trash rack has allowed accumulation of debris further down the mill race channel, although it is unknown whether a weir or other structure is located within the mill race at its outlet to the channel. Water is flowing into the mill race, and some may get through it, but is not free flowing. In response, Mike expressed concern that fish could become entrained within the trash rack and suggested the mill race could be entirely blocked off at its face if no downstream water rights are being exercised.

Kevin Newton (NHFGD) had no further comments.
Mike Hicks (USACE) requested that floodplain impacts should be addressed.
Jean Brochi (USEPA) emphasized earlier comment by Karl Benedict that if there will be a change in the plan there may need to be a second mitigation discussion.
Gary Croot (USCG) indicated that there is no Coast Guard jurisdiction in this river segment.

Lee, #41322 (X-A004(593))

Stephen Hoffmann reintroduced the Lee 41322 project involving the replacement of the structure carrying NH Route 125 over the Little River in Lee, NH. The project was previously presented at the October 2019, August 2020, and December 2021 NHDOT Natural Resource Agency Meetings. The purpose of this meeting was to present the selected alternative, provide project updates since the December 2021 meeting, discuss resource area impacts, and obtain concurrence from the resource agencies on the permitting and mitigation approach.

Updates since the prior resource agency meetings included: increasing the span length of the selected alternative from 90 feet to 100 feet; updated NHB DataCheck Results letter now includes spotted turtle and wood turtle in addition to the state listed species identified on prior NHB DataCheck Results Letters; rare plant survey completed in 2022 for American featherfoil and small whorled pogonia (no rare plants documented in the project area); and the advertising date has shifted from June 20223 to June 2024.

The existing structure consists of an 18' wide x 12' high corrugated metal pipe (CMP) that was installed in 1972 and was added to the State Red List in 2014. At the location of the crossing, the Little River has a watershed area of approximately 18.4 square miles making this a Tier 3 stream crossing. The Little River is also part of the Lamprey River Watershed and is a NH Designated River. The average bankfull width of the river at this location is 32' and the design channel bankfull width of the reference reach is 34'. Additional resources located within the project area include wetlands, priority resource areas (PRAs, floodplain wetlands adjacent to Tier 3 stream), 100-year floodplain (Zone A), and rare plants and animals identified by NHB and USFWS. Rare plants identified by NHB and USFWS include tufted yellow loosestrife, American featherfoil, and small whorled pogonia. A rare plant survey was completed in August 2020 and no rare species were identified. Based on coordination with NHB an additional rare plant survey was completed in June 2022 and again no rare species were documented in the project areas. Rare wildlife species include American eel, Blanding's turtle, spotted turtle, and wood turtle. NHF&G made the following recommendations based on preliminary coordination: 1) Time of year restriction from April 15th through July 1st to protect diadromous fish spawning runs, particularly river herring which has been documented in the Little River downstream from the project area, and American eel; 2) Wildlife friendly erosion control matting; and 3) Limiting riprap in the river channel. The NHDES WPPT was reviewed and the segment of the Little River was identified as a cold water fishery and an eastern brook trout water. However, John Magee at NHFG confirmed that this section of the Little River does not contain eastern brook trout and is not a cold water fishery.

The selected alternative consists of a 100-foot single span bridge structure with a channel realignment originating on the upstream side of the bridge. The proposed project will construct approximately 143 linear feet of "new" stream channel through the proposed structure. The

BUREAU OF ENVIRONMENT
CONFERENCE REPORT

Final

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: February 15, 2023
LOCATION OF CONFERENCE: Virtual meeting held via Zoom

ATTENDED BY:

NHDOT
Matt Urban
Andrew O'Sullivan
Jon Evans
Marc Laurin
Rebecca Martin
Arin Mills
Samantha Fifield
Jennifer Reczek
Meli Dube

ACOE
Mike Hicks

USCG
Gary Croot

EPA
Jean Brochi

NHDES
Karl Benedict
Mary Ann Tilton
Christian Williams

NHB
Ashley Litwinenko

NH Fish & Game
Mike Dionne

Federal Highway
Jamie Sikora

US Fish & Wildlife
Absent

The Nature Conservancy
Absent

NH Transportation & Wildlife Workgroup
Absent

Consultants/ Public Participants
Alanna Gerton
Michael Leach
Gerard Fortin
Megan Ooms
Bill McCloy
A Hubbard
Christine Perron
Noah Elwood
Geno Marconi
Michael Riccardi

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

Table of Contents:

- Since the next submittal in March is an amendment, the Corps and DES may want to discuss what will need to be involved and included in the submittal.

Gary Croot:

- No bridge impacts involved so no Coast Guard permitting is required.
- If construction involved barges adjacent to/in channel, the Coast Guard will coordinate with the Port to issue notice to mariners.

Jamie Sikora:

- Noted that FHWA is the lead federal agency and approved the NEPA Categorical Exclusion document. Design changes will be reevaluated, which includes reinitiating consultation on EFH and ESA.

Chris Williams:

- Notification to mariners and the fishing industry will be required due to the dredging and increase in vessel traffic during construction.

Fremont #23793

This is the second presentation to the Natural Resources meeting. Alanna Gerton introduced the Stantec project team to the meeting attendees, and stated this project is being presented on behalf of the Town of Fremont. She then began the presentation regarding Fremont 23793 – Culvert Replacement Project at Martin Road over Brown Brook, and noted the primary focus is project mitigation. She reviewed the existing condition of the site:

- Located at the Eastern side of Fremont
- Brown Brook (Tier 3 Stream) crosses under existing bridge
- Existing bridge is a 1930 cast in place concrete deck on steel beams
- 10' w x 4.5' h x 18' l
- Brown Brook is backwatered thru culvert to depth approximately 2 feet
- 9-10' travel lanes along Martin Road
- 520 AADT (2020)
- The project is adjacent to Prime Wetland

Photos of the inlet and outlet were presented along with photos of the existing bridge. Alanna noted the existing bridge has been on the State's Municipal Red List since 1992. The abutments are poorly aligned with the channel and the recent bridge inspection report dated December 21, 2021, notes the abutments are undermined and the north abutment has settled about 3 inches. The preferred alternative cross section was presented of a 22' span x 7' rise x 30' long precast concrete box with simulated channel bottom. Alanna noted the gravel fill material beneath the culvert to address the unsuitable material found during the geotechnical survey conducted for the project. A profile of the preferred alternative along the stream channel was presented showing the limits of work. Per comments received at the January 18th meeting, Alanna indicated the limits of riprap had been reduced by about 15 LF on the downstream side. A typical channel cross section and plan view of the preferred alternative was presented on the next slides. Alanna noted the extent of the simulated streambed material was clarified on the plan view.
A color plan was presented of the entire work area that provided a visualization of the stream limits, wetland limits, roadway improvement limits, proposed riprap, and the 100' prime wetland buffer line.

A construction phase plan view for the bridge replacement was presented. It showed a temporary 48" diversion pipe and temporary upstream and downstream coffer dams to be used during the removal of the existing structure, installation of the box culvert, and grading and installation of the stream channel material. Martin Road would be closed temporarily during the 2-3 weeks needed to complete the installation of the new box culvert.
Alanna turned the presentation over to Mike Leach to discuss the project wetland impacts. He noted the summation of temporary and permanent impacts to the stream, wetlands, prime wetlands, and 100' prime wetland buffer was reduced to 10,478 SF. A separate plan was presented showing the temporary and permanent impacts to the 100' prime wetland buffer.
Mike noted the permanent impacts to the downstream area was reduced as was requested at the January 18th meeting. In addition, he presented and noted the permanent impacts associated with the 100-ft Prime Wetland buffer are for the roadway widening and approach for the new bridge.
Mitigation for the project was presented and notes as:
• The culvert sizing is based on 1.2 x bank full width + 2' equal to 22 feet which is an increase in width of greater than 200%.
• The preferred alternative preserves the natural alignment of the stream channel.
• The proposed opening is 2.1 times greater than existing, which benefits aquatic passage, enhances stream conductivity and sediment transport, and minimizes the potential for inlet obstructions.
• A simulated stream bottom material will be provided as part of the preferred alternative.
• The design does not restrict high flows and maintains low flows.
• The preferred alternative will pass the 100-year storm for Brown Brook with more than 1' of freeboard.
• The project reduces the upstream 100-year floodplain elevation by approximately 1.5'.
• The project increases the 100-year flood volume storage by approximately 200 CF.
• The preferred alternative maintains approximately 2' of water through opening under normal flow conditions to promote aquatic passage.
• The design intent is to not cause erosion, aggregation, or scouring upstream or downstream of the crossing or water quality degradation.
• An alternative design report will be provided for the project.
• A waiver will be requested for the impacts to the Prime Wetland and 100-foot buffer.

Mike stated that for these reasons, he believes the project to be self-mitigating. At this point, the presentation was opened to questions.
Karl Benedict of NHDES stated this project overlaps two priority resource areas (PRA's) – the wetlands associated with the Tier 3 stream, and the 100' prime wetland buffer. He noted mitigation will be required for the permanent impacts associated with these PRA's. Mike said he would follow-up separately with Karl; Stantec will provide a color plan highlighting the permanent impacts within the PRA's for discussion regarding the mitigation fees.
Karl indicated the specification for the simulated streambed material should define a material similar to the existing reach streambed material; Mike acknowledged.
For the surface restoration identified as item 583.32 – Riprap, Class III Intermixed with Humus, Karl asked that Stantec consider using a native plantings for the banks; Mike acknowledged.
Andy O'Sullivan acknowledged the PRA areas require mitigation and noted impact areas D and E upstream and areas F, G, and H downstream will require mitigation.
Mike Leach noted the permanent 100-ft wetland buffer area impact for the roadways widening would also be included in the mitigation.

Michael Dionne of NH F&G had no comment on the presentation.
Michael Hicks of USACE asked if a historical assessment had been conducted for the project. Mike responded Stantec had completed the historical evaluation process in 2014; the bridge was determined to be not eligible and the NHDHR information would be included in the permit application.
Jean Brochi of the EPA had no comments on the presentation.
Gary Croot of the USCG had no comments on the presentation since Brown Brook is not a navigable waterway so the USCG has no jurisdiction.
Jamie Sikora of FHWA had no comment on the presentation.

Littleton-Waterford, #27711 (A003(594))

Today's NRACM meeting was a virtual meeting over Zoom. Megan Ooms (Dubois & King) and Bill McCloy (Normandeau) were present. Megan introduced the project team and summarized the existing bridge including its general location, surrounding landmarks and reviewed some photos of the site. Megan then summarized the details of the existing bridge, its deficiencies, and the project's purpose and need. The purpose of the project is to provide a safe and efficient highway crossing of the Connecticut River and to rehabilitate or replace the structurally deficient bridge thereby removing it from the State Bridge Red List and optimizing its remaining service life. The existing bridge exhibits substructure and steel superstructure deterioration and does not meet current width or railing standards. The bridge is a vital crossing for community. Megan discussed seven (7) alternatives currently under consideration in high-level detail: 1) Do Nothing (Does Not Meet Purpose & Need), 2) Deck Replacement, 3) Full Superstructure Replacement, 4) Full Superstructure Replacement & Widening, 5) Convert to Multi-Use Path (Does Not Meet Purpose & Need), 6) Full Replacement and 7) Demolition and Addition of New Ramps. A summary table of the alternatives was presented including the relative degree of impact to various factors including environmental impacts, traffic, historical resources, and others such as cost and service life.

Bill McCloy (Normandeau) summarized known natural resources and other related findings about the project site based on initial desktop due diligence and field investigations. Coordination with NHNHB indicated four known plant species, one wildlife species and no natural communities in the bridge vicinity. Follow up coordination with NHNHB and NHFG indicated that it was unlikely that the nearby rare plants would be present at the project site due to lack of appropriate habitat and that the wildlife species of concern was not utilizing the Route 18 bridge for nesting. Coordination with VTFW indicated three wildlife and one plant species of concern in the area of the bridge. VTFW is recommending a mussel survey in the river and review of the bank of the river on the VT shore for the rare plant known upstream of the site. Scattered invasive species were noted during the wetland delineation. VTANR reviewed the delineation boundaries and wetland classification pursuant to the VT Wetland Rules in 2022 and concurred. Coordination with USFWS IPaC indicated that the project falls within the range of the northern long-eared bat (NLEB), Canada lynx and monarch butterfly. A visual inspection of the bridge structure in Nov 2020 did not reveal any signs of bat utilization or roosting per the USFWS guidance and methodology at the time. An Essential Fish Habitat (EFH) study is not required at this time.

2022 VALUES

TOWN	LAND VALUE
Acworth	2015
Albany	1166
Alexandria	3283
Allenstown	11545
Alstead	3107
Alton	28465
Amherst	33150
Andover	5187
Antrim	5186
Ashland	17888
Atkinson	53267
Auburn	25811
Barnstead	10183
Barrington	14071
Bartlett	10785
Bath	2148
Bean's Grant	494
Bean's Purchase	494
Bedford	53267
Belmont	16815
Bennington	5777
Benton	494
Berlin	2091
Bethlehem	1170
Boscawen	8475
Bow	22793
Bradford	5543
Brentwood	25013
Bridgewater	21888
Bristol	19371
Brookfield	3208
Brookline	24118
Cambridge	494
Campton	6327
Canaan	5832
Candia	13335
Canterbury	4856
Carroll	4102
Center Harbor	43396
Chandler's Purchase	494
Charlestown	3287
Chatham	742
Chester	16676

NHDES AQUATIC RESOURCE MITIGAT
WETLAND PAYMENT CALCULAT
***INSERT AMOUNTS IN YELLOW CELI

	1	**Convert square feet of impact to acr**	
	INSERT SQ FT OF IMPACT	Square feet of impact =	759.00
			43560.00
		Acres of impact =	0.0174
	2	**Determine acreage of wetland const**	
		Forested wetlands:	0.0261
		Tidal wetlands:	0.0523
		All other areas:	0.0261
	3	**Wetland construction cost:**	
		Forested wetlands:	$2,677.79
		Tidal Wetlands:	$5,355.57
		All other areas:	$2,677.79
	4	**Land acquisition cost (See land valu**	
	INSERT LAND VALUE FROM TABLE WHICH APPEARS TO THE LEFT. (Insert the amount do not copy and paste.)	Town land value:	18506
		Forested wetlands:	$483.68
		Tidal wetlands:	$967.36
		All other areas:	$483.68
	5	**Construction + land costs:**	
		Forested wetland:	$3,161.47
		Tidal wetlands:	$6,322.93
		All other areas:	$3,161.47
	6	**NHDES Administrative cost:**	
		Forested wetlands:	$632.29
		Tidal wetlands:	$1,264.59
		All other areas:	$632.29
	**********	**TOTAL ARM PAYMENT**********	
		Forested wetlands:	$3,793.76
		Tidal wetlands:	$7,587.52
		All other areas:	$3,793.76

Exhibit K

Chesterfield	9817
Chichester	10581
Claremont	5788
Clarksville	681
Colebrook	1771
Columbia	684
Concord	37684
Conway	17622
Cornish	2954
Crawford's Purchase	494
Croydon	1878
Cutt's Grant	494
Dalton	1912
Danbury	2798
Danville	25564
Deerfield	9596
Deering	6106
Derry	53267
Dix's Grant	494
Dixville	494
Dorchester	869
Dover	53267
Dublin	6403
Dummer	494
Dunbarton	7038
Durham	35249
East Kingston	26497
Easton	1943
Eaton	3515
Effingham	4109
Ellsworth	655
Enfield	12084
Epping	22559
Epsom	10218
Errol	1110
Erving's Location	494
Exeter	53267
Farmington	9882
Fitzwilliam	4939
Francestown	5172
Franconia	4017
Franklin	15980
Freedom	16133
Fremont	18506
Gilford	30949
Gilmanton	7638
Gilsum	2184

Exhibit K

Leach, Michael

From: Benedict, Karl <Karl.D.Benedict@des.nh.gov>
Sent: Tuesday, March 7, 2023 3:49 PM
To: Leach, Michael
Cc: Fortin, Gerard; Gerton, Alanna
Subject: RE: Fremont 23793 – Martin Road over Brown Brook Mitigation

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Michael,

I would recommend running the ARM calculator for (only) the 759 sq. ft. of permanent impacts to PRA. For the upland impacts located within the 100' prime wetland buffer I recommend completing the prime wetland waiver request form linked below. Identify the proposed ARM payment for the PRA permanent impact, upgrade to the stream crossing and request to exclude upland areas within the ROW. You have excluded the riverine impacts and we will consider those to be self-mitigating with the culvert as discussed.
NH Online Forms System - Prime Wetland Waiver Forestry & Other Activities . Version 2.1
Sorry for delay in response as I was out of office.

Karl Benedict, Public Works Subsection Supervisor
Land Resources Management
Water Division, NH Department of Environmental Services
29 Hazen Drive, PO Box 95
Concord, NH 03302
Phone: (603) 271-4194
Fax: (603) 271-6588
Email: Karl.Benedict@des.nh.gov
Follow us on Twitter!
Like us on Facebook!

We greatly appreciate your feedback. Please take a moment to fill out our 3-minute NHDES-LRM customer satisfaction survey.

From: Leach, Michael <Michael.Leach@stantec.com>
Sent: Tuesday, February 21, 2023 10:58 AM
To: Benedict, Karl <Karl.D.Benedict@des.nh.gov>
Cc: Fortin, Gerard <Gerard.Fortin@stantec.com>; Gerton, Alanna <Alanna.Gerton@stantec.com>
Subject: Fremont 23793 – Martin Road over Brown Brook Mitigation

Hi Karl,
As a follow-up to the second NHDOT BOE meeting for the project held on February 15, the attached mitigation area plans have been highlighted for your review to confirm the project mitigation.
Based upon the meeting discussion, we understand the stream is self-mitigating (i.e., no stream mitigation fee), but there are 2 PRA areas associated with the project that will require mitigation by in-lieu fee for the permanent impacts under this project.

Exhibit K

One PRA area is the wetlands associated with the Tier 3 stream (impacts D and E upstream and impacts F, G and H downstream) that total to 759 SF associated with the new bridge.
The other PRA is the 100' Prime wetland buffer noted on the separate plan identified as areas A and B that total to 3,505 SF associated with the roadway widening and approach to the new bridge.
These 2 PRA areas sum to (759 + 3,505 =) 4,264 SF. We have obtained the 2022 wetland mitigation worksheet (latest one available at the NHDES website) and input the Wetland Impact area of 4,264 SF and the Town Value (18,506) that results in an in-lieu fee payment estimated at $21,313.03 - see attached.
Can you please confirm that this mitigation approach and associated impact areas are consistent with the BOE meeting for this project and that the final mitigation fee would be based upon any final adjustments to the permanent wetland impact areas and any adjustments to the Town's Value for 2023, if any.
Please e-mail or call me with any questions or comments.
Thank you,
Mike

Michael Leach
Senior Associate

Direct: 603-206-7538
Mobile: 603-203-3048
Fax: 603-669-7636
michael.leach@stantec.com

Stantec
5 Dartmouth Drive Suite 200
Auburn NH 03032-3984

Exhibit K

ENGINEERING STUDY

FREMONT 23793

Martin Road over Brown Brook

Bridge No. 155/133

Fremont, NH

November 2022
Revised December 2022

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Exhibit L

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1.0 INTRODUCTION

This report discusses replacement alternatives for the bridge carrying Martin Road over Brown Brook (Br. No. 155/133). Martin Road connects Fremont Road and North Road and runs north to south. The existing bridge is located about 2,500' north of North Road, which runs east to west.

The existing bridge is on the State's Municipal Red List due to the poor condition of the deck and serious condition of the substructure and has a load posting of 15 tons. The superstructure is in satisfactory condition. The abutments are poorly aligned with the channel and the recent bridge inspection report dated December 21, 2021, notes the abutments are undermined and the north abutment has settled about 3.5 inches. Channel scour and bank slumping are also noted.

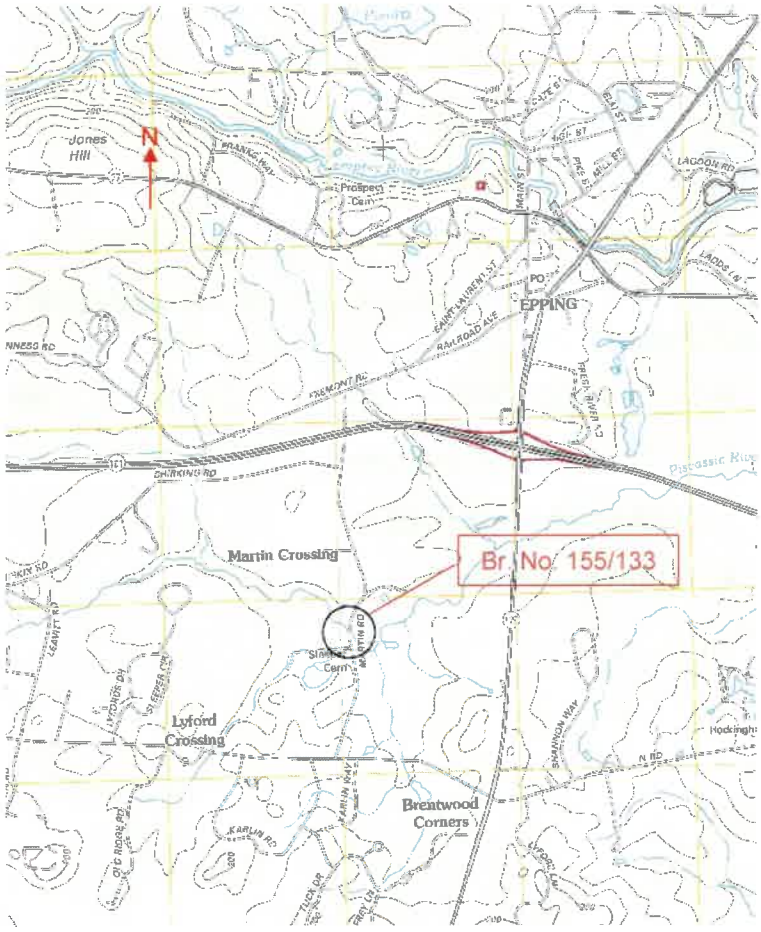

Figure 1 Location Map

2.0 EXISTING CONDITIONS

2.1 BROWN BROOK

Brown Brook rises in the Town of Fremont near Leavitt Road and flows to the east under Martin Road. Brown Brook reaches its confluence with the Piscassic River approximately 600 feet downstream of Martin Road. Many references note Brown Brook as the Piscassic River at and upstream of the bridge location, however the NHDES has designated the reach above the confluence as Brown Brook. The Piscassic River flows east under Route 125 then under Route 101, and eventually merges with the Fresh River then the Lamprey River, which discharges into Great Bay. The drainage area of Brown Brook at the crossing site is about 4.1 square miles.

The terrain and floodplain of Brown Brook is relatively gentle with a main channel slope at approximately 10.5 feet per mile. The watershed is a mix of open fields and forested areas with some residential development within the watershed. The land use is agricultural along Martin Road with farm cattle using the fields in the vicinity of the bridge.

2.2 ROADWAY APPROACH

See Table 1 for a brief summary of the roadway approaches and the following text for a more detailed description.

Table 1 Existing Martin Road Summary

Functional Class	Urban, Local
National Highway System	Bridge does not carry NHS
Roadway Section	Two-way with undefined width of travel lanes Roadway width varies – 15 to 19 feet.
Horizontal Alignment	Tangent
Vertical Alignment	Nearly level across the bridge with sag in vertical curve located approximately 100 feet south of the bridge
Posted Speed	25 mph
2020 AADT	520
2042 AADT	769
Truck Percentage	4%
Pavement Condition	Poor

The roadway alignment of Martin Road is on a short tangent section between horizontal curves which both curve to the east. The roadway varies in width at approximately 18-19 feet north and south of the bridge. The existing pavement is in poor condition. There is a gravel driveway located at the southwest quadrant just south of the bridge.

2.3 BRIDGE

See Table 2 below for a summary of the existing bridge components, which are discussed in more detail in the following subsections.

Table 2 Existing Bridge No. 155/133 Summary

Superstructure	Cast-in-place concrete deck on painted steel beams
Substructure	Concrete gravity abutments on soil with stone and concrete masonry wings
Built	1930
Length	18.0 feet total length. 15.0 feet single maximum span (clear span at waterway varies from 10.2 at downstream face to 12.3 feet at upstream face)
Width	~20.5 feet (17.8 feet curb to curb)
Skew	25°
Wearing Surface	Bituminous

2.3.1 Bridge History

The existing bridge was built in 1930 and consists of a cast-in-place concrete deck on steel girders, which are set on reinforced concrete abutments on soil. The bridge clear span is skewed and is 12'-3" at the inlet and 10'-2" at the outlet of the waterway. The clear height varies along the length between 4'-0" and 4'-5". A fence gate, presumably to prevent farm animals from entering the waterway, is located at the upstream side of the bridge.

Bridge curbs with a reveal of 0'-6" support tubular bridge rail with three steel posts over the bridge, leaving a total curb-to-curb roadway width of approximately 17.8'. This is also the approximate rail-to-rail width, as the rail is not appreciably set back from the vertical curb face. There is no bridge approach rail or bridge rail transitions at this structure.

2.3.2 Bridge Condition

As summarized in Table 3 below, the latest bridge inspection report of December 2021 has assessed the bridge deck to be in Poor (4) condition citing curbs have cracks and minor spalls; soffit has light cracks and spalls with exposed and rusted reinforcing steel, heavy leaking, several small delaminations, scaling and leaking with efflorescence.

The substructure was found to be in Serious (3) condition, with the north abutment exhibiting large cracks at north centerline with 3.5 inches of settlement, broken, bulging and undermined up to 12 inches. The south abutment was cracked up to 0.5 inch wide with spalls below the waterline and abrasion along the waterline. The bridge seats indicate large cracks on the north and south sides. Large cracks and spalls were observed at the northwest exterior bays with up to 20 inches of penetration. The stone wingwalls were observed to be loose with voids.

The posts of the bridge railing are all loose and several are not bolted; and one post is damaged and not attached. The bridge railing height is substandard.

Table 3 Existing Bridge Condition Summary

Red List	On Municipal Red List (Scheduled for 2023 construction completion)
Deck	4 Poor
Superstructure	6 Satisfactory
Substructure	3 Serious
Sufficiency Rating	16%
Bridge Rail	Substandard
Rail Transition	None

3.0 PROBLEMS AND SOLUTIONS

The key problems and solutions associated with the existing bridge are summarized in Table 4 below.

Table 4 Problems & Solutions

Problem	**The existing bridge is structurally deficient.**
Solution	Repair or replace the bridge.
Problem	**The existing abutment walls are misaligned with the channel.**
Solution	Replace the bridge with a wider opening structure aligned with Brown Brook with channel protection that will minimize scour effects at outlet side and deposition of material under and at the upstream side of the bridge. Remove accumulated debris below the bridge.

4.0 HYDRAULIC & ENVIRONMENTAL DESIGN CONSIDERATIONS

With consideration for the hydraulic and environmental aspects for the design of this bridge, this section summarizes the key factors considered in setting the span and channel section ahead of the structure alternative evaluation. For more detailed information, see Appendices A through E.

4.1 MINIMUM SPAN PER STREAM CROSSING GUIDELINES

The bridge is located in the middle of a large cattle farm field. Historically, the cattle have had access to the river immediately upstream and downstream of the bridge and have used these two areas as "watering holes". Over the years, the stream banks have been significantly modified by the farming activities, causing the banks to be much wider and flatter than the adjacent upstream and downstream

reaches. According to historical information, the project location along Martin Road is not subject to significant flooding from Brown Brook.

The memo *Geomorphic Characterization, Martin Road over the Brown Brook, Fremont, New Hampshire* summarizes the geomorphic investigation at this site. Brown Brook was identified with a classification of "D_A5" based on dominance of the sand bed, an entrenchment ratio greater than "4", a width/depth ratio less than "4", and a slope of less than 5%. Based upon the field work, the bankfull width is 17 feet. The minimum clear span is 1.2 x bankfull width + 2 feet (New Hampshire Stream Crossing Guidelines, 2009) or 22 feet, as shown in Table 5. See Appendix A for the complete geomorphic report.

Table 5 Bankfull Channel Data

Bankfull Width	17 ft
Minimum Clear Span (1.2 x Bankfull Width + 2')	22 ft

4.2 HYDRAULICS

Per Bridge Design Manual (BDM) Table 2.7.5-1, this bridge has a design 50-year event and a check 100-year flood event since it is on a Tier 5 highway The bridge substructure scour design is a 100-year event and a check 500-year flood event.

A summary of existing and proposed Water Surface Elevation (WSEL) and stream velocity from the HEC-RAS analysis is presented in Table 6 for the upstream cross-section at the bridge.

Table 6 Hydraulic Summary at Bridge

Bridge	Flood Event	Discharge (ft^3/sec)	Upstream Face		Downstream Face	
			WSEL (Feet, NAVD)	Average Stream Velocity (ft/sec)	WSEL (Feet, NAVD)	Average Stream Velocity (ft/sec)
Existing	10-yr	140	131.55	4.5	130.98	6.2
	50-yr	230	133.00	4.9	131.46	8.5
	100-yr	280	133.00	6.0	131.63	9.8
	500-yr	405	134.32	8.1	134.25	8.1
Proposed 22' Span	10-yr	140	131.27	2.5	131.19	2.4
	50-yr	230	131.64	3.6	131.48	3.5
	100-yr	280	131.84	4.1	131.65	4.1
	500-yr	405	132.40	5.0	132.09	5.1

The proposed structure with a 22 foot clear span assumes a design low chord elevation of 133.50. At the upstream bridge face, the proposed condition analysis yielded a 50-year elevation of 131.64 and 100-year elevation of 131.84. This provides for approximately 1.9 feet of freeboard above the 50-year storm elevation at the bridge face. The 50-year elevation at the approach cross section 167 is 132.29 with a channel depth of approximately 3.0 feet which compared to the upstream face at the bridge which has an opening height of approximately 4.9 feet. The Hydraulic Study Report, dated October 2022 is contained in Appendix B.

Existing and proposed freeboard is summarized in Table 7.

Table 7 Freeboard Summary at Bridge

Bridge	Upstream Channel Invert EL. (ft)	Downstream Channel Invert EL. (ft)	Upstream Minimum Low Chord EL. (ft)	Downstream Minimum Low Chord EL. (ft)	Flood Event	Upstream Freeboard (ft)	Downstream Freeboard (ft)
Existing	128.65	128.48	133.00	133.00	50-yr	0.00	1.54
					100-yr	0.00	1.37
					500-yr	0.00	0.00
Proposed 22' Span	128.65	128.48	133.50	133.50	50-yr	1.86	2.02
					100-yr	1.66	1.85
					500-yr	1.10	1.41

4.3 WETLANDS

Per *Wetland and Watercourse Delineation Report* and *Wetland Functional Assessment, Piscassic River, Martin Road, Fremont, New Hampshire* dated July 19, 2022, wetland boundaries were delineated and located using GPS. Stantec also performed a wetland functional assessment of the delineated wetland and stream in accordance with the New Hampshire Wetland Rules. See Appendix C for the complete wetlands report.

4.4 WILDLIFE CROSSING

No wildlife crossing is proposed with the replacement structure. The proposed alternative maintains the existing stream thread, which carries a few feet of water through the existing bridge. Since there is currently limited headroom within the crossing (total height to channel bottom is approximately 5 feet), providing a shelf for wildlife passage through the new structure would require increasing the roadway profile elevation. The structure span would also need to be increased to provide shelf area, resulting in additional filling in the floodplain and wetland resource areas to construct the raise roadway embankment. Given the very low traffic volumes as noted in section 2.2 and small size of this bridge, providing a wildlife crossing is not practical given the associated significant increases in environmental impacts and project

construction costs associated with raising the roadway profile to increase bridge size to accommodate a wildlife crossing.

Another consideration with providing a wildlife crossing is the abutting farm properties and farm animals using the adjacent fields. A gate currently exists at the downstream side of the existing bridge to prevent farm animals from crossing through the bridge opening. If a wildlife crossing were provided, this would encourage farm animals to use the bridge opening. The existing gate is being removed and not replaced with the proposed bridge design.

4.5 ARCHEOLOGICAL ASSESSMENT

A Phase 1A Archeological Sensitivity Assessment was conducted by Monadnock Archeological Consulting, Inc. dated April 13, 2014 for the replacement of the Martin Road Bridge. The study did not identify any archeological sites or areas of archeological concern within the project limits. No further study was recommended. The New Hampshire Division of Historical Resources (NHDHR) issued a determination on December 10, 2014 concurring with the consultant's recommendation that no further study was needed.

The Phase 1A Archeological Sensitivity Assessment and NHDHR determination are contained in Appendix D.

4.6 BRIDGE HISTORIC ELEGIBILITY

With an acknowledgement that the bridge is proposed to be replaced, NHDHR requested an Individual Inventory Form be prepared for the 1930's era bridge. The form, NHDHR INVENTORY # FRM0007, dated April 14, 2015 was filed with NHDHR by NHDOT and a determination of Not-Eligible was received with NHDHR's letter dated May 21, 2015.

The bridge Individual Inventory Form and NHDHR determination are contained in Appendix E.

5.0 GEOTECHNICAL

5.1 SUBSURFACE CONDITION SUMMARY

Stantec conducted a geotechnical exploration and analysis for replacement of the existing bridge. The work consisted of drilling four (4) test borings, evaluating the subsurface conditions and providing geotechnical engineering recommendations for the design and construction of the proposed bridge.

In general, the test borings encountered granular fill overlying naturally deposited soils. Fill was encountered in all of the borings and ranged in depth from the ground surface to approximately 7 feet. The fill generally consisted of fine to coarse sand with varying lesser amounts of gravel and silt. The recorded N-values ranged from 3 to 12 indicating a very loose to medium dense consistency. Based on field observations, an organic deposit was encountered in boring B-2 from approximately 7.0 to 10.0 feet.

This material is expected to be highly compressible. A clay deposit was encountered in B-2 and B-3 from approximately 7 to 16.5 feet. The recorded N-values ranged from 1 to 7 indicating a very soft to stiff consistency. A sand and gravel deposit was encountered in B-2 and B-3. The top of this deposit is expected to range from approximately 12.5 to 16.5 feet below the ground surface. The recorded N-values ranged from 28 to 66 indicating a medium dense to very dense consistency. Bituminous pavement was encountered at all boring locations and ranged from 3 to 5 inches in thickness.

Based on the subsurface conditions encountered in the test borings, a replacement bridge can be supported on soil. However, borings B-2 and B-3 encountered organic and clay deposits that are not suitable for supporting a replacement bridge. The deposit should be completely removed from the zone of influence of the proposed structure and replaced with compacted Structural Fill (NHDOT Item 508). The Geotechnical Engineering Report dated October 31, 2014 is provided in Appendix F.

6.0 DESIGN ALTERNATIVES

6.1 MAINTENANCE OF TRAFFIC ALTERNATIVES

The maintenance of traffic alternatives considered are as follows:

1. Bridge Closure. ← **Recommended**
2. Maintain alternating one-way traffic in phases.

6.1.1 Bridge Closure

A short-term bridge closure was considered and is the preferred alternative as the detour route is estimated at 3.3 miles using State Route 125 located parallel to Martin Road on the easterly side and traffic volume is a reasonably low Average Annual Daily Traffic (AADT) of 520 vehicles per day, see Figure 2 below.

This is the recommended maintenance of traffic alternative since it would result in a shorter construction duration over maintaining alternating one-way traffic and would be more cost-effective since only one construction phase would be needed for the work. With the bridge closure, the environmental impacts are significantly less with a smaller work area which also minimizes overall impacts. The intent with this alternative is to complete the project with a roadway closure of six weeks.

Figure 2 Signed Detour Route

6.1.2 Alternating One-Way Traffic

A second alternative was considered using alternating one-way traffic with temporary traffic signals in two phases however due to the relatively narrow width of Martin Road in the vicinity of the project, and the resulting lengthened duration of the work and significant environmental impacts using this method of traffic control, this alternative is not recommended. Furthermore, due to the serious condition of the substructure, it is unlikely that the abutments could be demolished in stages and continue to safely support traffic.

6.2 BRIDGE SCOPE OF WORK & ALTERNATIVES

Due to the existing bridge's age, poor condition of the bridge deck, serious condition of the substructure, and substandard bridge and approach railing, we recommend that the bridge be replaced. In addition, the existing abutment walls are misaligned with the channel which results in a narrower opening at the outlet side at 10.2 feet than the inlet side at 12.3 feet. This configuration appears to result in some minor scour at the outlet side of the bridge and some minor deposition upstream of the inlet side of the bridge. Bridge replacement allows for an increase in the hydraulic opening along with correction of the misalignment of the existing abutments.

The replacement alternatives considered are as follows:

1A. Provide new 22 ft wide x 7 ft high precast concrete box culvert with wingwalls on concrete spread footings and stone fill armoring and stream gravel to provide a simulated channel

bottom. Construction procedures will include a road closure with a detour to allow for shorter project duration.

1B. Provide new 22 ft wide x 7 ft high precast concrete box culvert with wingwalls on concrete spread footings and stone fill armoring and stream gravel to provide a simulated channel bottom. Construction procedures will include continuous one-way alternating flow of traffic throughout the project.

2A. Provide new 22 ft wide x7 ft high precast concrete 3-sided rigid frame structure on concrete spread footings with natural channel bottom. Construction procedures will include a road closure with a detour to allow for shorter project duration.

2B. Provide new 22 ft wide x 7 ft high precast concrete 3-sided rigid frame structure on concrete spread footings with natural channel bottom. Construction procedures will include continuous one-way alternating flow of traffic throughout the project.

3. Do Nothing - retain the existing structure.

The bridge inspection report dated November 2021 denotes the structure has been on the State's Municipal Red List since 1992. During a recent inspection conducted by NHDOT in mid-October of 2022, one of the existing bridge abutments showed additional signs of shifting, cracking, and settlement. Since the existing structure is in poor condition and is being closely monitored, further deterioration could result in closure of the roadway. Full replacement of the bridge is necessary.

Based on the geotechnical investigation performed, the soils are suitable for supporting the above new bridge alternatives, with some minor over-excavation, so pile-supported foundations were not considered due to the additional cost they would require.

Table 8 and

Table 9 compare various aspects of the structure alternatives considered. See Appendix G for a more detailed estimate breakdown.

Table 8 Structure Cost and Summary

Alternative	Structure Description	Estimated Construction Cost
1A	22 ft x 7 ft precast concrete box culvert with road closure	$1,167,000
1B	22 ft x 7 ft precast concrete box culvert with alt one-way traffic	$1,511,000
2A	22 ft x 7 ft precast 3-sided rigid frame structure with road closure	$1,223,000
2B	22 ft x 7 ft precast 3-sided rigid frame structure with alt one-way traffic	$1,590,000

Table 9 Structure Alternatives Comparison

Alternative	Pros	Cons
1A - Precast Concrete Box Culvert	• Lowest construction cost. • Shortest construction duration. • Less vulnerable to scour.	• Heaviest crane pick weights.
2A – Precast 3-Sided Rigid Frame Structure	• Reconstruction of natural channel bottom	• More extensive foundation construction. • Longer construction duration • More vulnerable to scour

7.0 SUMMARY

7.1.1 Bridge

The recommended alternative for replacement is a precast concrete box culvert, due to the lower construction cost and added scour protection over a 3-sided rigid frame. All work is anticipated to be performed using a temporary road closure and detour route.

7.1.2 Channel Reconstruction

The channel reconstruction through the bridge opening assumed for the hydraulic report consists of a twenty-two (22) foot bottom width with a two (2) foot thick layer of Simulated Streambed Material to create a natural channel bottom material extending to each of the culvert walls. This provides for approximately five (5) feet of open waterway area from channel invert to the low chord under the bridge.

The proposed section for the riprap aprons at the inlet and outlet sides of the bridge is a two (2) foot thick layer of Class III riprap (d_{50} = 12 inches). The channel bottom may be capped with natural material, Simulated Streambed Material, above the riprap layer as may be required by the resource agencies during the environmental permitting for the project. Riprap is proposed to be extended to top of bank and may be supplied intermixed with humus above the 100-year flood elevation.

7.1.3 Roadway

The roadway layout will generally remain unchanged. The recommended replacement alternative will result in a slight raising of the overall profile anticipated to be less than six (6) inches. It is anticipated this will be tapered out off the bridge and not result in any change to drainage patterns. The curb-to-curb bridge width will be increased from approximately eighteen (18) feet to twenty-six (26) feet to allow for eleven-foot (11) travel lanes with two (2) foot shoulders over the bridge and tapered to match the existing approach roadways at the limits of work. It is anticipated that this work may be accomplished by box widening of the existing roadway.

There is no existing approach guardrail at the bridge. The proposed layout includes standard transition rail at each quadrant to w-beam guardrail, except at the Southwest Quadrant, where there is a driveway. Bridge approach rail cannot be provided at this quadrant due to the close proximity to the bridge. The residential drive will remain as is, with the bridge rail being extended and curling at the existing limit of the drive, but not impacting the curb cut.

Table 10 Typical Proposed Approach Roadway Section

Road	Typical Section	Roadway Pavement	Structural Section
Martin Road	• Undefined lanes – width approximately 18 to 19 feet at limits of work • Two 11-foot travel lanes at bridge • 2-foot shoulders	• 4"	• 6" Crushed Gravel • 12" Gravel

7.1.4 Design Exceptions

None.

7.1.5 Drainage and Stormwater Treatment

Martin Road is uncurbed and there are no drainage facilities, BMPs, or defined ditches along the roadway within the project limits. Stormwater runoff from the uncurbed roadway sheet flows off the pavement and onto adjacent properties before eventually reaching Brown Brook. There is a negligible increase in pavement area with the bridge widening and no flow patterns are anticipated to change, therefore no water quality treatment is proposed.

7.1.6 Environmental

The following subsections summarize anticipated impacts for the bridge replacement.

7.1.6.1 Wetland Impacts

The proposed bridge replacement will impact Brown Brook and its banks. Approximate anticipated impacts, based on the recommended alternative described above, are as follows:

- 2,000 square feet of wetland impact,
- 105 linear feet of channel impact,
- 225 linear feet of bank impact

A wetlands permit application will be required. It is possible that mitigation will be required due to the linear footage of channel impact and bank impact. Should mitigation be required, it could be in the form of an Aquatic Resource Mitigation (ARM) fund contribution. This permit will be applied for during the

Preliminary Design phase of the project and will require approval of both New Hampshire Department of Environmental Services (NHDES) and the US Army Corps of Engineers (ACOE).

7.1.6.2 Shoreland Permitting

There is no Shoreland Permit required, as the location of the project is located along Brown Brook above the confluence of Brown Brook and the Piscassic River in Fremont, and is not jurisdictional under the Shoreland Water Quality Protection Act.

7.1.6.3 Limited Reuse Soils

Limited Reuse Soils do not apply for this project as Martin Road is a local Town road.

7.1.7 Utilities

There are no existing utility poles or aerial utility lines located along the roadway and no known underground utilities that are anticipated to be impacted by construction.

7.1.8 Right-of-Way

Temporary construction easements will be required on each of the two abutting parcels to the Martin Road bridge. Within the project limits, one property owner exists who owns the two abutting parcels, one on each side of the roadway. Coordination with adjacent property owner shall take place during Preliminary and Final Design to minimize any detrimental impacts to their properties. Existing ROW has been established with the base survey for the project. Temporary easements for cofferdams and bridge construction, channel reconstruction outside the roadway Right of Way, and to tie in slopes and match to the existing driveway are anticipated to be as follows:

- East Side of Roadway – Approximately 3,200 sf of temporary easement area.
- West Side of Roadway – Approximately 2,350 sf of potential temporary easement area.

The estimated area of potential permanent easement areas for maintenance of riprap and slopes should these be deemed necessary for by the Town are anticipated to be as follows:

- East Side of Roadway – Approximately 1,350 sf of temporary easement area.
- West Side of Roadway – Approximately 500 sf of potential temporary easement area.

7.1.9 Earthwork

There is limited proposed earthwork associated with the project. For a bridge replacement, there will be some fill in each quadrant to accommodate the raised roadway profile. It is anticipated that this work can be accomplished with (2:1 or flatter) slopes at the bridge adjacent to where new guardrail is provided and

(4:1 or flatter) slopes along the roadway approaches. The roadway grade will be raised approximately 6 inches or less at the bridge with new gravels.

7.1.10 Lighting

Lighting is not proposed for this project.

7.1.11 Estimate

A conceptual construction cost estimate has been prepared for the replacement alternative, summarized in Table 11 below. See Appendix C for more detailed cost estimate information.

Table 11 Estimate Summary

Estimated Cost	Bridge Replacement Alternative 1A Precast Box Culvert
Box Culvert	$250,000
Channel Reconstruction	$50,000
Bridge Demo/Cofferdams/Water Diversion	$180,000
Roadway	$462,000
Construction Engineering (12%+/-)	$115,000
Contingency (10%+/-)	$110,000
Total	**$1,167,000**

7.1.12 Conceptual Plans

See Appendix H for the Conceptual Plans.

8.0 REFERENCES

AASHTO LRFD Bridge Design Specifications, 8th Edition. (2017). Washington, DC: AASHTO.
Bureau of Bridge Design. (2000). *Bridge Design Manual, Version 1.0.* Concord: NHDOT.
Bureau of Bridge Design. (2015). *Bridge Design Manual, Version 2.0.* Concord: NHDOT.
New Hampshire Stream Crossing Guidelines. (2009). Durham: University of New Hampshire.

Fremont 23793 February 2023
Martin Road Culvert

Env-Wt 904.09 Alternative Design
TECHNICAL REPORT

Env-Wt 904.09(a) - If the applicant believes that installing the structure specified in the applicable rule is not practicable, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.69 defines practicable as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.)*

This document addresses compliance with Env-Wt 900 "Stream Crossings". Brown Brook is a Tier 3 stream crossing. The project involves replacing an existing simple span bridge on concrete abutments. A Summary of Meeting Minutes for the January 18 and February 15, 2023 Natural Resource meetings have been provided with the wetland application.

The replacement of the existing culvert was determined to be the most appropriate action to remedy the failing existing culvert at this location. It allows for improved hydraulics and aquatic passage at the location, as well as removing a failing bridge from the State's redlist. The Town did consider other alternatives, including a three-sided rigid frame structure with a natural bottom. Since additional excavation and channel reconstruction would be necessary due to the poor soils at the crossing, the box culvert alternative with cutoff walls and a simulated channel bottom was determined to be the most resistant to scour. In addition, impacts associated with staged construction for the full replacement option would be significant, requiring a widened crossing to maintain traffic through construction, as well as an extended construction period. The Town's preference was the full replacement option, with a short-term full roadway closure.

The 'no build' alternative will not address the existing culvert, which is in poor condition; without any improvements, its condition will continue to decline and eventually forcing the roadway to be closed. Therefore, this alternative was rejected.

The proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the *maximum extent practicable*, as specified below.

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed:

(a) In accordance with the NH Stream Crossing Guidelines.
The NH Stream Crossing Guidelines recommend that the crossing should be a span structure with a minimum width of 1.2 x Bankfull Width + 2 feet. A Stream Crossing Assessment performed by Stantec determined the bankfull width to be 17 feet. This results in a minimum structure width of 22 feet to comply with the guidelines. <u>This criterion will be met under the guidelines.</u>

The Stream Crossing Assessment also identified the stream type as DA5 with a minimum entrenchment ratio of 6.7. The guidelines recommend the structure include consideration of the stream entrenchment ratio to maintain the stream channel through the proposed structure. Based upon the entrenchment ratio, a 116-foot opening is required. This is not practical for the location as it would be too large to

utilize a precast culvert and would require a full bridge structure to span that distance. This would necessitate an increase in elevation of the roadway profile to account for the span length and deck thickness. This would result in additional filling and wetland impacts and would have an adverse impact on the floodplain storage as well. ***This design criteria will not be met under the guidelines.***

(b) With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing.
The proposed structure increases the opening by 200% which allows for enhancement of the bed forms and streambed characteristics in the vicinity of the new structure inlet and outlet to be consistent with and be comparable to those found upstream and downstream of the stream crossing. This criterion will be met under the guidelines.

(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage.
There will not be an opportunity to provide vegetated banks inside the culvert. Outside the culvert, riprap installed above the 100-year storm elevation will be intermixed with humus and vegetated. ***This criterion will not be met under the guidelines.***

(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain.
The culvert is being widened on the existing alignment and gradient. The proposed work will not impact the natural flow regimes of the brook. There will be a net gain in floodplain storage due to the larger structure. This criterion will be met under the project.

(e) To accommodate the 100-year frequency flood, to ensure that (1) there is no increase in flood stages on abutting properties; and (2) flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability. *The hydraulic study performed for the culvert indicates the improvements will result in a decrease in flood elevations from existing for larger storm events at the upstream side of the crossing and continue to pass the 100-year storm event. This criterion will be met under the project. A more detailed discussion of the hydrologic and hydraulic analyses can be found in the Hydraulic Study Report dated October 2022 which has been provided with the wetland application*(f) To simulate a natural stream channel.
Designed simulated streambed material will be placed within the channel in any locations where the existing streambed is impacted. This criterion will be met under the project.

(g) So as not to alter sediment transport competence.
Sediment transport competence will not be altered under the project. This criterion will be met under the project.

Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:
Env-Wt 904.01
(a) Not be a barrier to sediment transport;
Sediment transport is accommodated by the existing culvert and will continue to be accommodated at this crossing. This criterion will be met under the project.

(b) Prevent the restriction of high flows and maintain existing low flows;
High and low flows are accommodated at this crossing, and will continue to be accommodated with the culvert improvements. The improvements to the culvert will result in a decrease in the velocity of high flows through the structure and at the culvert outlet for a range of storm flows: 10-year event 6.2 fps to 2.4 fps and for the 100-year event 9.8 fps to 4.1 fps. This criterion will be met under the project. Additional information can be found in the Hydraulic Study Report dated October 2022 which has been provided with the wetland application.

(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;
There will be no obstructions or disruptions to the movement of aquatic life indigenous to the waterbody beyond the duration of construction. The existing slope and profile of the culvert is being maintained with the improvements. This criterion will be met under the project.

(d) Not cause an increase in the frequency of flooding or overtopping of banks;
The hydraulic study performed for this project demonstrates that the culvert improvements will not cause an increase in the frequency of flooding or overtopping of banks and provides 1 foot of freeboard under the structure during the 100-year storm event. This criterion will be met under the project.

(e) Preserve watercourse connectivity where it currently exists;
Watercourse connectivity exists today and will continue to exist with the culvert improvements. This criterion will be met under the project.

(f) Restore watercourse connectivity where: (1) Connectivity previously was disrupted as a result of human activity(ies); and (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;
Not applicable to this project.

(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and
The proposed culvert maintains the existing gradient, reduces channel velocities for a range of storm flows through the structure, and will not cause erosion, aggradation, or scouring upstream or downstream of the crossing. The culvert inlets and outlets will be protected with Riprap, Class III topped with simulated streambed material. This criterion will be met under the project.

(h) Not cause water quality degradation.
The proposed culvert improvements will not cause water quality degradation. Erosion and sediment controls will be utilized during construction to protect water quality in Brown Brook. This criterion will be met under the project.

Exhibit N

Please mail 2 copies of the completed form and required material to:

Cultural Resources Staff
Bureau of Environment
NH Department of Transportation
7 Hazen Drive
Concord, NH 03302

STANTEC CONSULTING
RECEIVED
DEC 12 2014
DEC 02 2014
5 DARTMOUTH DR., STE 101
AUBURN, NH 03032

DHR Use Only	
R&C #	6301
Log In Date	___/___/___
Response Date	___/___/___
Sent Date	___/___/___

Request for Project Review by the New Hampshire Division of Historical Resources for Transportation Projects

☒ This is a new submittal.
☐ This is additional information relating to DHR Review and Compliance (R&C)#:

GENERAL PROJECT INFORMATION

1930 IB-C

DOT Project Name & Number Martin Road Bridge (Bridge #155/133)

Brief Descriptive Project Title New bridge along Martin Road over the Pascassic River

Project Location Martin Road

City/Town Fremont

Lead Federal Agency and Contact *(if applicable)* Army Corps of Engineers
(Agency providing funds, licenses, or permits)

Permit Type and Permit or Job Reference #

Wetlands

DOT Environmental Manager *(if applicable)*

PROJECT SPONSOR INFORMATION

Project Sponsor Name Town of Fremont

Mailing Address PO Box 120 Phone Number 895-2226

City Fremont State NH Zip 03044 Email

CONTACT PERSON TO RECEIVE RESPONSE

Name/Company Michael Leach - Stantec Consulting Services, Inc

Mailing Address 5 Dartmouth Drive - Suite 101 Phone Number -6698672

City Auburn State NH Zip 03032 Email michael.leach@stantec.com

This form is updated periodically. Please download the current form at http://www.nh.gov/nhdhr/review. *Please refer to the Request for Project Review for Transportation Projects Instructions for direction on completing this form.* Submit 2 copies of this project review form for each project for which review is requested. Include 1 self-addressed stamped envelope to expedite review response. Project submissions will not be accepted via facsimile or e-mail. This form is required. Review request form must be complete for review to begin. Incomplete forms will be sent back to the applicant without comment. Please be aware that this form may only initiate consultation. For some projects, additional information will be needed to complete the Section 106 review. All items and supporting documentation submitted with a review request, including photographs and publications, will be retained by the DOT and the DHR as part of its review records. Items to be kept confidential should be clearly identified. For questions regarding the DHR review process and the DHR's role in it, please visit our website at: http://www.nh.gov/nhdhr/review or contact the R&C Specialist at christina.st.louis@dcr.nh.gov or 603.271.3558.

PROJECTS CANNOT BE PROCESSED WITHOUT THIS INFORMATION

Project Boundaries and Description

- ☒ Attach the relevant portion of a 7.5' USGS Map (photocopied or computer-generated) ***indicating the proposed area of potential effect (APE).*** *(See RPR for Transportation Projects Instructions and R&C FAQs for guidance. Note that the APE is subject to approval by lead federal agency and SHPO.)*
- ☒ Attach a detailed narrative description of the proposed project.
- ☒ Attach current engineering plans with tax parcel, landscape, and building references, and areas of proposed excavation, if available.
- ☒ Attach photos of the project area/APE with photo key (overview of project location and area adjacent to project location, and specific areas of proposed impacts and disturbances.) *(Blank photo logs are available on the DHR website. Informative photo captions can be used in place of a photo log.)*
- ☒ A DHR file review must be conducted to identify properties within or adjacent to the APE. Provide file review results in **Table 1**. *(Blank table forms are available on the DHR website.)*
  File review conducted on 03/21/2014.*

  **The DHR recommends that all survey/National Register nomination forms and their Determination of Eligibility (green) sheets are copied for your use in project development.*

Architecture

Are there any buildings, structures (bridges, walls, culverts, etc.) objects, districts or landscapes within the APE? ☒ Yes ☐ No
If no, skip to Archaeology section. If yes, submit all of the following information:

- ☐ Attach completed **Table 2**.
- ☒ Photographs of ***each*** resource or streetscape located within the APE. Add to the photo key and photo log noted above. (Digital photographs are accepted. All photographs must be clear, crisp and focused.)
- ☐ Copies of National Register boundary (listed *or* eligible) mapping, and add National Register boundaries for listed and eligible properties to the 7.5' USGS project map *(if applicable).*

Archaeology

Does the proposed undertaking involve ground-disturbing activity? ☒ Yes ☐ No
If yes, submit all of the following information:

- ☒ Description of current and previous land use and disturbances.
- ☒ Available information concerning known or suspected archaeological resources within the project area (such as cellar holes, wells, foundations, dams, etc.)

Please note that for many projects an architectural and/or archaeological survey or other additional information may be needed to complete the Section 106 process.

AGENCY COMMENT *This Space for DOT and Division of Historical Resources Use Only*

Sent to DHR; Authorized DOT Signature: Sheila Charles Date: 12/1/2014

☐ Insufficient information to initiate review.

☐ Additional information is needed in order to complete review.

Comments: As the project proposes to replace the bridge, prepare an Individual Inventory Form for the 1930 structure.

~~Exhibit N~~

If plans change or resources are discovered in the course of this project, you must contact the Division of Historical Resources as required by federal law and regulation.

Authorized DHR Signature: Edna Feighner Date: 12/10/14

BUREAU OF ENVIRONMENT, NHDOT
REVIEW REQUEST TO THE NH DIVISION OF HISTORICAL RESOURCES

RECEIVED
DEC 02 2014

Date: December 1, 2014 **Return Prior to:**

Project: Fremont – NHDHR Bibliography Form and Short Report for Phase IA Archaeological Sensitivity Assessment, Martin Road Bridge over the Piscassic River, Fremont, NH by Goodby and Labbe 2014

Other Parties

COMMENTS: Agree with the consultant recommendations.

This request is forwarded to the **NH DIVISION OF HISTORICAL RESOURCES** for review and comment. NEPA and Sec. 106 of the NHPA require consultation with the SHPO to ensure the review of all actions covered by these acts relative to historical and cultural properties. The review should focus on the project's impacts pertinent to this act.

FOR MORE INFORMATION CONTACT: Sheila Charles, Cultural Resources Program Specialist
scharles@dot.state.nh.us 603-271-4049

COMMENTS: Please check one. Additional comments should be included below or on a separate sheet.

✓ **CONCUR** No further review

____ **CONCUR WITH CONDITION** *(Indicate major reservations about the project and the specific substantive changes or modifications desired.)*

____ **TECHNICAL COMMENTS** *(No formal position, technical comments may be attached.)*

____ **NO COMMENTS**

** **NON-RECEIPT OF THIS REVIEW IMPLIES CONSENT**

PLEASE COPY AND RETURN THIS SHEET

Date: 12/10/14

Reviewer's signature: Edna A. Feighner **Title:**
(Please Type or Print)

J:\FORMS\trDHR Archaeology.doc

Exhibit N

NEW HAMPSHIRE DIVISION OF HISTORICAL RESOURCES
State of New Hampshire, Department of Cultural Resources
19 Pillsbury Street, Concord, NH 03301-3570
TDD Access: Relay NH 1-800-735-2964
www.nh.gov/nhdhr

603-271-3483
603-271-3558
FAX 603-271-3433
preservation@dcr.nh.gov

STANTEC CONSULTING

MAY 2 5 2015

5 DARTMOUTH DR., STE 101
AUBURN, NH 03032

May 21, 2015

Jillian Edelmann
Bureau of Environment
NH Department of Transportation
Hazen Drive
Concord NH 03302-0483

RE: DOT, RPR 6301

Dear Jill:

Thank you for requesting a determination of National Register eligibility for the property listed below. As requested, the Division of Historical Resources' Determination of Eligibility Committee has reviewed the *DHR Inventory Form* prepared by Lisa Mausolf; based on the information available, the DOE Committee's evaluation of National Register eligibility is:

Town:	Property:	Determination:
Fremont	Martin Road Bridge 155/133 over Piscassic River, FRM0007	Not Eligible

A copy of the DHR evaluation form is attached for your use. The inventory data and the evaluation will also be added to the statewide survey database for historic properties in New Hampshire.

Please call Mary Kate Ryan at 271-6435 if you have questions.

Sincerely,

Chris

Christina St.Louis
Program Specialist

Enclosure

CC Elizabeth Muzzey, Director/SHPO
Stantec
Lisa Mausolf

Exhibit N

New Hampshire Division of Historical Resources

Determination of Eligibility (DOE)

Inventory #: FRM0007

Review Date: 5/13/2015 ***DOE Date:*** 5/7/2015

☑ Final DOE Approved

Property Name: Sleeper Bridge (155/133)

Area:

Address: Martin Road over Piscassic River

Town: Fremont **County:** Rockingham

Reviewed For: R&C **DOE Program(s):** DOT Department of Transportation

DETERMINATION OF ELIGIBILITY

Not eligible for NR **Integrity:** Partial **Level:**

Criteria: ***A:*** No ***B:*** No ***C:*** No ***D:*** No ***E:*** N

STATEMENT OF SIGNIFICANCE:

The DOE committee agrees with the consultant that the Sleeper Bridge is not eligible for the National Register of Historic Places. The 1930 I-beam bridge with concrete deck is a common bridge type in NH. At least 136 bridges of this type were constructed in NH by 1936 and this bridge has a relatively short span and replacement rails.

AREAS OF SIGNIFICANCE(S)

Does Not Apply

Period of Significance:

to

☐ Period not applicable

Boundary: footprint of bridge including abutments & approach

Follow Up:

Notify appropriate parties.

Comments:

Exhibit N

Town of Fremont NH
Office of the Select Board
PO Box 120
Fremont NH 03044–0120

Telephone 603 895 2226 x 301
Facsimile 603 895 3149
Email: hcarlson@fremont.nh.gov

MEMORANDUM OF UNDERSTANDING

To: Brenda Barthelemy, Rev Tr
Scott Barthelemy, Rev Tr
154 Martin Road
Fremont NH 03044

Reference: Martin Road Bridge Replacement
Parcel 06-034
Parcel 06-035

From: Town of Fremont
Select Board

Date: March 29, 2023

This memorandum confirms the Town's understanding that you, as the owners of record of Parcels 06-034 and 06-035 would agree to grant the Town of Fremont a temporary right of entry and temporary easements (if necessary) to facilitate the reconstruction of the Martin Road Bridge. **Any easement deed will be subject to your final approval.**

Attached, please find a plan showing the general location of the bridge and roadway improvements along with the corresponding limit of work at your properties adjacent to the bridge. The specific definition of the temporary right of entry is shown on the attached plan titled Easement Exhibit Plan – FIG-01 with approximate dimensions of the proposed easements along with the proposed bridge and roadway improvements shown for the project. The project scope includes some work relative to your property along the frontage of Martin Road including excavation, filling, grading, construction of the new bridge, channel reconstruction at Brown Brook, placement of riprap, wetland impacts, paving, driveway slope matching, guardrail, and topsoiling and seeding all disturbed areas. Permanent easements are also requested for general maintenance and for future maintenance of the proposed riprap aprons and slopes. **Any easement deed will be subject to your final approval.**

The Town will be responsible for all work associated with the project and will be responsible for the repair and restoration of all disturbed areas including any disturbance caused to your property associated with the construction of the project improvements.

Please undersign this memorandum to signify your general agreement with the foregoing information and willingness to provide written permission for right of entry and easements for the proposed work.

Exhibit O

Thank you for your time and cooperation.

Gene Cordes
Chairman, Select Board

Neal R Janvrin, Select Board

Roger A Barham, Select Board
Select Board Dated: 04/13/2023

Heidi Carlson
Town Administrator
Dated: 04/10/2023

Owner of Parcels: 06-034 and 06-035

Brenda P. Barthelemy 4/10/23
Owner Date
Brenda Barthelemy, Rev Tr

Scott Barthelemy 4/10/23
Owner Date
Scott Barthelemy, Rev Tr

Exhibit O

APPENDIX A

WETLAND PERMIT APPLICATION PLAN SET