STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE: March 30, 2021

FROM: Andrew O'Sullivan
Wetlands Program Manager

AT (OFFICE): Department of Transportation
Bureau of Environment

SUBJECT Dredge & Fill Application
Meredith, 42912

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

Forwarded herewith is the application package prepared by NH DOT Bureau of Highway Design for the subject major impact project. This project is classified as major in Env-Wt 903.01(g)(3)b. The project is located along the NH Route 104 in the Town of Meredith, NH. The proposed work consists of rehabilitating an existing 178-foot-long 90" diameter structural plate pipe with a 76" diameter corrugated metal tunnel liner carrying an un-named perennial stream.

This project was reviewed at the Natural Resource Agency Coordination Meeting on December 16, 2020. A copy of the minutes are included with this application package. A copy of this application and plans can be accessed on the Departments website via the following link: http://www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/wetland-applications.htm.

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

Mitigation is not required for the project. Further details regarding mitigation are discussed within the minutes of the Natural Resource Agency Meeting.

The lead people to contact for this project are Kirk Mudgett, Bureau of Highway Design (271-1598 or Kirk.Mudgett@dot.nh.gov) or Sarah Large, Wetlands Program Analyst, Bureau of Environment (271-3226 or Sarah.Large@dot.nh.gov).

A payment voucher has been processed for this application (Voucher # 641079) in the amount of $1804.40.

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

AMO:sel
cc:
BOE Original
Town of Meredith (4 copies via certified mail)
David Trubey, NH Division of Historic Resources (Cultural Review Within)
Carol Henderson, NH Fish & Game (via electronic notification)
Maria Tur, US Fish & Wildlife (via electronic notification)
Beth Alafat & Jeanie Brochi, US Environmental Protection Agency (via electronic notification)
Michael Hicks & Rick Kristoff, US Army Corp of Engineers (via electronic notification)
Kevin Nyhan, BOE (via electronic notification)

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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: NH Dept. of Transportation **TOWN NAME:** Meredith

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

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

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

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

Has the required planning been completed?	☒ Yes ☐ No
Does the property contain a PRA? If yes, provide the following information:	☒ Yes ☐ No
• Does the project qualify for an Impact Classification Adjustment (e.g. NH Fish and Game Department (NHF&G) and NHB agreement for a classification downgrade) or a Project-Type Exception (e.g. Maintenance or Statutory Permit-by-Notification (SPN) project)? See Env-Wt 407.02 and Env-Wt 407.04.	☐ Yes ☒ No
• Protected species or habitat? ○ If yes, species or habitat name(s): ○ NHB Project ID #: NHB20-1183	☐ 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): Streamstats 1090.5 AC (not used) LIDAR 1101.5 AC	

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 project will rehabilitate an existing 178 ft long x 90" diameter structural plate pipe carrying an un-named stream under NH 104 located 150' southwest of Corliss Hill Road. The proposed design is to slipline with a 76" diameter corrugated metal tunnel liner. Incidental work will include temporary access roads to the inlet and outlet, repair of the inlet concrete headwall, and filling of sinkholes on the NH 104 embankments. Proposed impacts are all temporary.

SECTION 3 - PROJECT LOCATION

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

ADDRESS: NH 104 150' southwest of Corliss Hill Road.

TOWN/CITY: Meredith, NH

TAX MAP/BLOCK/LOT/UNIT: N/A

US GEOLOGICAL SURVEY (USGS) TOPO MAP WATERBODY NAME: Unnamed Steam
☒ N/A

(Optional) LATITUDE/LONGITUDE in decimal degrees (to five decimal places): 43.62693° North
71.53721° West

SECTION 4 - APPLICANT (DESIRED PERMIT HOLDER) INFORMATION (Env-Wt 311.04(a)) If the applicant is a trust or a company, then complete with the trust or company information.		
NAME: NH Dept. of Transportation		
MAILING ADDRESS: PO Box 483		
TOWN/CITY: Concord	STATE: NH	ZIP CODE: 03303
EMAIL ADDRESS: Kirk.Mudgett@dot.nh.gov		
FAX:	PHONE: 603-271-1598	
ELECTRONIC COMMUNICATION: By initialing here: KM, 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.:		
COMPANY 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 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: Andrew.OSullivan@dot.nh.gov		
FAX:	PHONE: 603-271-3226	
ELECTRONIC COMMUNICATION: By initialing here AMO, I hereby authorize NHDES to communicate all matters relative to this application electronically.		

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

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

In accordance with Env-Wt 400 the jurisdictional areas within the project limits have been delineated by: Sarah Large, Wetland Program Analyst; Andrew O'Sullivan, Wetland Program Manager; and, Deidra Benjamin, Environmental Coordinator, of the NHDOT Bureau of Environment. The jurisdictional areas are referenced on the attached included wetland impact plans. The project has been designed in accordance with Env-Wt 527, and Env-Wt 900 to the maximum extent practicable. The application includes a technical report as well as details within the supplemental narrative to address Env-Wt 904.10- Alternative Designs. Unavoidable impacts to wetlands have been minimized to the maximum extent practicable. Project specific information is contained within this permit application.

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: 12 Day: 16 Year: 2020

(☒ 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			☐	428		☐
	Scrub-shrub Wetland			☐			☐
	Emergent Wetland			☐	523		☐
	Wet Meadow			☐			☐
	Vernal Pool			☐			☐
	Designated Prime Wetland			☐			☐
	Duly-established 100-foot Prime Wetland Buffer			☐			☐
Surface Water	Intermittent / Ephemeral Stream			☐	657	125	☐
	Perennial Stream or River			☐	1699	88	☐
	Lake / Pond			☐			☐
	Docking - Lake / Pond			☐			☐
	Docking - River			☐			☐
Banks	Bank - Intermittent Stream			☐			☐
	Bank - Perennial Stream / River			☐	1204	148	☐
	Bank / Shoreline - Lake / Pond			☐			☐
Tidal	Tidal Waters			☐			☐
	Tidal Marsh			☐			☐
	Sand Dune			☐			☐
	Undeveloped Tidal Buffer Zone (TBZ)			☐			☐
	Previously-developed TBZ			☐			☐
	Docking - Tidal Water			☐			☐
TOTAL					**4511**	**361**	

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):	4511 SF	× $0.40 =	$	1804.40
Seasonal docking structure:	SF	× $2.00 =	$	
Permanent docking structure:	SF	× $4.00 =	$	
Projects proposing shoreline structures (including docks) add $400 =			$	
		Total =	$	1804.40

The application fee for minor or major impact is the above calculated total or $400, whichever is greater =	$ 1804.40

SECTION 13 - PROJECT CLASSIFICATION (Env-Wt 306.05)

Indicate the project classification.

☐ Minimum Impact Project	☐ Minor Project	☒ Major Project

SECTION 14 - REQUIRED CERTIFICATIONS (Env-Wt 311.11)

Initial each box below to certify:

Initials: KOM	To the best of the signer's knowledge and belief, all required notifications have been provided.
Initials: KOM	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: KOM	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: KOM	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): Kirk Mudgett	PRINT NAME LEGIBLY: Kirk Mudgett	DATE: 3/25/21
SIGNATURE (APPLICANT, IF DIFFERENT FROM OWNER):	PRINT NAME LEGIBLY:	DATE:
SIGNATURE (AGENT, IF APPLICABLE):	PRINT NAME LEGIBLY:	DATE:

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: State agency exempt per RSA 482-A:3,I(a)

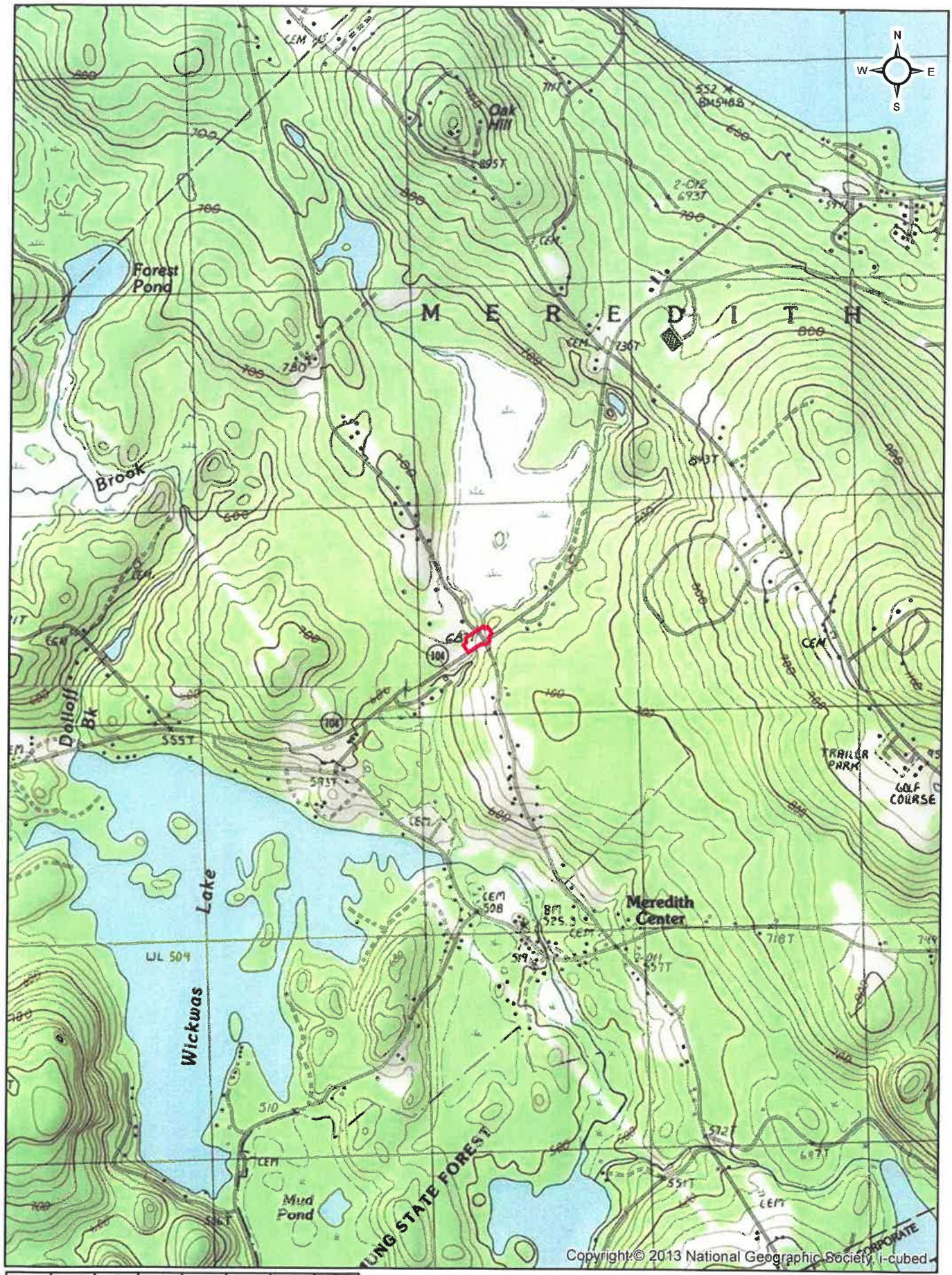
TOWN/CITY: 4 copies via cert. mail	DATE: exempt per Env-Wt 311.05(a)(14)

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".

Meredith 42912



0 0.25 0.5 1 Miles

1:24,000

Meredith 42912

Meredith 42912 Tax Map

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

Water Division/Land Resources Management

Wetlands Bureau

Check the Status of your Application

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

APPLICANT'S NAME: NH Dept. of Transportation **TOWN NAME:** Meredith

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.

A FULLY COMPLIANT STREAM CROSSING DESIGN WOULD INVOLVE REPLACING THE 90" STRUCTURAL PLATE PIPE WITH AN 18' SPAN BRIDGE. DUE TO THE HIGH TRAFFIC VOLUME ON NH 104 AND BEING ONE OF THREE REGIONAL ROUTES CONNECTING I-93 TO THE LAKES REGION AND THE WESTERN WHITE MOUNTAINS TWO LANES OF TRAFFIC WILL HAVE TO BE MAINTAINED DURING CONSTRUCTION, REQUIRING TEMPORARY WIDENING ON BOTH SIDES OF NH 104, RESULTING IN MUCH LARGER WETLAND IMPACTS THAN FOR THE PROPOSED ALTERNATIVE. IN ORDER TO MAINTAIN FLOW IN THE EXISTING CULVERT DURING CONSTRUCTION, THE NEW STRUCTURE WOULD BE CONSTRUCTED ON NEW ALIGNMENT, REQUIRING ADDITIONAL PERMANENT STREAM IMPACTS. THE TIME FRAME TO SECURE FUNDING AND DESIGN A BRIDGE OF THIS SPAN IS ESTIMATED AT 3-5 YEARS WHICH WOULD SIGNIFICANTLY INCREASE THE RISK OF STRUCTURAL FAILURE ON AN ALREADY COMPROMISED STRUCTURE.

A HYDRAULIC DESIGN WAS ALSO CONSIDERED, THAT WOULD PASS THE 50 YEAR STORM WITHOUT SUBMERGING THE INLET. THIS WOULD BE A 6' HIGH X 8 ' WIDE BOX CULVERT EMBEDDED 24". THE EXTENT OF THE WETLAND IMPACTS AND DELAY IN CONSTRUCTION WOULD BE SIMILAR TO THE BRIDGE OPTION.

A REPLACE IN KIND OPTION WAS ALSO CONSIDERED BUT NOT SELECTED DUE TO SITE AND FUNDING CONSTRAINTS SIMILAR TO THE BRIDGE AND BOX CULVERT OPTIONS.

NONE OF THESE ALTERNATIVES MEETS THE PROJECT OBJECTIVE OF A TIMELY & COST EFFECTIVE REHABILITATION THAT MINIMIZES CHANGES TO THE CULVERT CAPACITY AND OUTLET VELOCITY.

PERMANENT IMPACTS WERE AVOIDED. ALL OF THE IMPACTS ASSOCIATED WITH PROPOSED DESIGN ARE TEMPORARY.

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

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

There are no palustrine marshes delineated within the project area.

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 existing 90" culvert provides a hydrologic connection between the upstream and downstream channels of the un-named stream. There is no perch at the inlet or outlet. The invert of the proposed liner pipe will be set as close as practical to the existing 90" culvert invert. Temporary disturbance to inlet and outlet areas will be restored such that there is no perch. The proposed liner will maintain the existing hydrologic connection and match the existing flow conditions to the maximum extent practicable. There will be no permanent impact on wetlands adjacent to the upstream and downstream channels. The hydrologic connection between the forested wetlands to the north and the emergent wetlands to the south of NH Route 104 will remain the same post construction.

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 project has been designed in accordance with ENV-Wt 400, 500, and 900. Unavoidable impacts to wetlands have been minimized to the maximum extent practicable; the Department has addressed Env-Wt 311.07 Avoidance and Minimization through the checklist document included with this application.

The resources present within the project area are: Un-named stream, an emergent, palustrine wetlands complex along the outlet embankment of NH 104 and the southwest corner of Corliss Hill Road, a forested plaustrine wetland southwest of the inlet running uphill along the existing right-of-way line, and an intermittent stream flowing southwest from Corliss Hill Road to the pipe outlet area. There are no vernal pools, exemplary natural communinties, or State listed species known to occur in the project area. The NH Natural Heritage Bureau reviewed the project area for records of protected species and exemplary natural communities near the project area and found that there are no known populations or occurences of any State or Federally protected species or their habitats in the vicinity.

The project area is within the habitat of the northern long eared bat (NLEB) and small whorled pogonia (SWP), both of which are listed as a threatened species under the Federal Endangered Species Act. The US Fish and Wildlife Service (USFW) Information for Planning and Conservation webtool was used to determine that the project qualifies for the December 15, 2016 FHWA Range-wide Programmatic Biological Opinion for NLEB and and the USFWS has concurred that the project has a May Affect, Likely to Adversely Affect determination due to the need to clear trees during the NLEB active season, all appropriate Avoidance and Minimzation Measures will be included in the contract document and no further consultation is necessary. A site survey for SWP was performed and no specimens were observed in the proejct area. The NH Natural Heritage Bureau reviewed the project area and did not identify known records of any protected species in the vicinity of the work.

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

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

The proposed design/work will allow traffic to continue to flow along NH 104 during construction allowing public travel and access to the Lakes Region and the Western White Mountains, minimizing the impact to local and regional tourism and commerce. The un-named stream is not used for water recreation nor is it an identified fishing location. The site is not a suitable nor feasible recreation area and therefore the level of impact to recreation will be minimal to none.

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 proposed rehabilitation will not have a significant effect on floodplain wetlands. As defined by Env-Wt 103.10 and Env-Wt 102.01 floodplain wetlands are wetlands located within a 100-year floodplain, as identified by FEMA's FIRM maps. As discussed within the supplemental narrative included with this application, portions of the project area are believed to be within a FEMA mapped floodplain (Zone A) however there is not a detailed study nor regulatory 100-year flood elevations associated with this floodplain. The digital FIRM maps were overlayed onto the design plans however they don't align well with DOT survey nor LIDAR contours and don't accurately reflect the floodplain. Provided as an attachment called Floodplain Exhibit with the supplemental narrative is an image of the plan showing this overlay, as well as the elevation of water associated with the 100-year storm. Based off the digitized overlay of the FIRM maps, the forested wetland up slope of the inlet of the crossing appears to fall within the 100-year floodplain, however based on the topography and landscape position of the stream at the inlet of the crossing and the hydraulic analysis completed with this application, the forested wetland is not within the stream's 100-year floodplain. The proposed design matches existing flow conditions to the maximum extent practicable. The existing 90" pipe ponds water in the upstream channel during high flow events, but the topography in the ponded area is steep and existing and proposed ponding area is below the delineated top of bank.

Impacts within the stream channel and bank are temporary and are associated with accessing the inlet and outlet of the crossing to install the liner. Impacts to the forested wetland are associated with accessing the inlet and are temporary. See supplemental narrative and the construction sequence for additional details regarding how the access road will be construction to avoid permanent impacts to the forested wetlands. All temporary impacts will be restored to their original condition post construction per Env-Wt 307.12.

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.

Avoidance of all impacts is not practicable due to the poor structural condition of the existing culvert. The proposed design has the least impact to wetlands of any practicable alternative. Impacts at the culvert inlet and outlet are temporary. Distrubed jurisdictional areas will be restored to existing conditions.

The forested and emergent ditch wetlands within the project area are not of high ecologic integrity. There were no scrub shrub wetlands found within the project limits.

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 will have no effect on wetlands that would be detrimental to adjacent drinking water supply and groundwater aquifer levels.

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 project includes only temporary impacts to the upstream and downstream channels. The smaller diamater liner will not have a significant impact on the outlet velocity or the surface water elevation. The stream channel will continue to capture, contain, and convery stormwater runoff in the same manner as it does today. The surrounding landscape topography will not be changed as a result of this projects, therefore stormowater runoff will enter the stream system the same way it currently does.

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

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

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

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

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

N/A

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

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

N/A

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

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

N/A

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

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

N/A

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

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

N/A

PART II: FUNCTIONAL ASSESSMENT

REQUIREMENTS

Ensure that project meets the requirements of Env-Wt 311.10 regarding functional assessment (Env-Wt 311.04(j); Env-Wt 311.10).

FUNCTIONAL ASSESSMENT METHOD USED:
US Army Corps of Engineers Highway Methodology

Functions and values narrative is included in the Supplemental Narrative. Functions and values worksheets are included elsewhere in the application.

NAME OF CERTIFIED WETLAND SCIENTIST (FOR NON-TIDAL PROJECTS) OR QUALIFIED COASTAL PROFESSIONAL (FOR TIDAL PROJECTS) WHO COMPLETED THE ASSESSMENT:
SARAH LARGE AND ANDREW O'SULLIVAN

DELINEATION PER ENV-WT406

DATE OF ASSESSMENT: 7/9/2020

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.

Wetland Function-Value Evaluation Form

Meredith, 43912
wetland 4 (impactplan)

Total area of wetland 705+ sq. ft. Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use transportation & residences Distance to nearest roadway or other development adjacent

Dominant wetland systems present Palustrine Forested Contiguous undeveloped buffer zone present Some, not completely

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? upper portion of drainage basin

How many tributaries contribute to the wetland? none Wildlife & vegetation diversity/abundance (see attached list)
Flows to a stream

Wetland I.D. Wetland A (datasheets)

Latitude 43.627 Longitude 71.538

Prepared by: S. Lange Date 7/9/20

Wetland Impact:
Type temporary Area *see impact plan

Evaluation based on:
Office ____ Field ✓

Corps manual wetland delineation completed? Y ✓ N ____

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		4, 7, 10, 11, 12, 15		
Floodflow Alteration		2, 4*, 5, 9, 11, 13		Lots of flood storage upslope / upstream of stream wetland hydrologically connected to
Fish and Shellfish Habitat	Y	1, 2, 4, 7, 8, 9, 10, 14, 15, 17		*wetland upgradient from stream Barrier/ *perched culvert upstream = impediment to AOP!
Sediment/Toxicant Retention	Y	1, 2, 4, 5, 10, 13, 14, 16	P	wetland feeds into a ditch which connects to stream
Nutrient Removal		4, 7, 10,		wetland is not very large
Production Export		1, 2, 4, 8, 10		
Sediment/Shoreline Stabilization		2, 3, 14		
Wildlife Habitat	Y	1, 2, 8, 14, 18, 19, 20		when NH RT 104 was originally constructed it likely bisected this forested wetland
Recreation		6		this wetland is along a road and w/in an abutter's backyard
Educational/Scientific Value		11		Along a state route, not safe
Uniqueness/Heritage		1, 2, 11, 17, 18, 22		wetland is near perennial stream however its along a state route
Visual Quality/Aesthetics		6, 7, 12		
ES Endangered Species Habitat				No T&E species identified by NHB
Other				

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Meredith, 42912
Wetland 9 (impact plan)

Total area of wetland 155 sq. ft. Human made? yes Is wetland part of a wildlife corridor? no or a "habitat island"? no

Adjacent land use transportation, residencial Distance to nearest roadway or other development adjacent

Dominant wetland systems present PEM1E Contiguous undeveloped buffer zone present no

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? upper portion of drainage basin

How many tributaries contribute to the wetland? flow from drainage structure 3 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland B (datasheets)

Latitude 43.628 Longitude -71.537

Prepared by: S. Lange Date 7/9/20

Wetland Impact:
Type temporary Area *see impact plan

Evaluation based on:
Office ____ Field ✓

Corps manual wetland delineation completed? Y ✓ N ____

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		4, 7,		wetland is fed by / created by drainage and runoff from surrounding roads
Floodflow Alteration		2, 4*, 5, 9*, 13, 16,		very small wetland compared to watershed lots of storage upstream of perennial stream
Fish and Shellfish Habitat		1		PEM1E wetland transitions into R4 stream
Sediment/Toxicant Retention	Y	1, 2, 4, 10, 11, 16*	P	wetland created by stormwater drainage and run off. created wetland ditch then feed intermittent stream
Nutrient Removal	Y	3*, 4, 7, 8*, 9, 10, 11, 13*	P	wetland is not very large immediately at outlet of drainage, high likelihood traps sediment
Production Export		2, 7, 8, 10, 12,		
Sediment/Shoreline Stabilization		1, 2, 3*, 4, 9,		
Wildlife Habitat		8, 13,* 14, 19		Surround land is very developed. Roads!
Recreation		6		This wetland is a drainage ditch along the side of a state route
Educational/Scientific Value		11		Along a state route, not safe
Uniqueness/Heritage		1, 2, 11, 17, 22		wetland is near a perennial stream however it is along a state route
Visual Quality/Aesthetics		12		
ES Endangered Species Habitat				NO T & E species identified by NHB
Other				

Notes:

* Refer to backup list of numbered considerations.

CULVERT REHABILITATION
UNNAMED STREAM UNDER NH 104
MEREDITH, NH
NHDOT PROJECT NO. 42912
SUPPLEMENTAL NARRATIVE

Project Description

The project will rehabilitate an existing 90" diameter structural plate pipe x 178' long at a 45° skew to NH 104. The proposed design includes repairing the inlet headwall, constructing temporary access roads to the inlet and outlet ends of the pipe, and fixing sink holes on NH 104 embankments. The 90" pipe will be slipped lined with a 76" (nominal) diameter tunnel liner. Access road locations will be restored to existing conditions upon completion of project.

This is a federally funded culvert rehabilitation project. The proposed advertising date is August 17, 2021, with construction anticipated in summer of 2022.

This project was initiated and is funded under NHDOT's Federal Culvert Replacement/Rehabilitation & Drainage Repair (CRDR) Program. The Program purpose is to address major culvert and drainage needs statewide that are not being addressed through current or future Capital Improvement or other programmatic projects. The Program receives $2,000,000 in total funding annually, which includes construction, engineering, and ROW costs. Projects are selected and scheduled based primarily on the condition of the culvert (risk of failure), and Road Tier, traffic volume, depth of fill, and detour length (potential impact of failure). The Program funding is fully committed for at least the next three years. This culvert is one of the highest statewide priority locations out of nearly 50 known locations eligible for the Program. Failure to address the structural deficiency of this culvert risks further deformation of the culvert which would make rehabilitation impossible and/or collapse of the culvert which could cause serious impacts to public/private infrastructure and the travelling public.

Existing Conditions

The existing culvert is a 90" diameter structural plate pipe 178' long at a skew of 45° to NH 104. Culvert slope is 2.98%. The pipe has a concrete headwall at the inlet and the outlet end is mitered with concrete support walls. Maximum cover is about 18' at the centerline of NH 104, fill height is just under 26'. There are large sinkholes on the embankment of NH 104 near the inlet and outlet.

The culvert was originally constructed in 1963 (see Exhibit 1, Archive plan, included with this supplemental narrative. The culvert has voids along the invert and lower sides and several sections of missing or detached invert. The culvert has separated from the inlet headwall and has significant changes in shape throughout the pipe. The worst location measured 75" high x 82" wide as of 11-12-2020. Based on the level of deterioration and change in shape, the culvert is considered to be at a high risk for structural failure.

The existing ROW shown on the plans was acquired under the 1962 Return of Layout, which included all rights necessary to access, maintain, and repair slopes and drainage structures constructed by the Project (see page 7 of Exhibit 2, Existing ROW information, included with this supplemental narrative). At the time of the Natural Resource Meeting, title research had not been completed so a proposed temporary construction easement was shown and referenced. It has been determined that a new temporary construction easement is not required.

The 90" culvert is Statewide Priority #2, based on, fill height, traffic volume, and risk of failure. NH104 is one of 3 major regional routes connecting I-93 to the Lakes Region and western White Mountains with average daily traffic volumes over 12,000 vehicles per day (2019). Summer time traffic volumes are very high, with hourly counts over 1,100 vehicles per hour.

This crossing is classified as Tier 3 based on drainage area of 1.72 Sq mi. (1101.5 acres) as determined from LIDAR contours, archive plans, and field review. The Streamstats boundary delineation was similar, but slightly smaller at 1.7 Sq mi. (1090.5 acres).

NHDOT Maintenance District 3 reports this crossing has no history of flooding. Analysis indicates the culvert has the capacity to pass the 100-year flow. The inlet area is contained by steep topography to a depth of over 18', bypass flow is unlikely unless the inlet was blocked by debris. In this case, bypass would be over a driveway at Sta 275+14 and then southwest along the toe of the NH 104 embankment for about 500' to a 30" rcp culvert crossing under NH 104 and then back to the un-named stream about 700' downstream of the 90" cmp outlet.

The un-named stream is in generally good condition with no significant bank erosion or sediment deposition, other than some minor sediment buildup at the outlet. There is no perch at the inlet or outlet of the 90" culvert. Baseflow in the culvert has been observed at 8" to 18" deep over several NHDOT field visits.

A small accumulation of sediment supporting growth of two small trees was noted at the inlet. Baseflow is diverted around the deposit and the root systems are preventing natural transport of this sediment through the pipe.

There is a small waterfall just upstream formed by a bedrock outcrop. The next culvert upstream is a town owned 103"x71" corrugated metal arch pipe with a substantial perch at the outlet. Farther upstream is a large ponded wetland/floodplain. The stream is a tributary to Lake Winnisquam, which is about 1.85 miles downstream of the 90" cmp outlet. There is one road crossing between the 90" outlet and the lake, a state owned bridge on Meredith Center Road just downstream of the Lake Wickwas outlet.

A stream assessment was performed for the un-named stream, finding the stream to be a Rosgen Type B. The stream has highly variable bankfull widths near the 90" culvert inlet and outlet, resulting in an average bankfull width of 20.75' within the proximity of the crossing. Regional curves predict a bankfull width of 16.2' for this crossing based on the Streamstats drainage area of 1.7 Sq mi. A bankfull width of 12.8' was determined for the reference reach (just upstream of Hatch Corner Rd) and a 1.4 entrenchment ratio was used to set the compliant span of 18'.

Natural and Cultural Resources

Threatened and Endangered Species:
There are 2 Federal or State listed endangered or threatened species in the project area: the Northern Long Eared Bat, and the Small-Whorled Pogonia (SWP). USFWS has verified that this project may rely on the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat. The project has a may affect - likely to adversely affect determination for NLEB due to tree clearing and no further consultation is needed. There were no SWP's identified during a site visit in June of 2020.

The Natural Heritage Bureau data check resulted in a determination that there were no records of protected species identified in the project area.

Cultural Resources: The proposed work was reviewed by the Department's Cultural Resources Program and was found to be consistent with the Section 106 Programmatic Agreement (Section 196 PA) among the FHWA, the New Hampshire State Historic Preservation Office, the Advisory Council on Historic Preservation and the Department. The existing 90" culvert is eligible for review under the Program Comment for Post-1945 Bridges and Culverts and is therefore considered to be non-historic. As such, the proposed work has been determined to have no potential to effect historical resources under Appendix B of the Section 106 PA.

Wetlands:
In addition to the un-named perennial stream, other wetland resources present within the project area include a small palustrine forested wetland on the north west side of the culvert inlet and small palustrine emergent wetland and intermittent stream on the east side of the outlet which carries water from a State owned 24" rcp underneath Corliss Hill Road. The 125' long intermittent stream channel has a 4' wide bed with 2:1 side slopes.

Included with this application are Function and Value Assessments, following the US Army Corp of Engineers' Highway Methodology, for the two palustrine wetlands delineated within the project limits. The functions and values of the palustrine forested wetland north of NH Route 104 area: sediment/toxicant retention (principal function), wildlife habitat (suitable), and supports fish and shellfish habitat (suitable) within the adjacent perennial stream that water flows from the wetland to. The functions and values of the palustrine emergent wetland at the outlet of the 24" rcp underneath Corliss Hill Road are: sediment/toxicant retention (principal function) and nutrient removal (principal function). As noted both wetlands' principal function is sediment/ toxicant retention and nutrient removal, which are common functions and values of a wetlands adjacent to development (transportation and residential). The un-named perennial stream has many character defining features and presents natural stream processes such as water and sediment transport and is supported by the surrounding forested landscape.

Per Env-Wt 103.66 and as defined by Env-Wt 103.10 and 102.01, the project temporarily impacts floodplain wetlands contiguous to a Tier 3 watercourse, a Priority Resource Area (PRA). Further details about this designation can be found within Attachment A: Minor and Major Projects section I.VI. The wetland complex upstream of Hatch Corner Road is designated prime

wetland by the town of Meredith, however the proposed work at the NH 104 crossing will not directly nor indirectly impact this wetland.

Water Quality:

The level of disturbance meets the Bureau of Alteration of terrain (AOT) threshold of greater than 2,500 SF disturbance within 50' of a surface water, however, the project is consistent with the AOT Permit-by-Rule. The project does not propose to increase the amount of impervious surface. It is anticipated that the project will not result in a negative impact on water quality in the project area and therefore, no permanent stormwater treatment is proposed. A NPDES Discharge General Permit may be required if dewatering within the stream is required. Best Management practices will be utilized to prevent and reduce the likelihood of erosion or sediment entering the wetlands system. See the included erosion control plans for more details regarding BMPs.

Prime Wetlands, Designated Rivers, and Shoreland Water Quality Protection Act:

There are no prime wetlands in the vicinity of the project area and the project is not located within the protected corridor of any designated rivers. The project is not located near any waterbodies protected by the NH Shoreland Water Quality Protection Act.

Floodplains:

The un-named stream is within a FEMA mapped floodplain (Zone A) with no detailed study or regulatory 100-year flood elevations. The digital FIRM map was downloaded, referenced to the project location, and traced onto the Plans. The Zone A boundary does not align well with NHDOT survey and LIDAR contours. No fill in the floodplain is proposed. See Exhibit 3, Floodplain information, included with this supplemental narrative. This exhibit also shows the elevation of ponded water upstream of the inlet at the 100-year storm volume.

Invasive Species: An inventory of invasive plant species was completed on May 18, 2020. No existing populations of invasive species were identified at the time. The Contractor will be required to perform all work activities in accordance with the Department publication "Best Management Practices for the Control of Invasive and Noxious Plant Species" in order to prevent the spread of invasive species to the site during construction.

Conservation Commission: The Town of Meredith Conservation Commission was contacted via letter on April 29, 2020 requesting information about the project area and feedback on the proposed work. No response has been received to date.

Hydrology / Hydraulics

Culvert inverts and edges of pavement in the immediate vicinity of the 90" culvert are from NHDOT survey (NAVD88 datum), completed in October 2020. Detail outside the survey area is from archive plans, aerial photos, and field review. LIDAR contours were developed from UNH Granite data, Merrimack River Watershed, 2011-2012, NAVD88 datum.

USGS Streamstats delineates the drainage boundary at 1.70 Sq Mi. (1,088 acres). Streamstats Q100 prediction is 144 cfs, with a range of 76.8 cfs to 270 cfs. Approximately 22% of the watershed is developed, including paved and gravel roads and residential and commercial uses.

Two other runoff methods were considered using the LIDAR drainage area of 1.72 Sq mi. FHWA Regression method predicts Q100 between 193 cfs and 358 cfs. SCS Method (Hydrocadd) predicts Q100 at 418 cfs (using a 24 hour rainfall depth of 6.67"), but without considering storage in the numerous upstream wetlands and low areas. This model was not used for design as there was not sufficient accurate data to model storage and discharge in the numerous low areas and wetlands within the drainage area.

Design flows were set at the upper limit of the Streamstats model:
Q2 = 50 cfs, Q10 = 121 cfs, Q50 = 214 cfs, Q100 = 270 cfs

Storage in the large ponded wetland upstream of Hatch Corner Road was evaluated and found to have little to no effect on the incoming flow to the 90" cmp.

FHWA's HY-8 Culvert Analysis Program was used for analysis of the 90" cmp. The existing headwater depth for the Q100 design flow of 270 cfs is 6.13 ft which corresponds to an elevation of 615.54 ft. Outlet velocities range from 7.4 ft/s for Q2 to 11.3 ft/s for Q100.

Alternatives

A fully compliant crossing design was considered, consisting of an 18' span bridge, crossing underneath NH 104 on a new alignment so that stream flow could be maintained in the existing culvert during construction. Impacts and costs for this option were based on open cut with phased construction. Two lanes of traffic would be need to be maintained due to the duration and traffic volumes. A sheet pile cofferdam would likely be used to support the portion of roadway open to traffic and a significant amount of temporary widening would be needed on both sides of NH104. Lane shifts would extend about 800' from the culvert in both directions. Construction could be expected to take a full construction season, with significant impacts to traffic and utilities.

The cost estimate for the fully compliant option is as follows:

Removal of existing 90" CMP	$ 25,000
Concrete Rigid Frame (3-sided) – 44' clear pavement width, 18' span, 45° skew Includes headwalls, wings, bridge curb & rail, excavation and backfill	$1,809,000
Structure Incidentals (water diversion, cofferdams, simulated streambed, etc.)	$ 283,370
Structure Sub-Total	**$2,117,370**
NH 104 Reconstruction (200 LF x 44' wide)	$ 28,424
Guardrail (including terminal units and incidentals, excluding bridge rail)	$ 17,600
Construct and Remove Temporary Widening, Inlet and Outlet (12'wide x 400')	$ 70,000
Temporary Concrete Barrier and temporary end units (600LF + 2 end units)	$ 30,000
Temporary Signals, 4 Units (Including 4 side roads)	$ 40,000
Temporary Access Road to Inlet	$ 10,000
Temporary Access Road to Outlet	$ 20,000

	Roadway Sub-Total	**$ 216,024**
Humus, Seed, Mulch (approx. 1 acre)		$ 48,400
Invasive Species Management Plan		$ 3,000
Project Operations Plan (for LRS)		$ 2,500
Field Office, Type C – 1 Season		$ 27,500
	Item Sub-Total	**$2,414,794**
Erosion Control (5% of Sub-Total)		$ 120,740
Traffic Control (5% of Sub-Total)		$ 120,740
Misc. Items and Contingency (15% of Sub-Total)		$ 362,219
	Contract Sub-Total	**$3,018,493**
Mobilization (5% of Contract Sub-Total)		$ 301,849
Fuel & Asphalt Adjustments (fixed amount based on Contract Sub-Total)		$ 40,000
Construction Administration and Inspection (6% of Contract Sub-Total)		$ 301,849
	Construction Total	**$3,662,192**

Note that Design Engineering, additional survey, geotechnical investigation, and ROW and/or Easement acquisition costs are not included in the above Construction Estimate. NHDOT Engineering and Contract preparation costs are typically 5% to 15% of the Construction Total, based on the size and complexity of the project. Engineering costs for projects designed by NHDOT Consultants are typically higher.

Securing the funding and typical design time for such a project would require a delay in the start of construction of at least 3 – 5 years. A delay of this magnitude would significantly increase the risk of structural failure of the existing 90" structural plate pipe.

A hydraulic design was also considered, which would pass the 50 year storm without submerging the inlet. This would be an 8' wide x 6' high x (clear opening) box culvert, embedded 24" below streambed. Costs and impacts were evaluated in the same way as for the fully compliant option. The box culvert would have to be constructed on new alignment so that stream flow could be maintained in the existing culvert during construction. The Construction Cost for this option is estimated at $1.9 million. Delays to secure funding, and design timeline are similar to the bridge option. Construction Duration for this option is less than the bridge option coming in at 9 months.

We also considered replacement in kind, with a cost $1.2 million and at least 6 months duration, Funding, delay in start of construction, and temporary impacts would be similar to the bridge and box options. The estimate assumes the new pipe could be constructed in the same location as the existing pipe.

Note that the estimates provided are only for construction cost. Design engineering, permit fees, mitigation cost (if any), ROW impacts, and reimbursable utility impacts are not included.

None of the replacement options are feasible under the current budget and schedule. This culvert is at high risk of further deformation and structural failure. Rehabilitation using cured in place liners, spray on liners, or shotcrete invert repair are not feasible due to the level of deterioration and change in shape. The only practicable option remaining is sliplining. Potential slipline material options included corrugated metal tunnel liner and HDPE corrugated interior pipe.
The HDPE liner was not selected because this type of liner must be sized to fit through the smallest dimension of the host pipe. A 66" diameter HDPE liner was determined to be the largest pipe liner that would fit vs a 76" tunnel liner. The smaller diameter causes additional reduction in capacity and a larger increase in outlet velocity.

Smooth interior liners were not considered due to the potential adverse effects of increased culvert velocities. For example, a 76" diameter smooth liner with improved inlet efficiency could match the existing 90" cmp capacity but would result in an estimated 19.5 ft/s outlet velocity for the Q100 flowrate.

Proposed Design

The proposed liner is a 76" (nominal) diameter corrugated metal tunnel liner that is constructed in short rings, allowing the workers to be inside the completed rings and allowing them to reach forward to cut out severely deteriorated and /or obstructing portions of the existing pipe. This feature allows the largest diameter liner to be installed. The liner invert will be set at or slightly below the existing 90" invert, eliminating the concern for creating a perch.

Field review of the existing 90" cmp in November 2020 found that the pipe has deformed in places. Approximate measurements at the worst location (about 75' upstream of the outlet) were 75" high x 82" wide. The proposed tunnel liner plate can be factory deformed up to 5% without compromising load carrying capacity. Deformed outside dimensions of the liner would be approximately 73" high x 81" wide indicating that the 76" (nominal) diameter liner will fit. Exact dimensions of the liner will be recommended by the Contractor before the start of construction. See the slipline detail on the "Profiles" sheet included in the Wetland Plans.

The estimated elliptical shape is not available in the HY-8 Culvert Analysis Program. Hydraulic information is reported for the 76" (nominal) circular liner. Elliptical shapes typically perform better that circular shapes because the cross sectional area is at lower elevation, so actual headwater elevations should be lower than reported. The small change in shape will not have a significant effect on velocity results.

Q100 headwater depth for the preferred 76" tunnel liner option would increase by 0.91 ft, from 6.13 ft for existing to 7.04', corresponding to elevation 616.45. The increased area of Q100 inundation would be about 430 SF (see Exhibit 3, Floodplain information, included with this supplemental narrative).

Q100 outlet velocity would increase from 11.3 ft/s for existing to 11.8 ft/s for the 76" liner.

Q2 outlet velocity would increase from 7.4 ft/s for existing to 7.9 ft/s for the 76" liner. The proposed liner will not have a significant effect on capacity, velocity, flooding, or sediment transport. No effect on FEMA maps or downstream structures is anticipated.

Trees growing within 5' of the inlet and outlet will be removed. The small accumulation of sediment at the inlet may be removed if it conflicts with the Contractor's water diversion, dewatering, or rehabilitation methods.

Water diversion will be through the existing 90" pipe unless otherwise approved as part of the Contractor's stormwater plan. A Water Diversion Item will be provided with the construction contract for passing stream flow through the work area. The water diversion will be designed by the Contractor to accommodate a 2 year storm, with the provision that excess flows be allowed through the existing culvert. The proposed slipling process can accommodate these requirements. A typical water diversion for this type of project would be a sandbag dam at the inlet and pump(s) to maintain the upstream water elevation at an acceptable level. The pump discharge hose is typically attached to the inside of the existing host culvert with temporary straps or hangers. In the event of storm predicted to exceed the pump capacity, workers and loose materials would be removed from the culverts and flow would be allowed through or over the dam and into the existing culverts.

Temporary access roads will be required at the inlet and outlet. Any vegetation that is cut will be allowed to re-establish naturally. Access roads are proposed to be along the toe of the NH104 embankments, impacting wetlands and a small intermittent stream. Restricting access to roadway embankment slopes was considered, but embankment slopes are too steep to be traversed by typical equipment and are protected by guardrail The ground can be covered with temporary geotextile and stone to create the temporary access road and to minimize disturbance to wetland soils, root systems, and the intermittent stream channel. Total amount of clearing for the project is estimated at 7,000 SF (0.16 acres) (5,935 sf inlet, 1,065 at outlet). The majority of trees are small, between 3" and 8" diameter. Removal of stumps and root mat is not anticipated. Disturbed wetland areas will be restored using a wetland seed mix and where slopes are steeper than 4:1, a wildlife friendly erosion control matting will be used.

All work will be within the existing ROW or easement rights granted under the 1962 Return of Layout (see page 7 of Exhibit 2, Existing ROW information, included with this supplemental narrative).

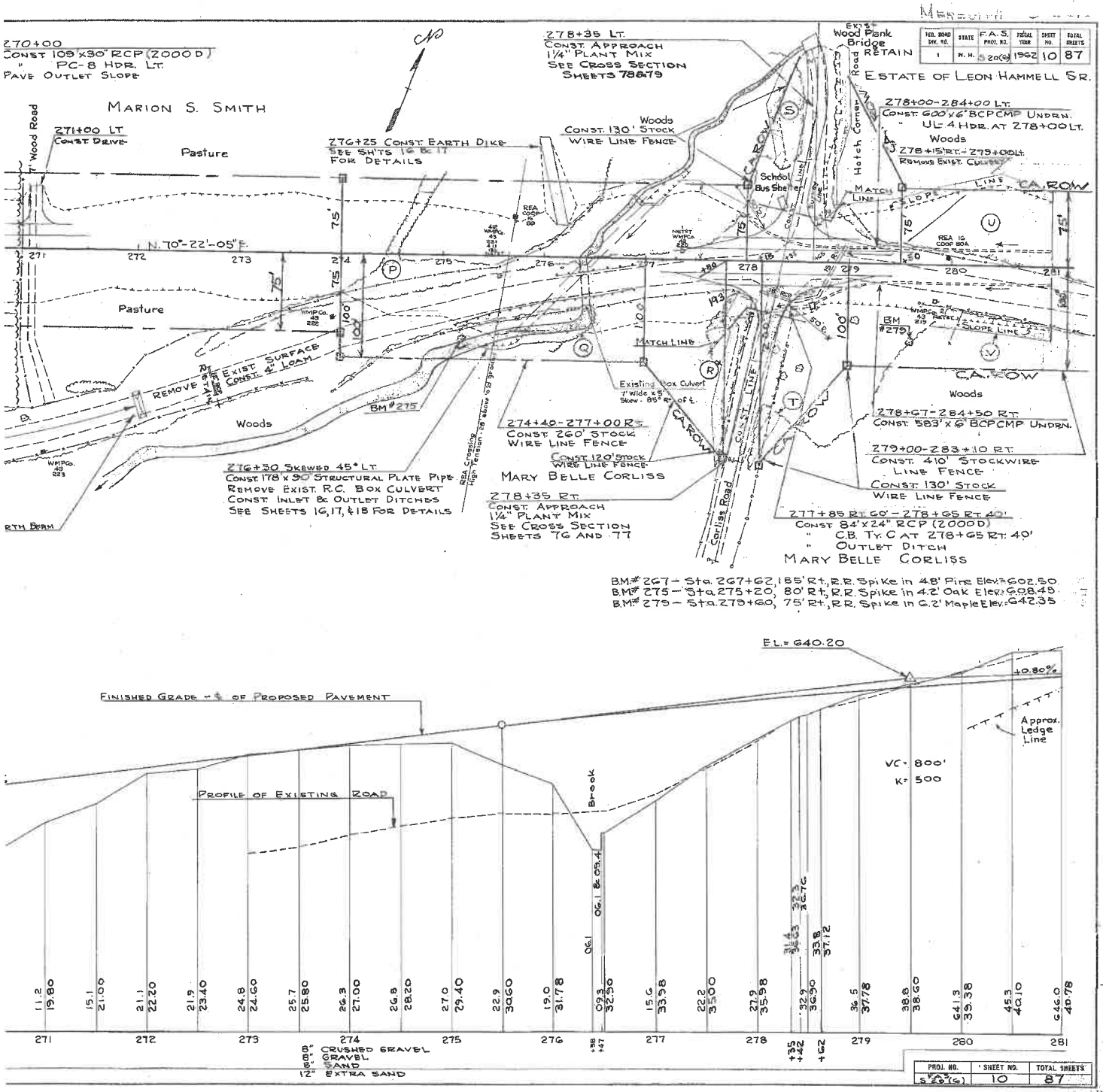
Construction is estimated to take 3 months, with no significant impact to traffic, utilities, or other resources.

The preliminary estimate for the proposed option is as follows:

Corrugated metal liner, including cleaning and preparation of the existing pipe, grouting of voids and filling the annular space, and removal of obstructing portions of the existing pipe	$ 191,275
LRS handling and compliance	$ 4,500
Repair inlet and outlet slopes	$ 1,350

Locate underground utilities	$ 375
Fill material for behind inlet and outlet headwalls	$ 1,500
Water Diversion	$ 25,000
Repair of inlet headwall (includes cleaning of headwall and concrete)	$ 2,000
Project wide Items (Access Roads, LRS, reset riprap, humus/seed mulch, etc)	$ 41,050
Erosion Control Items	$ 15,100
Traffic Control Items	$ 42,600
Misc. Items	$ 400
Fuel Adjustment (fixed amount based on Contract Item Total)	$ 2,000
Mobilization (10% of Contract Item Total)	$ 40,000
Contract Total	**$ 367,150**
Construction Administration and Inspection (8% of Contract Total)	$ 30,000
Construction Total	**$ 397,150**

The project was presented as a Repair, Rehabilitation, or Replacement of a Tier 3 Legal Crossing, under Env-Wt 904.09 at the project's Natural Resources Coordination Meeting. The proposed design meets all requirements for permitting under Env-Wt 904.09, except for hydraulic capacity. Modelling indicates a slight decrease in capacity, but the resulting headwater increase is not considered significant. The increase in inundated area is small and the proposed Q100 headwater elevation is below the top of bank. No adverse effect on the environment or public or private infrastructure is anticipated due to the small increase in Q100 ponding area. The increase in headwater for lower flow events is significantly less. For example, the Q2 headwater increase is estimated at 0.13' and the Q10 increase is estimated at 0.4'. Increases in headwater are minimized to the maximum extent practicable by selection of the proposed liner size and type, which considers capacity, velocity, AOP, constructability, and cost. The project is presented as an Alternative Design under Env-Wt 904.10 in this application.



Portion of Archive Plan - Project S4212 (1963), Sheet 10
showing original construction of the 90" cmp, Sta 276+50

Not to scale

STATE OF NEW HAMPSHIRE
MEREDITH

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

Exhibit 1
Archive Plan

DGN	STATE PROJECT NO.	SHEET NO.	SHEET TOTAL
42912 Archive Plan exhibit 42912		1	1

COMMISSIONERS' RETURN

OF

HIGEWAY LAYOUT

MEREDITH S 20(6) S-4212

1962

3/6/62 - Rec. Fee $11.80

BELKNAP COUNTY REGISTER
RECEIVED March 2, 1962
9 H 30 M AM
Recorded Book 421 Page 483
Examined by
Charles P Raymond Registrar
by Dorothea Hilliard, Deputy

- P E T I T I O N -

To His Excellency the Governor and the Honorable Council:

In accordance with Chapter 235, RSA of 1 9 5 5, I, John O. Morton, Commissioner of Public Works and Highways, propose the alteration in the location of the New Hampton Road in the Town of Meredith, at the location given below:

> Beginning at a point in the travelled way of said New Hampton Road, said point being near the premises of Pulets; thence Easterly partly with the highway as now travelled and partly on new location a distance of about two (2) miles to a point about eight hundred feet (800') easterly of the Winona Road.

Therefore, in accordance with Chapter 2 3 6, RSA of 1 9 5 5, I, John O. Morton, Commissioner of Public Works and Highways propose that such alteration be made in said New Hampton Road in the Town of Meredith.

(Sg'd.) John O. Morton
Commissioner.

Dated at Concord, N. H.,
this 11th day of October, 1961.

The Governor and Council assembled in Executive Session on October 31, 1961, appointed:

> Hon. James H. Hayes, Councilor - District No. 5;
> Hon. Philip A. Robertson, Councilor - District No. 1;
> Hon. Roger E. Brassard, Councilor - District No. 3;

a Special Committee to conduct a hearing to determine whether there is occasion for the laying out of the highway.

N O T I C E O F H E A R I N G

The Special Committee in accordance with Chapter 2 3 6, RSA of 1 9 5 5, and the Federal Highway Act of 1 9 5 6, have set a public hearing thereon to be held in the Municipal Building in Meredith on December 6, 1961 at 1:30 P. M.

The Municipal Building will be open one (1) hour prior to the time of hearing for the inspection of plans by any interested persons.

Given under our hands this 1st day of November, A.D., 1961.

James H. Hayes
Philip A. Robertson
Roger E. Brassard

SPECIAL COMMITTEE

COMMISSIONERS' RETURN

OF

HIGHWAY LAYOUT

MEREDITH S 20(6) S-4212

1 9 6 2

The Governor and Council, after a public hearing conducted at Meredith on December 6, 1961, in accordance with Chapter 236 RSA of 1955, approved the Report of the Special Committee on a Limited Access Highway hearing in the Town of Meredith dated December 14, 1961, and subsequent to said hearing on December 29, 1961 in accordance with the provisions of the law referred to above, appointed:

John B. Mulaire, Hooksett;
Norman W. Turner, Wolfeboro;
Clifford H. Higgins, Concord

a Commission to assess property damage on the Limited Access Highway Project in the Town of Meredith.

And we, the undersigned, being duly sworn, and having proceeded with the duties to which we were appointed in accordance with the location determined by the Highway Commissioner do hereby describe the lands, rights and easements acquired by purchase or as laid out hereby which are necessary for the construction of said highway in the Town of Meredith, the center or construction line of which is as follows:

Beginning at a point in the travelled way of Route 104 in the Town of Meredith said point being also shown as Station 228+00 on a plan of MEREDITH S 20(6) S-4212 Project on file in the records of the New Hampshire Department of Public Works and Highways and to be recorded in the Belknap County Registry of Deeds; thence curving to the right with the arc of a circle having a radius of one thousand nine hundred ten feet (1910') a distance of one hundred fifty and one-hundredths feet (150.01'); thence S. 62° 07' 20" E. a distance of nine hundred thirty-two and forty-two hundredths feet (932.42'); thence curving to the left with the arc of a circle having a radius of one

(Continued)

thousand nine hundred ten feet (1910') a distance of one thousand six hundred twenty-nine and twenty-six hundredths feet (1629.26'); thence N. 69° 00' E. a distance of three thousand four hundred fifty-three and ninety-one hundredths feet (3453.91'); thence curving to the left with the arc of a circle having a radius of one thousand four hundred thirty-two and five-tenths feet (1432.5') a distance of one thousand one hundred seventy and thirty-one hundredths feet (1170.31'); thence N. 22° 11' 15" E. a distance of two thousand three hundred fifty-seven and ninety-four hundredths feet (2357.94'); thence curving to the right with the arc of a circle having a radius of one thousand nine hundred ten feet (1910') a distance of one thousand three hundred seven and twenty-two hundredths feet (1307.22'); thence N. 61° 24' 15" E. a distance of six hundred forty-eight and ninety-three hundredths feet (648.93') to a point in the travelled way shown as Station 344+50.

AND TAKING ON THE LEFT OR NORTHERLY SIDE of the above-described center line all the land that comes within a distance of seventy-five feet (75') between the property line between land of Rudolph Puletz and land of Francis O. Cooper near Station 229+00 and Station 318+50, and taking sixty feet (60') between the last-named Station and Station 324+93.85, and taking seventy-five feet (75') between the last-named Station and the division line between land of Ada B. Burleigh and land of Edna G. Piper near Station 334+60.

AND TAKING ON THE RIGHT OR SOUTHERLY SIDE of the above-described center line all the land that comes within a distance of seventy-five feet (75') between the division line between land of said Puletz and land of Oscar G. Piper Estate near Station 229+00 and Station 235+00, and taking fifty feet (50') between the last-named Station and the division line between land of said Cooper and land of Marian S. Smith near Station 240+00, and taking seventy-five feet (75') between the last-named division line and Station 274+00, and taking one hundred feet (100') between the last-named Station and Staton 284+00, and taking seventy-five feet (75') between the

(Continued)

last-named Station and Station 341+00, and taking one hundred feet (100') between the last-named Station and the Easterly property line of land of Hugh O. Barndollar near Station 344+50.

AND TAKING SEVERAL SMALL PARCELS of land described as follows: #1 - A triangular parcel of land, beginning at a point seventy-five feet (75') Southerly of and directly opposite Station 234+00; thence Southerly at right angles to said center line to the Northerly side line of Route 104 as now travelled; thence Westerly with said side line to a point seventy-five feet (75') Southerly of said center line; thence Easterly parallel to said center line to the point of beginning. #2 - Beginning at a point seventy-five feet (75') Southerly of and directly opposite Station 255+00; thence Southerly at right angles to said center line to the Northerly side line of Route 104 as now travelled; thence Easterly with said side line to a point seventy-five feet (75') Southerly of said center line; thence Westerly parallel to said center line to the point of beginning. #3 - Beginning at a point seventy-five feet (75') Southerly of and directly opposite Station 263+00; thence Southerly at right angles to said center line to the Northerly side line of Route 104 as now travelled; thence Westerly with said side line to a point seventy-five feet (75') Southerly of said center line; thence Easterly parallel to said center line to the point of beginning. #4 - Beginning at a point one hundred feet (100') Southerly of and directly opposite Station 277+00; thence Easterly parallel to said center line to the Westerly side line of Corliss Road; thence Southerly with said side line ninety-five feet (95'); thence Northwesterly to the point of beginning. #5 - Beginning at a point seventy-five feet (75') Northerly of and directly opposite Station 278+00; thence Easterly parallel to said centerline to the Westerly side line of Hatch Corner Road; thence Northerly with said side line one hundred thirty feet (130'); thence Southerly to the point of beginning. #6 - Beginning at a point one hundred feet (100') Southerly of and directly opposite Station279+00; thence Westerly parallel to said center line to the

(Continued)

hundred feet (100'); thence Northeasterly to the point of beginning.

#7 - Beginning at a point seventy-five feet (75') Northerly of and directly opposite Station 279+50; thence Westerly parallel to said center line to the Easterly side line of Hatch Corner Road; thence Northerly with said side line one hundred ten feet (110'); thence Southeasterly to the point of beginning.

#8 - And taking all the land that lies between the highway as now travelled and a line seventy-five feet (75') Southerly of and parallel to said center line between Station 284+00 and Station 289+00. #9 - And taking all the land that lies between the highway as now travelled and a line seventy-five feet (75') Northerly of and parallel to said center line, between Station 325+00 and Station 330+50. #10 - Beginning at a point one hundred feet (100') Southerly of and directly opposite Station 327+00; thence Easterly parallel to said center line to the Westerly side line of Winona Road; thence Southerly with said side line seventy-five feet (75'); thence Northwesterly to the point of beginning. #11 - Beginning at a point one hundred feet (100') Southerly of and directly opposite Station 329+00; thence Westerly parallel to said centerline to the Easterly side line of Winona Road; thence Southerly with said side line one hundred ten feet (110'); thence Northeasterly to the point of beginning.

Taking also with the above land all rights of access, light, air and view over, from, and to the same from the remainder of abutting lands at the line of taking between Stations 228+00 and 332+50 with the following specific exceptions: SEE EMENDATION

M. SMITH - Three (3) points of access each fifty feet (50') in width at the right-of-way line on the North.

J. SMITH - One (1) point of access fifty feet (50') in width at the right-of-way line on the South.

HORNE - -- One (1) point of access fifty feet (50') in width at the right-of-way line on the South.

WEEKS - -- One (1) point of access fifty feet (50') in width at the right-of-way line on the North and two (2) on the South.

CORLISS -- One (1) point of access fifty feet (50') in width at the right-of-way line on the South.

(Continued)

in width at the right-of-way line on the South and two (2) on the North.

AND TAKING THE RIGHT to dispose of muck in areas as shown on said plan.

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE

AND TAKING for the Public Service Company of New Hampshire a right and easement to construct, repair, rebuild, operate, patrol and remove overhead and underground lines consisting of wires, cables, ducts, manholes, poles and towers together with foundations, crossarms, braces, anchors, guys, grounds and other equipment for transmitting electric current and/or intelligence over, under and across a strip of land of varying width as shown on said plan.

In laying out this portion of the lands, rights and easements described above, the Commission includes herewith the right to extend and maintain any slopes and embankments that may extend beyond the limits of said layout, the right to construct and maintain drainage in accordance with the plan referred to above, and any damage which may be occasioned by the extension of slopes and embankments or drainage, is included in the amounts which we award or have already paid to the several landowners as set forth hereinafter.

And for land taken and for other easements necessary for the above construction, and in accordance with the before-mentioned plan, we award damages to owners of land as listed below:

Oscar G. Piper Estate, Donald F. Piper, Sr., Admr.	$ 1,200.00
Rudolph Puletz and Florence Puletz	50.00
Francis L. Cooper and Clara E. Cooper	3,545.00
Marian S. Smith	10,000.00
Armand Hilliard	1,000.00
Maurice P. Smith	1,000.00
Mary B. Corliss	1,000.00
Leon Hammell Sr. Estate	2,500.00
Joseph F. Smith	500.00
Arthur R. Horne	1,500.00

(Continued)

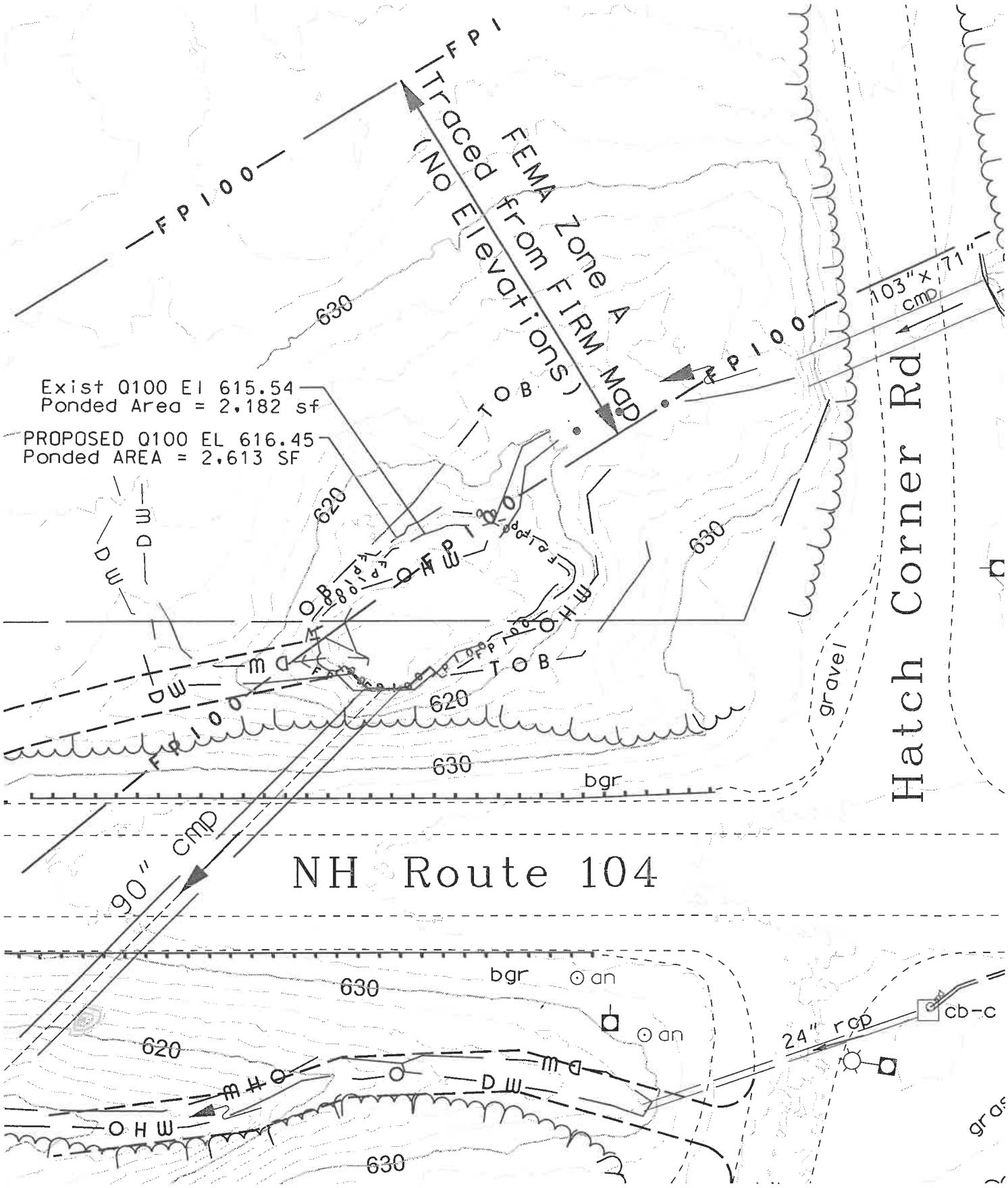
Myrna E. Weeks	4,200.00
Hugh G. Barndollar, Sr. and Mary Ida Barndollar and City Savings Bank	3,890.00
Ada B. Burleigh	750.00
Edna G. Piper	100.00

Given under our hands this 1st day of March A.D., 1962.

John B Milane

Clifford H. Higgins

COMMISSIONERS



Contour Interval 2'

20 0 20 40

SCALE IN FEET

STATE OF NEW HAMPSHIRE
MEREDITH

DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

Exhibit 3
Floodplain Information

DGN	STATE PROJECT NO.	SHEET NO.	SHEET TOTAL
42912 Floodplain exhibit	42912	1	1

AVOIDANCE AND MINIMIZATION CHECKLIST

Water Division/Land Resources Management

Wetlands Bureau

Check the Status of your Application

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

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

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

The following definitions and abbreviations apply to this worksheet:

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

SECTION 1 - CONTACT/LOCATION INFORMATION		
APPLICANT LAST NAME, FIRST NAME, M.I.: NH Dept. of Transportation		
PROJECT STREET ADDRESS: NH Route 104, 150' S.W. of Corliss Hill Rd	PROJECT TOWN: Meredith, NH	
TAX MAP/LOT NUMBER: N/A NHDOT ROW		
SECTION 2 - PRIMARY PURPOSE OF THE PROJECT		
Env-Wt 311.07(b)(1)	Indicate whether the primary purpose of the project is to construct a water-access structure or requires access through wetlands to reach a buildable lot or the buildable portion thereof.	☐ Yes ☒ No

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

The purpose of this project is to rehabilitate an aging 90" corrugated metal culvert, a valuable state asset, in order to support long term and safe use of the State's public transportation network.

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

BUREAU OF ENVIRONMENT
CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: December 16, 2020
LOCATION OF CONFERENCE: Virtual meeting held via Zoom

ATTENDED BY:

NHDOT
Sarah Large
Matt Urban
Andrew O'Sullivan
Ron Crickard
Mark Hemmerlein
Arin Mills
Samantha Fifield
Nancy Spaulding
Jon Evans
Chris Carucci
Meli Dube
Kirk Mudgett
Julius Nemeth
Bill Saffian
David Scott
Don Lyford
Joe Adams
Jennifer Reczek
Marc Laurin
Ron Kleiner
Tobey Reynolds
Mike Mozer
Bob Juliano

ACOE
Richard Kristoff
Mike Walsh

Federal Highway
Jaimie Sikora

EPA
Beth Alafat
Jeanie Brochi

NHDES
Lori Sommer
Karl Benedict
Eben Lewis
Stefanie Giallongo
Christian Williams
Ann Pelonzi

NH Fish & Game
Carol Henderson

NHB
Amy Lamb

The Nature Conservancy
Pete Steckler

US Coast Guard
Jeff Stieb
Donna Fischer

NOAA
Michael Johnson
Roosevelt Mesa

USFWS
Susi von Oettingen

Consultants/ Public Participants
Rich Brereton
Kevin Ryan
Bill McCloy
Sean Sweeney
Bryson Welch
Lee Carbonneau
Ray Hanf
Dave Smith
Josif Bicja
Ed Weingartner
Stephanie Dyer-Carroll
Dan Hageman
John Stockton
Roch Larochelle
Nicholas Caron
Alyson Eberhardt, UNH
Thom Marshall

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

(When viewing these minutes online, click on a project to zoom to the minutes for that project.)

located will require a solid earth berm to support the wall, and therefore posts will not suffice. He also noted that elevating the wall on posts to limit impacts to the vernal pool would not be an option as this would leave a gap at the bottom of the wall which would negate any of the noise reduction benefits from that section of the wall. Similarly, any linear breaks in the wall would also let noise through, defeating the noise mitigation value of the wall. Jon noted that there really are no other alternatives to avoiding or minimizing the wetland impacts associated with these walls other than shortening the ends of the walls as was noted during the presentation.

Andy O'Sullivan asked Karl if the impacted streams could be included in a single alternative stream crossing report, and Karl responded that as long as the linear and areal impacts are included, and each stream is described separately and is individually identifiable, they can be included in one report.

This project was previously discussed at the 8/19/2020 Monthly Natural Resource Agency Coordination Meeting.

Meredith, #42912 (X-A004(991))

Chris Carucci, NHDOT Bureau of Highway Design, introduced the project and provided a description of the project location, existing conditions, project purpose and need and proposed alternatives. The purpose of the meeting was to review the project area and existing resources and to receive feedback on the proposed alternatives and potential impacts. The project is federally funded and is slated to advertise in August 2021 with anticipated construction in 2022. The purpose of the project is to address structural deficiencies at an existing 178' x 90" structural metal plate culvert carrying an unnamed stream under NH Route 104 just south of the intersection of Corliss Hill Road and Hatch Corner Road in the Town of Meredith. The crossing is a Tier 3 crossing with a 1.72 square mile drainage area. The culvert currently has a concrete headwall at the inlet and is mitered at the outlet with concrete support walls with a maximum of 18' of cover at the centerline of NH Route 104. The need for this project is demonstrated by the deterioration of the existing pipe which is demonstrated by voids along the invert and lower sides, as well as several detached or missing sections of invert. The pipe has separated from the headwall and has significant change in shape in some places. There are also large sinkholes in the roadway embankment near the inlet and outlet. This culvert is currently statewide priority #2 based on fill height, traffic volume and is at high risk of further deformation and structural failure. The Department aims to avoid this, as NH Route 104 is a high volume road and is one of the three major regional routes connecting Interstate 93 to the Lakes Region and western White Mountains. Structural failure of the culvert would have significant impacts on the traveling public, local commerce and tourism.

The current crossing has a 2.98% slope, does not have a history of flooding and is capable of passing the 100-year flow. The stream is not perched and is in generally god condition with no significant bank erosion or sediment deposition. There is a small waterfall just upstream formed by a bedrock outcrop and the next culvert upstream, which is town owned, has a substantial perch. There is a large ponded wetland farther upstream which feeds the unnamed stream. The unnamed stream is a tributary to Lake Winnisquam which is located 1.85 miles downstream of the project with only one other crossing, a state-owned bridge, in between. There is also a small forested wetland adjacent to the culvert inlet and an intermittent stream on the east side of the outlet header which carries water from a State owned 24" culvert crossing underneath Corliss Hill Road.

A stream assessment was completed in May of 2020. The stream is a Rosgen Type B with highly variable bankfull widths averaging 20.75' near the 90" culvert. A bankfull with of 12.8' was determined for the reference reach which was located upstream of the waterfall and the perched culvert crossing under Hatch Corner Road described above. An entrenchment ratio of 1.4 was used to set a compliant span of 18'. The

existing culvert passes the design Q100 of 270 cfs with a headwater depth of 6.13 feet with outlet velocities ranging from 7.4 ft/s for Q2 to 11.3 ft/s for Q100.

The project is located in a FEMA flood zone A at the outlet. It is also located within the ranges of the federally threatened northern long-eared bat and small whorled pogonia. Appropriate consultation with the US Fish and Wildlife Service will be completed. The NH Natural Heritage Bureau did not indicate records of any known protected species in the project area. The culvert is eligible for review under the Section 106 Programmatic Agreement, and there are no anticipated adverse effects to water quality.

C. Carucci explained the various alternatives that were considered. First, a fully compliant crossing involving an 18" span bridge with an estimated $3.6 million cost and a funding/design delay of 3-5 years. This would require open cut phased construction of a new off-alignment crossing in order to maintain traffic during construction and stream flow through the existing culvert. This would result in temporary widening on both sides of NH Route 104 and significantly increased earth disturbance, clearing, grubbing and stream/wetland impacts. For these reasons, this alternative was not fully developed and is not preferred by the Department. A hydraulic design involving a 6' high x 8' wide box culvert with 2' of simulated stream bed material which would pass the 50 year storm without submerging the inlet was also considered. This alternative would cost an estimated $1.9 million and would have similar delays in construction and impacts. Replacement in-kind with an estimated cost of $1.2 million was also considered but due to the complications associated with open-cut construction would have similar timing delays and impacts as the other replacement options. For these reasons, none of the replacement options were examined further and are not preferred by the Department as the current culvert is at high risk for failure and delays in repairs increase the subsequent safety risk to the traveling public.

Several rehabilitation options were considered, including using cured-in-place liners, spray on liners and shotcrete invert repair, however, none of these approaches were considered feasible due to the advanced level of deterioration of the pipe which has significant change in shape and section loss. Sliplining is considered to be the only remaining feasible option which would meet the project purpose and need within a timeframe that is acceptable to avoid increased safety risk to the traveling public. Sliplining with a HDPE pipe was not considered viable because it must be sized to fit the existing smallest dimension of the host pipe, which would decrease the diameter of the pipe to 66" due to the deterioration and existing shape change. The preferred alternative is to slipline with a 76" diameter metal tunnel liner which involves constructing the liner in short rings and allows workers to safely remain within rehabilitated sections while reaching forward to remove obstructing portions of the existing pipe. This alternative is estimated to cost $417,000 and would take 3 months and could be ready for construction in 2022. It would also have significantly fewer impacts to wetlands and streams, less earth disturbance and minimal impacts to traffic during construction. The proposed 76" tunnel liner option would not have a significant effect on pipe capacity, velocity, flooding or sediment transport and there would be no anticipated effect on FEMA maps or downstream structures.

Construction of temporary access roads would be required at the inlet and outlet, which would be located along the toe the NH104 embankments which will require impacting isolated wetlands and an intermittent stream. A 20' x 65' temporary construction easement outside of existing State ROW at the inlet, all other work would remain within the ROW. The ground can be covered with temporary geotextile and stone to minimize disturbance to the wetland soils and root systems. An estimated 7,000 SF (0.16 acres) of clearing is necessary for construction of the access roads (5,995 SF at the inlet and 1,065 SF at the outlet), however, the majority of these trees are between 3" and 8" DBH and removal of stumps and root mat is not anticipated. The total proposed earth disturbance would be 16,800 SF (0.39 acres) and would therefore not require coverage under the EPA's NDPES CGP. Water diversion during construction will be through the existing pipe. All wetland and stream impacts will be temporary. Temporary access roads will impact the

two small isolated forested and emergent wetlands, totaling approximately 950 SF, and 657 SF of intermittent stream on the outlet side. Impacts to the main channel will be approximately 1700 SF below OHW and 1200 SF of banks. Total temporary impacts will be approximately 4,512 SF. C. Carucci requested concurrence from NHDES that the sliplining alternative could be permitted under Env-Wt 904.09 with no mitigation necessary due to the nature of the temporary impacts.

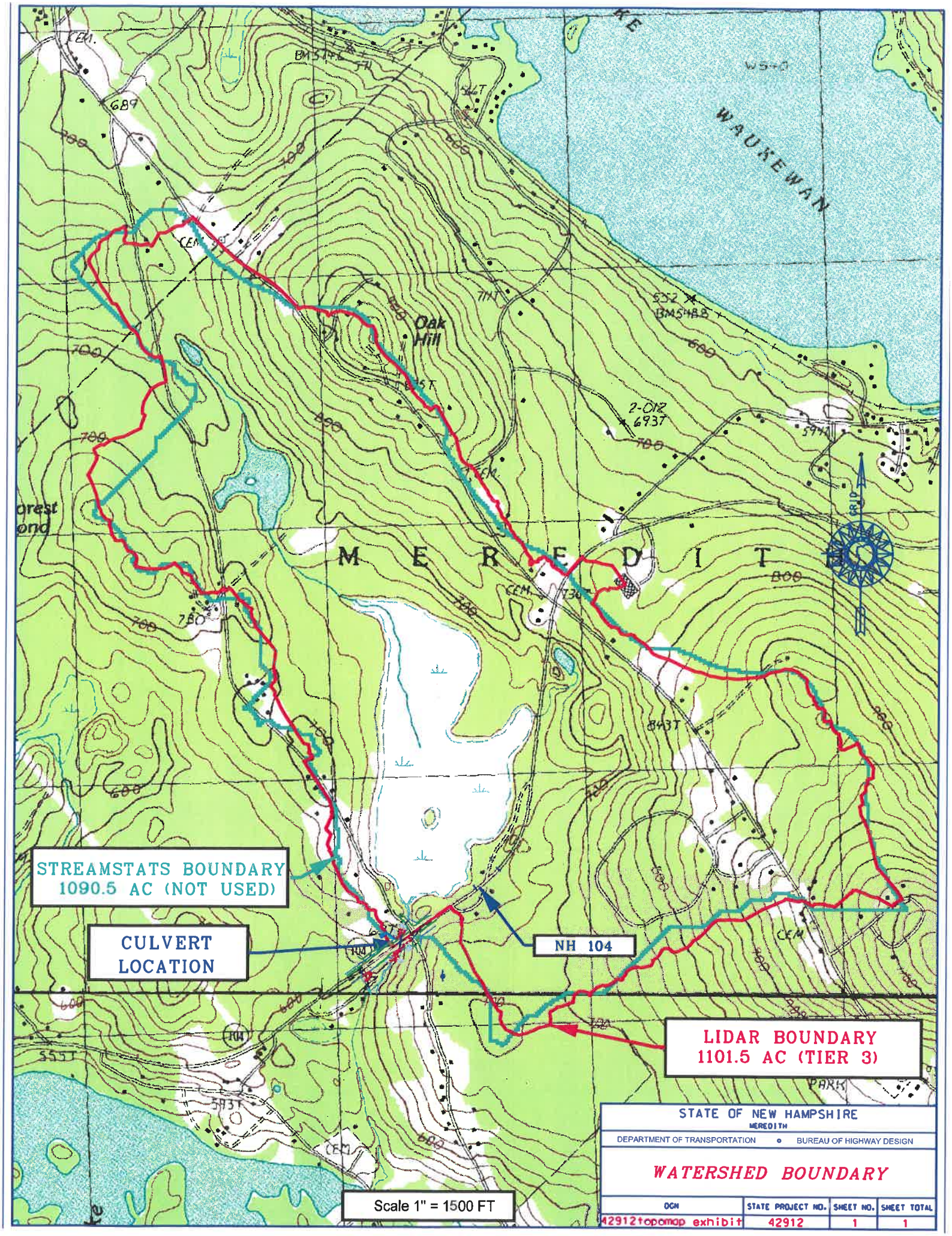
Karl Benedict, NHDES Wetlands Bureau, asked about considerations for change in stream bed elevations at the inlet and outlet to prevent creating a perched condition and if there would be any grade controls used, as well as whether considerations were made for ensuring the pipe would remain backwatered. C. Carucci replied that because of the extreme deterioration of the existing invert, which is essentially missing, the liner sections would be placed at or below the current pipe invert level so there is not anticipated to be any substantial grade change. K. Benedict then asked if the proposed diameter of the pipe after slip lining passes the 100-year storm and C. Carucci responded that it does with a 9/10th of a foot increase in the flooding elevation at the inlet. K. Benedict asked for clarification about the proposed water diversion and C. Carucci explained that it would be diverted through the existing pipe using a hose and pump, but that in the event of a large rain storm that all workers and equipment would be removed from the pipe and flow would be allowed to pass as normal. K. Benedict inquired about the impacts associated with access and suggested that a specific restoration plan would be needed to mitigate for impacts to adjacent wetland and the intermittent stream. C. Carucci reiterated that geotextile fabric overlaid with a stone base would be placed on top of the stream to provide a stabilized access path but that both the stone and fabric would be removed after construction and that this method avoids and minimizes the impact to the stream channel and or root mat and soil. The stream nor adjacent wetlands will be permanently disturbed and will be in the same condition and configuration as they exist today once the access materials are removed. This sequencing was sufficient information to meet the restoration concern. Lori Sommer, NHDES Wetlands Bureau, agreed that no mitigation would be required for this project since there are no proposed permanent impacts. Carol Henderson, NHFG, noted that the stream is considered a warm water stream according to the Region 2 biologist, Ben Nugent. There were no further comments.

This project has not been previously discussed at the Monthly Natural Resource Agency Coordination Meeting.

Hinsdale-Brattleboro, #12210D (X-A004(821))

Sarah Large began the meeting and provided Resource Agency partner introductions. Josif Bicja presented an overview of the existing bridges' information, project status, location of the proposed replacement bridge relative to the existing and recommended rehabilitation measures. The Anna Hunt Marsh Bridge (Br. No. 041/040) and Charles Dana Bridge (Br. No. 042/044) were constructed in 1920 and 1927, respectively. Rehabilitation work on both bridges in 1988 included deck and floor system replacement. The bridge decks were replaced again in 2004. Both bridges currently have an overall National Bridge Inspection Standard Condition Rating of 4 (poor). Recommended rehabilitation measures include the following: maintaining the bridge travel way width of 20' +/-, bridge rail replacement, deck repairs, removing the exterior sidewalks, repairing truss members and exterior stringers with advanced sections loss and complete repainting. The existing bearings, deck expansion joints and substructures will also be rehabilitated. He also noted the bridge approaches and island roadway width will be reduced to 16 feet. Natural Resource concerns include:

- Wetlands – Impacts to bank and stream for access to abutments and piers, which may consist of temporary trestles and piles, to perform repairs.
- Shoreland – Permit by Notification is anticipated based on expected clearing work associated with bridge substructure rehabilitation access needs.



STATE OF NEW HAMPSHIRE
MEREDITH
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

WATERSHED BOUNDARY

OGN	STATE PROJECT NO.	SHEET NO.	SHEET TOTAL
42912topomap exhibit	42912	1	1

NH Department of Transportation
Bureau of Highway Design
Project, #42912 Meredith
Env-Wt 904.10 Alternative Design
TECHNICAL REPORT
Prepared by: C. Carucci, PE

Env-Wt 904.10(a) - If the applicant can demonstrate that installing the structure specified in the applicable rule is not practicable, as that term is defined in Env-Wt 103, the applicant may propose an alternative design in accordance with this section.

Please explain why the structure specified in the applicable rule *(a compliant structure)* is not practicable. Practicable is defined as *available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes.)*

This project was initiated and is funded under NHDOT's Federal Culvert Replacement/Rehabilitation & Drainage Repair (CRDR) Program. The Program purpose is to address major culvert and drainage needs statewide that are not being addressed through current or future Capital Improvement or other programmatic projects. The Program receives $2,000,000 in total funding annually, which includes construction, engineering, and ROW costs. Projects are selected and scheduled based primarily on the condition of the culvert (risk of failure), Road Tier, traffic volume, depth of fill, and detour length (potential impact of failure). The Program funding is fully committed for at least the next three years. This culvert is one of the highest statewide priority locations out of nearly 50 known locations eligible for the Program. Failure to address the structural deficiency of this culvert risks deformation of the culvert which would make rehabilitation impossible and/or collapse of the culvert which could cause serious impacts to public/private infrastructure and the travelling public. Alternatives that significantly exceed the Program budget are not practicable since allocating multiple years of Program funding to a single culvert would put the State at risk for failures elsewhere.

Env-Wt 904.10(c)(1) Explain how the proposed alternative meets the criteria for approval specified as applicable:

a. Detailed financial comparison of the costs of a structure that complies with all applicable design requirements, the proposed structure, and a structure that requires fewer waivers than the proposed structure, with a range of costs estimated for each;
A fully compliant design would be an 18' span bridge. The estimated construction cost for this option is $3,662,192.
A hydraulic design was also considered, which would pass the 50 year storm without submerging the inlet. This would be a 6' high x 8'wide (clear opening) box culvert, embedded 24" below streambed. The estimated construction cost for this option is $1.9 million.

   See the Supplemental Narrative for detailed cost information. The typical range of costs for the preliminary alternative estimates presented are from 10% under to 30% over the amount cited. The typical range of costs for the preferred alternative is 5% under to 20% over the amount cited.

b. A detailed description of the physical limitations of the site; and
The physical limitations for this site include the depth of fill over the culvert, traffic volumes, and critical nature of the roadway above the culvert. See the Supplemental Narrative for detailed information about the site and associated resources and constraints.

c. A hydraulic analysis to show the proposed stream crossing can accommodate the applicable design storm that the crossing, together with the associated roadway and roadway embankment, can safely accommodate overtopping flows;

For this project, the design flow (Q100) is 270 cfs. The existing culvert accommodates the design flow with approximately 6.1' of headwater depth (El 615.54), which is approximately 12.5' below the bypass elevation of 628.0. Bypass would be over a driveway at Sta 275+14 and then southwest along the toe of the NH 104 embankment for about 500' to a 30" rcp culvert crossing under NH 104 and then back to the un-named stream about 700' downstream of the 90" cmp outlet. NHDOT Highway Maintenance District 3 has indicated no reports of flooding or damage associated with this culvert. The proposed design will accommodate the design flow with headwater El 616.45, which is still well below the bypass elevation.

See the Supplemental Narrative for detailed information about hydraulic modelling and associated model results.

Env-Wt 904.10(c)(2)a – The proposed alternative design must meet the general design criteria established in Env-Wt 904.01:

See the Supplemental Narrative for additional information related to the responses below.

Env-Wt 904.01 General Design Considerations

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

1) Not be a barrier to sediment transport;
The proposed design has no features that would be a barrier to sediment transport. The existing culvert has been in service for 58 years, with no evidence of obstructing sediment transport.

2) Not restrict high flows and maintain existing low flows;
The proposed liner will maintain existing high flow and low flow hydraulic capacities with similar flow depths.

3) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;
The proposed liner will not obstruct the movement of aquatic life indigenous to the waterbody. The area immediately adjacent to the culvert inlet and outlet matches the existing culvert invert and the liner invert will be set to closely match the existing 90" cmp invert. Velocities within the culvert will increase slightly as a result of the smaller liner diameter and slightly lower roughness coefficient. Baseflow in the culvert was observed at 8" to 18" deep over several NHDOT field visits. The proposed design will not significantly change low flow conditions. With all of this in mind, current passage of aquatic life is not inhibited by the existing culvert and will remain the same post construction.

4) Not cause an increase in the frequency of flooding or overtopping of banks;
The proposed liner will cause an estimated 0.91' increase in headwater elevation for the 100 year flowrate. Due to the steep topography surrounding the inlet, this headwater increase is limited to a very small area (see Supplemental Narrative Exhibit 3 – Floodplain information). The existing and proposed ponding elevations are below the delineated top of bank and are in an undeveloped wooded area. The proposed rehabilitation will have no effect on flood flow or flood elevations downstream of the existing 90" culvert.

5) Maintain or enhance geomorphic compatibility by:
   a. Minimizing the potential for inlet obstruction by sediment, wood, or debris; and
   The existing culvert does not have a history of debris blockage. The existing concrete headwall is a typical inlet structure, which is tapered to improve hydraulic efficiency and help funnel debris through the culvert. The culvert slope closely matches the approach channel slope, which reduces the potential for sediment accumulation.

   b. Preserving the natural alignment of the stream channel;

The proposed design will not alter the existing culvert alignment. The existing culvert is skewed 45 degrees to the road. The 1963 project significantly improved the culvert alignment on the inlet side (see Supplemental Narrative Exhibit 1 - Archive Plan), but was unable to align the culvert with the downstream channel as it is nearly parallel to NH104. Due to the construction and funding constraints, rehabilitating the existing structure is the proposed scope of work and improving the culvert alignment is not feasible with this project. This project is not making the alignment worse.

6) Preserve watercourse connectivity where it currently exists;
The proposed design will not alter connectivity. The liner invert will be set at approximately the same elevation as the existing culvert invert. The areas immediately adjacent to the inlet and outlet will be restored to existing conditions such that there is no perch.

7) Restore watercourse connectivity where:
   a. Connectivity previously was disrupted as a result of human activity(ies); and
   Connectivity of low flows and the hydrologic connection was maintained by the existing culvert. It is not practicable to restore vegetated banks, buffers, or floodplain inside of the existing culvert.

   b. Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;
   The proposed rehabilitation will not alter existing connectivity.

8) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and
The proposed design will have no effect on upstream hydraulics or sediment transport through the culvert. Outlet velocities will increase slightly as a result of the smaller liner diameter and lower roughness coefficient, but no effect on the downstream channel is anticipated. No changes to the downstream channel are proposed.

9) Not cause water quality degradation.
The project will have no effect on water quality. No new pavement or changes to drainage patterns is being proposed.

(b) For stream crossing over tidal waters, the stream crossing shall be designed to:
1) Match the velocity, depth, cross-sectional area, and substrate of the natural stream: and
N/A – This is not a tidal crossing

2) Be of sufficient size to not restrict bi-directional tidal flow over the natural tide range above, below, and through the crossing.
N/A – This is not a tidal crossing

Env-Wt 904.10(c)(2)b - The proposed alternative design meets the applicable design criteria established in Env-Wt 904.07 for Tier 2, Tier 3, and Tier 4 stream crossings to the *maximum extent practicable*, as specified below.

Env-Wt 904.07 Design Criteria for Tier 2, Tier 3, and Tier 4 Stream Crossings

(a) Unless otherwise specified, all design criteria in this section shall apply to new and replacement Tier 2 crossings, new and replacement Tier 3 crossings, as well as new and replacement Tier 4 tidal crossings that do not meet the requirements of Env-Wt 904.07.
This is not a new or replacement crossing. The proposed rehabilitation (by sliplining) meets all of the requirements for permitting under 904.09 (Rehabilitation of a Tier 3 crossing), except for hydraulic capacity. Modelling indicates a slight decrease in capacity, but the resulting headwater increase is not considered significant. The increase in inundated area is small and the proposed Q100 headwater elevation

is below the top of bank. The increase in headwater is minimized to the maximum extent practicable by selection of the proposed liner size.

(b) Tier 2 and tier 3 stream crossings shall be designed in accordance with the NH Stream Crossing Guidelines.
As this is not a new or replacement crossing, there is little to no opportunity to modify the crossing to better match the NH Stream Crossing Guidelines.

(c) Tier 2, tier 3, and tier 4 stream crossings shall be designed:

1) To meet the general design considerations specific in En-Wt 904.01;
The proposed design meets the requirements of 904.01.

2) Of sufficient size to accommodate the greater of:
   a. The 100-year 24-hour design storm;
   b. Flows sufficient to:
      1. Prevent an increase in flooding on upstream and downstream properties; and
      2. Not affect flows and sediment transport characteristics in a way that would adversely affect channel stability; or
   c. Applicable federal, state, or local requirements;

The rehabilitated culvert will pass the 100 year design flow, which is greater than the NHDOT requirement of a 50 year storm design for this type of crossing. The existing culvert has performed well for 58 years, with no evidence of obstructing sediment transport or causing channel instability. The proposed design will not significantly alter sediment transport capacity or flow conditions.

For this project, design flows were based on USGS Streamstats and Regression equations. A simple conservative Hydrocadd model (SCS Method) was developed for the 100 year 24 hour storm, which predicted a 100 year flowrate of 418 cfs. This model was not used for design as there was not sufficient accurate data to model storage and discharge in the numerous low areas and wetlands within the drainage area. The rehabilitated culvert will pass 418 cfs with a headwater elevation of 623.27 vs the bypass elevation of 628.0.

3) 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.

It is not practicable 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 since the crossing is a closed bottom structure and will remain closed bottom as well as the site constraints that prevent replacement and support rehabilitation. The selection of the liner material provides the best available balance between capacity and velocity.

4) To provide a vegetated bank on both sides of the watercourse or to provide a wildlife shelf of suitable substrate and access to allow for wildlife passage.
It is not practicable to provide a vegetated bank on both sides of the watercourse or to provide a wildlife shelf inside the existing culvert due to site constraints.

5) 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.

It is not practicable to alter the alignment or gradient of the existing culvert to restore the natural alignment of the stream that it once was prior to the original culvert installation. The proposed rehabilitation maintains the existing alignment and gradient of the crossing.

6) To simulate a natural stream channel.
It is not practicable to simulate a natural stream channel inside the existing culvert. The existing 90" CMP is a closed bottom corrugated metal culvert. The proposed culvert will be a closed bottom 76" (nominal) diameter corrugated metal culvert.

7) So as not to alter sediment transport competence.
The proposed design will not have a significant effect on sediment transport competence. Existing culvert velocities are sufficient to prevent aggregation of sediment inside the culvert. Proposed liner velocities will be slightly higher than the existing velocities.

8) To avoid and minimize impacts to the stream in accordance with Env-Wt 313.03
The project was designed to avoid and minimize wetland impacts to the maximum extent practicable. Additional details are provided in the Avoidance and Minimization checklist included elsewhere in the application.

(d) In addition to meeting the criteria specified in (c), above, new, repaired, rehabilitated, or replaced tier 4 stream crossing shall be designed:

N/A – Crossing is not a Tier 4

1) Based on a hydraulic analysis that accounts for daily fluctuating tides, bidirectional flows, tidal inundation, and coastal storm surge;
2) To prevent creating a restriction on tidal flows; and
3) To account for tidal channel morphology and potential impacts due to sea level rise.

Stream Crossing Assessment Summary

June 8, 2020

Sarah Large, NHDOT Wetlands Program Analyst

Data at the Crossing:

- Average WBF: 20.75'
- Average Flood Prone Width: 33.25'
- Average Bankfull Depth: 1.175'
- Entrenchment Ratio: 1.6 (moderately entrenched)
- Width/Depth Ratio: 17.7 (moderate)
- Average Channel Material at the crossing: 10% sand, 35% gravel, 22.5% cobble, and 32.5% boulder
- Could not calculate slope due to road fill height and level of field equipment used by BOE
- Based on the Rosgen table/ figure this data would classify the crossing as a Type B stream

Reference Reach Data:

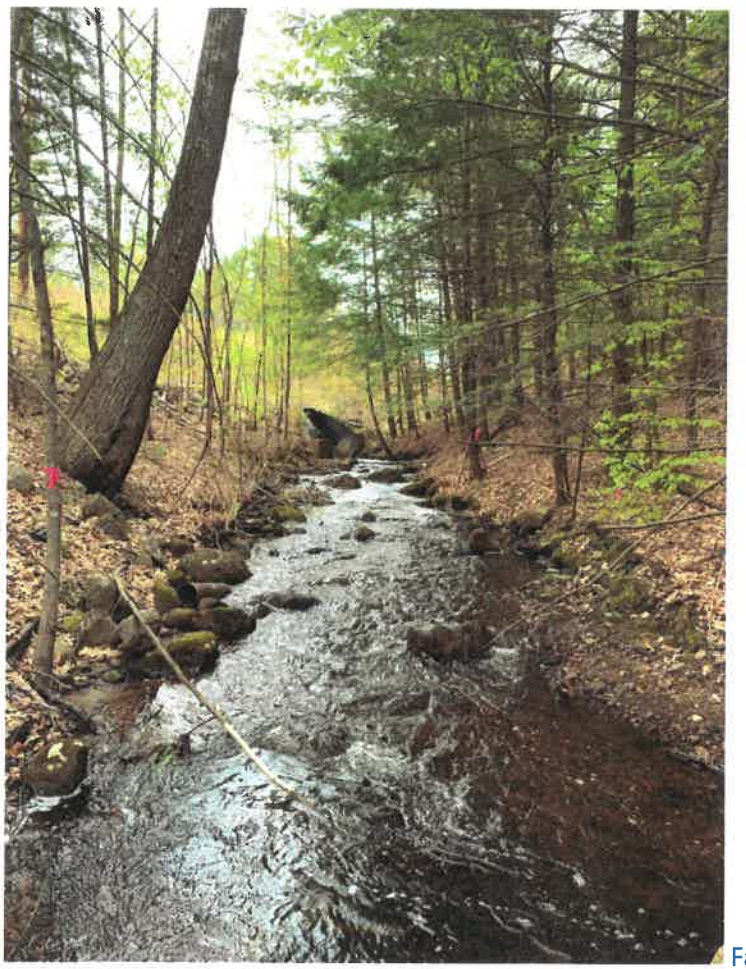
- Average WBF: 12.8'
- Flood Prone Width: 30.5'* [* used only the Wfpa data from Reference 1, the entrenched segment of the
- reference reach]
- Average Bankfull depth: 1.01'
- Entrenchment Ratio: 2.4 (slightly entrenched) **was challenging to get accurate flood prone area width
- measurements, the entrenchment ratio might be slightly skewed. The flood plane was wide on river right but the
- stream was entrenched on river left. Reference reach showed signs of human disturbance and influence
- associated likely with a historic dam at the confluence of the upstream pond and the stream.
- Width/Depth Ratio: 12.7 (moderate)
- Sinuosity: 1.1 (moderate)
- Channel Slope: Ref 1 to Ref 2= 3.9%; Ref 2 to Ref 3= 2.3%
- Channel material: 10% sand, 10% gravel, 35% cobble, 45% boulder
- Stream Fluvial geomorphology: Riffles and chutes/rapids
- Based on field observations and comparing the descriptions for both type B and type C streams in the UNH New Hampshire Stream Crossing Guidelines document the crossing shows characteristics that align with a type B stream through the Rosgen Classification. Based on the data provided above the crossing would be classified as a type C, however this is primarily determined by the entrenchment ratio, and as noted above the flood prone area width was quite variable in the reference reach due to observed and extrapolated human influence along river right. Therefore, it is our determination that that the stream more accurately is classified as a Type B stream.

UNH Stream Crossing Guidelines: Type B Stream-

"Type B streams display moderate sinuosity, slope, width/depth ratios, and entrenchment. This generally stable stream type commonly consists of riffles and rapids and occasional scour pools. Type B streams are often found in forested areas with flood plain vegetation moderately influencing channel stability. Streambank erosion is typically considered low and sensitivity to disturbance is often low to moderate. Fish habitat in this channel type is often attributed to scour pools developed by large woody material."

Based on the UNH Stream Crossing Guidelines, NHDES recent guidance on multipliers, and use of NHDES' new stream crossing form NHDOT BOE's Wetlands Program recommends that a compliant sized structure at this crossing should have a span of 18' and be open bottom with streambed material composition similar to the reference reach.

Compliant Structure Size Range- Calculations:
(12.8' x 1.2) + 2= 17.36'
12.8' x 1.4 = 17.92'... rounded up to an 18' span
12.8' x 2.2 = 28.16'

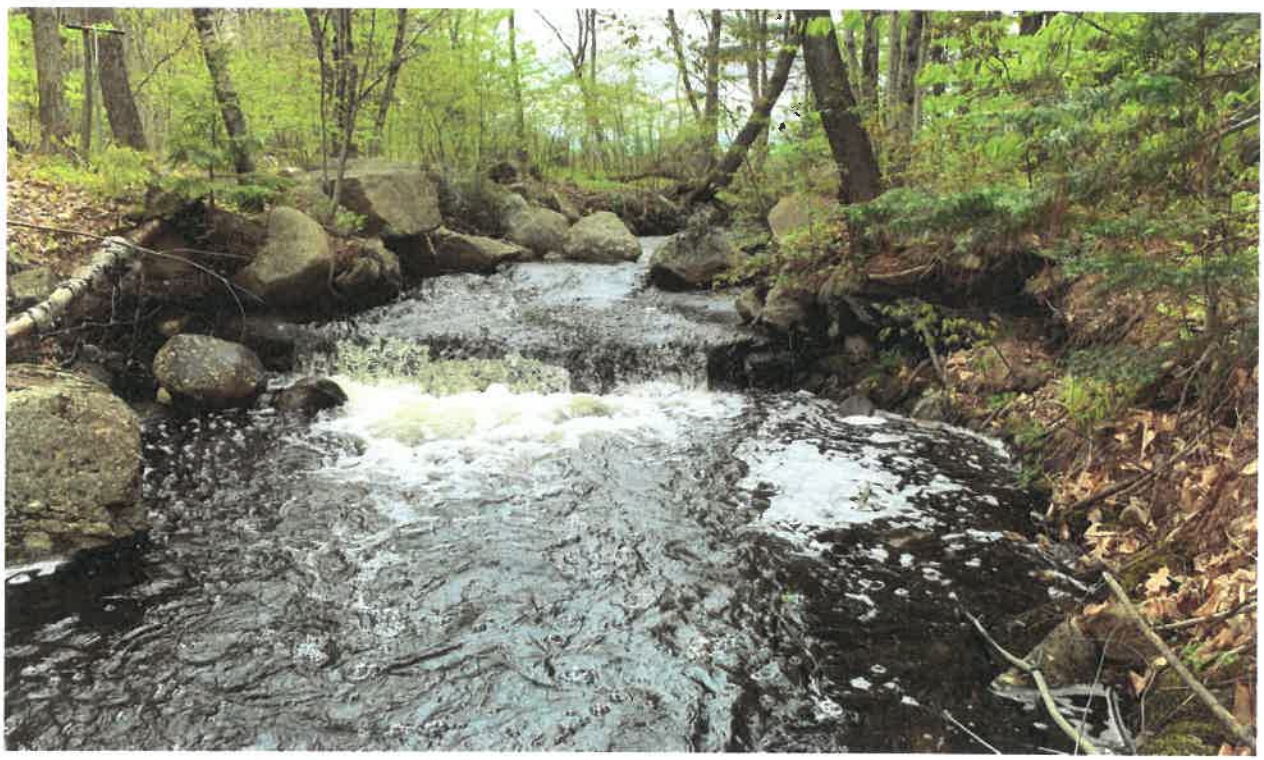


Facing outlet from Downstream

Outlet Cross Section- Facing upstream towards the outlet of the culvert

Inlet Cross Section- Facing downstream towards the inlet of the culvert

Reference Reach Data collected upstream the next structure upstream of the DOT structure and before reaching beaver dam and large pond upstream of both crossings



Reference Reach Cross Section #1 – Facing upstream towards beaver dam and pond

Reference Reach Cross Section #2- Facing upstream towards beaver dam and pond

Reference Reach Cross Section #3- Facing upstream towards beaver dam and pond

NHDOT STREAM CROSSING ASSESSMENT WORKSHEET

Project Meredith 42912 Location of Crossing NH 104 Date of field assessment 5/18/20

Stream Parameters at Crossing

Existing Crossing (type and size): 90" CMP x 178' Long **Watershed size** Tier 3 1.7 sq. mi.

☒ CMP ☐ RCP ☐ HDPE ☐ Arch/Squash Pipe ☐ Closed Box ☐ Open Box ☐ Bridge ☐ Other _____

General Information to be collected at the Crossing:

GPS Wetland Delineation: ☒ YES ☐ NO

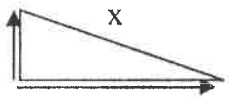
Riparian Zone (surrounding or on the banks):

Extent of vegetation (circle): *absent, low density, moderate density, high density*

Type of dominant vegetation (circle): *graminoid, herbaceous, shrub/sapling, tree*

Dominant Species:
beech
hemlock
yellow birch
pine
sugar maple
sensitive fern
christmas tree fern

Slope at crossing: _____ (Rise in Elev.) _____

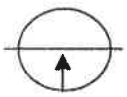


_____ (Length of Crossing)

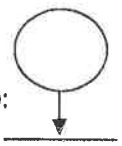
No measurable with equipment

Outlet Data:

Depth of water at invert if not perched: 1.1 edge of mitered end (example):



→ 0.8 @ below top out of pipe



Perched at outlet? ☐ YES ☒ NO (If yes, Distance from invert to the waters surface: _____) (example):

Tailwater Controls present at crossing? ☐ YES ☒ NO

Pool Configuration: width N/A length: _____ Max pool depth at outlet: _____

Location (distance from outlet): N/A Materials: _____

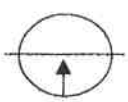
Dominant Channel Material (visual assessment): ☐ sand ☐ silt ☒ gravel ☐ cobble ☒ boulder ☐ bedrock
Pebble Count: ☒ YES ☐ NO (Collect Data on Pg. 2)

☒ Photo of Outlet Structure
☒ Photo of Downstream Conditions

☒ Outlet Cross Section (Use Pg. 3 to collect Data)

Inlet Data:

Depth of water at inlet: 1.1 (example):



Dominant Channel Material (visual assessment): ☐ sand ☐ silt ☐ gravel ☐ cobble ☒ boulder ☐ bedrock
Pebble Count: ☒ YES ☐ NO (Collect Data on Pg. 2)

☒ Photo of Inlet Structure
☒ Photo of Upstream Conditions

☒ Inlet Cross Section (Use Pg. 4 to collect Data)

NHDOT STREAM CROSSING ASSESSMENT WORKSHEET

Project Meredith 42912 **Location of Crossing** _____ **Date of field assessment** 5/10/20

At Crossing Pebble Counts: - measure at least 100 "pebbles" along a channel cross-section when possible (counts are usually done in riffles); measure the first "pebble" you touch at the end of your foot as you work your way across the channel; substrate is measured along the intermediate axis (neither the longest nor the shortest of the three perpendicular axes)

(Check Box Tally)

Substrate Material	Upstream from crossing	Downstream from crossing	Within Structure
Sand (<0.007')			
Gravel (0.007'-0.21')			
Cobble (0.22'- 0.83')			
Boulder (0.92' – 13.3')			
Bedrock (>13.3')			

Outlet

sand 19 20 15%.

Gravel 48 35%.

Cobble 35%.

Boulder 15 15%.

Bedrock

Inlet

Sand 5%.

Gravel 35%.

Cobble 10%.

Boulder 50%.

Bedrock

Reach 1

sand

Gravel 5%.

Cobble 20%.

Boulder 75%.

bedrock

NHDOT STREAM CROSSING ASSESSMENT WORKSHEET

Project Meredith 42912 Location of Crossing _____ Date of field assessment 5/18/2020

Outlet Cross Section: River R -> River L

Starting bank (left/right)

0 = 0.1

Dist. from bank (ft.)	Dbf
1	0.9
2	1.0
3	0.9
4	0.7
5	0.9
6	1.0
7	1.3
8	1.3
9	1.5
10	2.0
11	1.7
12	1.5
13	1.4
14	0.4
15	0.1
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Avg Dbf= 1.1

Max water depth= 1.1

Ctr of structure@: 10

Wbf = 15.2

Flood Prone Width= 24

NHDOT STREAM CROSSING ASSESSMENT WORKSHEET

Project Meredith 42912 **Location of Crossing** _____ **Date of field assessment** 5/18/20

Inlet Cross Section:

0 = 0.1

Starting bank (left/right)

Dist. from bank (ft.)	*Dbf*	
1	0.7	
2	1.6	
3	1.4	
4	1.4	
5	1.2	
6	0.8	
7	1.3	
8	1.6	
9	1.7	
10	1.8	
11	1.2	
12	0.8	
13	1.6	
14	0.9	
15	1.3	
16	1.3	
17	1.3	
18	1.0	boulder
19	1.2	
20	1.3	
21	1.5	
22	1.1	
23	1.6	
24	1.4	
25	0.1	boulder
26	0.1	boulder
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Avg Dbf= 1.25

Max water depth= 0.7

Ctr of structure@: 15'

Wbf = 26.3

Flood Prone Width= 42.5

NHDOT STREAM CROSSING ASSESSMENT WORKSHEET

Project Meredith, #42912 **Location of Crossing** _____ **Date of field assessment** 5/18/20

Reference Reach 1:

0 = 0.7

Starting bank (left/right)

Dist. from bank (ft.)	*Dbf*	
1	0.1	boulder
2	0.1	boulder
3	1.2	
4	1.2	
5	1.3	
6	1.3	
7	0.9	
8	1.2	
9	1.4	
10	0.8	boulder
11	1.2	
12	1.3	
13	1.0	
14	0.6	
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Avg Dbf= 0.97

Max water depth= 0.7

Ctr of structure@: N/A

Wbf = 14.2

Flood Prone Width= 30.5

NHDOT STREAM CROSSING ASSESSMENT WORKSHEET

Project Meredith 42912 **Location of Crossing** _____ **Date of field assessment** 5/10/20

Reference Reach 2:

Starting bank (left/right)

Dist. from bank (ft.)	*Dbf*	
1	1.1	0 = 0.4
2	1.5	
3	1.7	
4	1.7	
5	1.3	
6	2.1	
7	1.8	
8	1.9	
9	1.4	
10	0.7	boulder
11	1.2	
12	0.7	
13	0.1	boulder
14	0.3	
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Avg Dbf= 1.1

Max water depth= 1.4

Ctr of structure@: N/A

Wbf = 14.4

Flood Prone Width= 200+

NHDOT STREAM CROSSING ASSESSMENT WORKSHEET

Project Meredith 42912 **Location of Crossing** _____ **Date of field assessment** 5/18/20

Reference Reach 3:

Starting bank (left/right)

Dist. from bank (ft.)	*Dbf*	
1	0.8	0 = 0.2
2	1.2	
3	1.1	
4	0.8	
5	1.2	
6	1.2	
7	1.0	
8	1.1	
9	0.3	boulder
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Avg Dbf= 0.96
Max water depth= 0.7
Ctr of structure@: N/A
Wbf = 9.9
Flood Prone Width= 260+

NHDOT STREAM CROSSING ASSESSMENT WORKSHEET

Project Meredith 42913 **Location of Crossing** _____ **Date of field assessment** 5/10/20

Reference Reach Pebbble Counts: - measure at least 100 "pebbles" along a channel cross-section when possible (counts are usually done in riffles); measure the first "pebble" you touch at the end of your foot as you work your way across the channel; substrate is measured along the intermediate axis (neither the longest nor the shortest of the three perpendicular axes)

(Check Box Tally)

Substrate Material	Ref 1 see other sheet	Ref 2	Ref 3
Sand (<0.007')			
Gravel (0.007'-0.21')			
Cobble (0.22'- 0.83')			
Boulder (0.92' – 13.3')			
Bedrock (>13.3')			

5% gravel
20% cobble
75% boulder

sand 10%
gravel 10%
Cobble 35%
Boulder 45%
bedrock

sand 10%
gravel 10%
Cobble 35%
Boulder 45%
Bedrock

NHDOT STREAM CROSSING ASSESSMENT WORKSHEET

Project Meredith 42912 **Location of Crossing** _____ **Date of field assessment** 5/19/20

Longitudinal Profile for Reference Reach (length = 7-10 times bankfull width)

Starting at Reference 1 going towards Reference 2:

Shooting a pop level from at a height of: 5 ft.

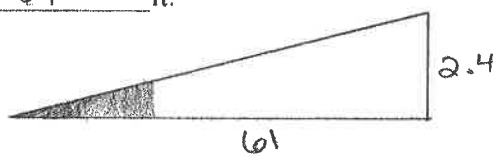
Reading on survey rod at Ref 2: 2.6 ft.

A Difference of: 2.4 ft.

Distance between Ref 1 and Ref 2: 61 ft.

2.4 | 61 = (0.0393)(100) = 3.93

Slope at crossing: 3.93 %



Depth of Water at Thalweg: 0.8

(Features: *Riffle*, *Run*, *Pool*, *Step*, *Glide*)

Features between Ref 1 and 2:

Pool	@ 0 - 19	ft
Chute	@ 19 - 38	ft
Run	@ 38 - 55	ft
Chute	@ 55 - 56	ft
Pool	@ 56 - 61	ft
	@	ft

From Reference 2 going towards Reference 3:

Shooting a pop level from at a height of: 5 ft.

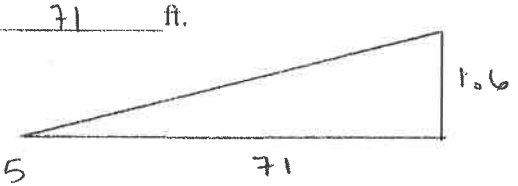
Reading on survey rod at Ref 3: 3.4 ft.

A Difference of: 1.6 ft.

Distance between Ref 1 and Ref 2: 71 ft.

1.6 | 71 = (0.0225)(100) = 2.25

Slope at crossing: 2.25 %



Depth of Water at Thalweg: 1.5

(Features: *Riffle*, *Run*, *Pool*, *Step*, *Glide*)

Features between Ref 1 and 2:

Pool	@ 0 - 13	ft
Run	@ 13 - 34	ft
Riffle	@ 34 - 71	ft
	@	ft
	@	ft
	@	ft

NHDOT STREAM CROSSING ASSESSMENT WORKSHEET

Project Meredith 42712 Location of Crossing _____ Date of field assessment 5/18/20

Office Calculations for (At Crossing Data):

Entrenchment Ratio: Wfpa/Wbf = 33.25/20.75 = 1.6 Moderately entrenched [1.4 - 2.2]

Width/Depth Ratio: Wbf/Average Depth = 20.75/1.175 = 17.659 Moderate (>12)

Sinuosity: stream length/valley length = _____

Channel Slope: _____

Channel Material: Average 10% sand, 35% gravel, 22.5% cobble, 32.5% boulder

Rosgen Classification: Type B classification

Office Calculations for (Reference Reach Data):

Entrenchment Ratio: Wfpa/Wbf = 30.5/12.8$\overline{33}$ = 2.3766 * this doesn't make sense Slightly entrenched (> 2.2)

Width/Depth Ratio: Wbf/Average Depth = 12.8$\overline{33}$/1.01 = 12.7 Moderate (>12)

Sinuosity: stream length/valley length = 234/216 = 1.08 or 461/419 = 1.1 Moderate

Channel Slope: 3.93% & 2.25%

Channel Material: 10% sand, 10% gravel, 35% cobble, 45% boulder

Rosgen Classification: _____ or type B stream

Crossing

v. Wbf = (15.2 + 26.3)/2 = 20.75

v. Floodprone W = (24 + 42.5)/2 = 33.25

v. Depth = (1.1 + 1.25)/2 = 1.175

Reference Reach

w. wbf = (14.2 + 14.4 + 9.9)/3 = 12.8$\overline{33}$

iv. floodprone = (30.5 + 200+ + 200+)/3 = 143.5 / 30.5

v. Depth = (0.97 + 1.1 + 0.96)/3 = 1.01

Compliant sizes

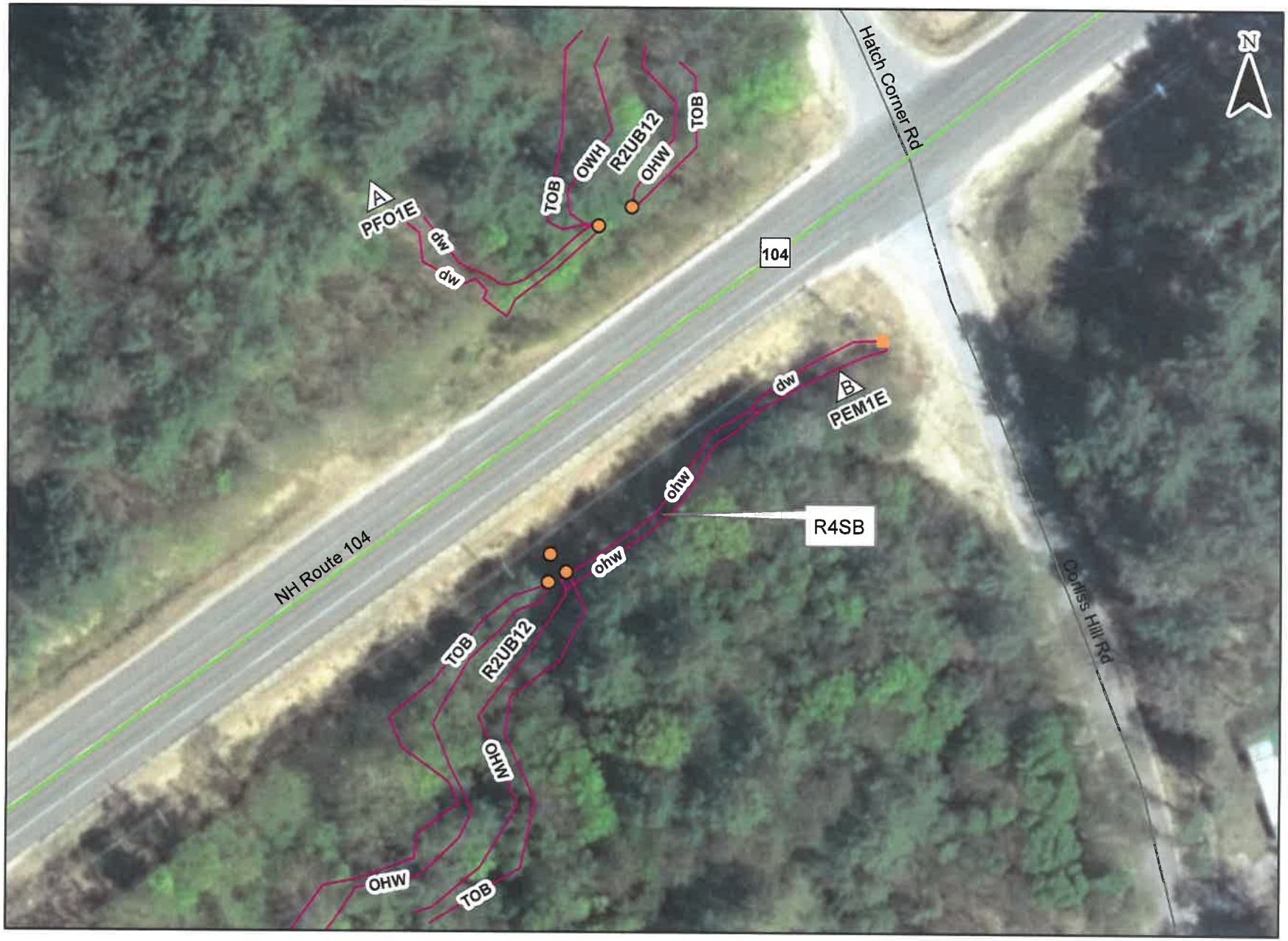
(12.8 × 1.2) + 2 = 17.36' *

12.8 × 1.4 = 17.92' *

12.8 × 2.2 = 28.16'

12.8 × 2.4 = 30.72'

Meredith, #42912



0 55 110 220 Feet 1 in = 70 ft

New Hampshire Natural Heritage Bureau

To: Melilotus Dube
7 Hazen Drive
Concord, NH 03301

Date: 4/28/2020

From: NH Natural Heritage Bureau

Re: Review by NH Natural Heritage Bureau of request dated 4/28/2020

NHB File ID: NHB20-1183

Applicant: Melilotus Dube

Location: Tax Map(s)/Lot(s):
Meredith

Project Description: NHDOT Meredith 42912. The proposed work addresses safety concerns at a 178' long 90" CMP carrying an unnamed stream unnamed stream under NH Route 104 in the Town of Meredith approximately 150' southwest of Corliss Hill Road. The existing pipe is in poor condition and is causing sinkholes in the NH104 embankment. The proposed alternatives being considered include various replacement and rehabilitation options.

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

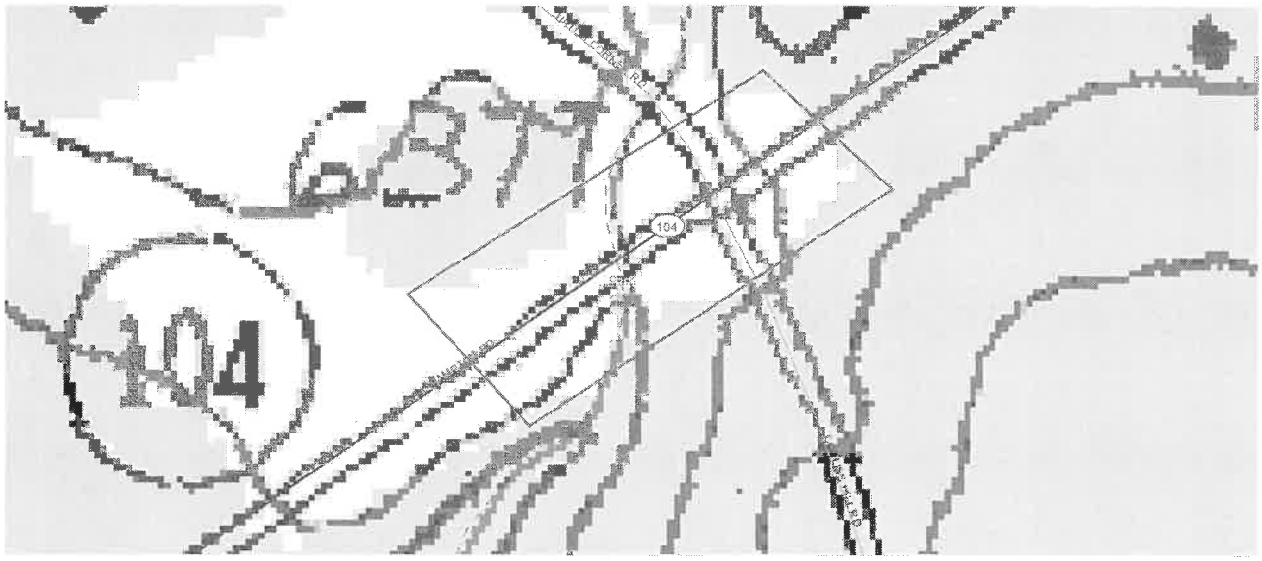
A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed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

This report is valid through 4/27/2021.

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

DRED/NHB
172 Pembroke Road
Concord NH 03301

MAP OF PROJECT BOUNDARIES FOR NHB FILE ID: NHB20-1183



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

DRED/NHB
172 Pembroke Road
Concord NH 03301

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
http://www.fws.gov/newengland

In Reply Refer To:
Consultation Code: 05E1NE00-2020-SLI-2354
Event Code: 05E1NE00-2021-E-03922
Project Name: Meredith 42912

February 03, 2021

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

To Whom It May Concern:

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

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

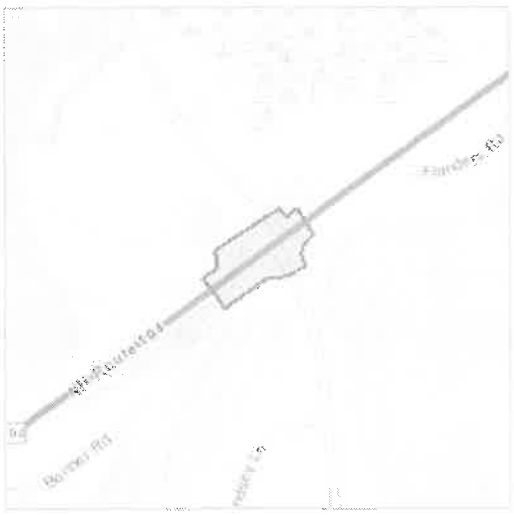
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2020-SLI-2354
Event Code: 05E1NE00-2021-E-03922
Project Name: Meredith 42912
Project Type: TRANSPORTATION
Project Description: The proposed project will address safety concerns at the crossing of NH Route 104 over an unnamed stream approximately 150' southwest of Corliss Hill Road in the Town Meredith. The existing crossing is a 178' long 90" corrugated metal pipe in poor condition. The several replacement and rehabilitation alternatives are being considered.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.6270078545973,-71.53706940707445,14z



Counties: Belknap 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.

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

Flowering Plants

NAME	STATUS
Small Whorled Pogonia *Isotria medeoloides* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1890	Threatened

Critical habitats

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

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
http://www.fws.gov/newengland

IPaC Record Locator: 161-98938565 February 03, 2021

Subject: Consistency letter for the 'Meredith 42912' project (no current TAILS record) under the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request to verify that the **Meredith 42912** (Proposed Action) may rely on the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action is within the scope and adheres to the criteria of the PBO, including the adoption of applicable avoidance and minimization measures, and may affect, and is likely to adversely affect the endangered Indiana bat (*Myotis sodalis*) and/or the threatened Northern long-eared bat (*Myotis septentrionalis*). Consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) is required.

This "may affect - likely to adversely affect" determination becomes effective when the lead Federal action agency or designated non-federal representative requests the Service rely on the PBO to satisfy the agency's consultation requirements for this project. Please provide this consistency letter to the lead Federal action agency or its designated non-federal representative for review, and as the agency deems appropriate, transmit to this Service Office for verification that the project is consistent with the PBO.

This Service Office will respond by letter to the requesting Federal action agency or designated non-federal representative within 30 calendar days to:

- verify that the Proposed Action is consistent with the scope of actions covered under the PBO;

- verify that all applicable avoidance, minimization, and compensation measures are included in the action proposal;
- identify any action-specific monitoring and reporting requirements, consistent with the monitoring and reporting requirements of the PBO, and
- identify anticipated incidental take.

ESA Section 7 compliance for this Proposed Action is not complete until the Federal action agency or its designated non-federal representative receives a verification letter from the Service.

For Proposed Actions that include bridge/structure removal, replacement, and/or maintenance activities: If your initial bridge/structure assessments failed to detect Indiana bats, but you later detect bats during construction, please submit the Post Assessment Discovery of Bats at Bridge/Structure Form (User Guide Appendix E) to this Service Office. In these instances, potential incidental take of Indiana bats may be exempted provided that the take is reported to the Service.

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

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

- Small Whorled Pogonia Isotria medeoloides Threatened

Project Description

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

Name

Meredith 42912

Description

The proposed project will address safety concerns at the crossing of NH Route 104 over an unnamed stream approximately 150' southwest of Corliss Hill Road in the Town Meredith. The existing crossing is a 178' long 90" corrugated metal pipe in poor condition. The several replacement and rehabilitation alternatives are being considered.

Determination Key Result

Based on your answers provided, this project is likely to adversely affect the endangered Indiana bat and/or the threatened Northern long-eared bat. Therefore, consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required. However, also based on your answers provided, this project may rely on the conclusion and Incidental Take Statement provided in the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

Qualification Interview

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

   [1] See Indiana bat species profile

   Automatically answered
   No

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

   [1] See Northern long-eared bat species profile

   Automatically answered
   Yes

3. Which Federal Agency is the lead for the action?

   A) Federal Highway Administration (FHWA)

4. Are *all* project activities limited to non-construction[1] activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

   [1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

   No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces[1]?

   [1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

   No

6. Does the project include *any* activities **within** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum[1]?

   [1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

   No

7. Is the project located **within** a karst area?

   No

8. Is there *any* suitable[1] summer habitat for Indiana Bat or NLEB **within** the project action area[2]? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   [2] The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR Section 402.02). Further clarification is provided by the national consultation FAQs.

   Yes

9. Will the project remove *any* suitable summer habitat[1] and/or remove/trim any existing trees **within** suitable summer habitat?

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   Yes

10. Will the project clear more than 20 acres of suitable habitat per 5-mile section of road/rail?

    No

11. Have presence/probable absence (P/A) summer surveys[1][2] been conducted[3][4] **within** the suitable habitat located within your project action area?

    [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

    [2] Presence/probable absence summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate distance from hibernacula) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

    [3] For projects within the range of either the Indiana bat or NLEB in which suitable habitat is present, and no bat surveys have been conducted, the transportation agency will assume presence of the appropriate species. This assumption of presence should be based upon the presence of suitable habitat and the capability of bats to occupy it because of their mobility.

    [4] Negative presence/probable absence survey results obtained using the summer survey guidance are valid for a minimum of two years from the completion of the survey unless new information (e.g., other nearby surveys) suggest otherwise.

    No

12. Does the project include activities **within documented NLEB habitat**[1][2]?

    [1] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry biangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

    [2] For the purposes of this key, we are considering documented corridors as that where Indiana bats and/or NLEB have actually been captured and tracked to using (1) radio telemetry; or (2) treed corridors located directly between documented roosting and foraging habitat.

    No

13. Will the removal or trimming of habitat or trees occur **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors?

    Yes

14. What time of year will the removal or trimming of habitat or trees **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors occur?

    A) During the active season

15. Will *any* tree trimming or removal occur **within** 100 feet of existing road/rail surfaces?

    Yes

16. Will **more than** 10 trees be removed **between** 0-100 feet of the road/rail surface *during* the active season[1]?

    [1] Areas containing more than 10 trees will be assessed by the local Service Field Office on a case-by-case basis with the project proponent.

    Yes

17. Will *any* tree trimming or removal occur **between** 100-300 feet of existing road/rail surfaces?

    No

18. Are *all* trees that are being removed clearly demarcated?

    Yes

19. Will the removal of habitat or the removal/trimming of trees involve the use of **temporary** lighting?

    No

20. Will the removal of habitat or the removal/trimming of trees include installing new or replacing existing **permanent** lighting?

    No

21. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?

    No

22. Does the project include slash pile burning?

    No

23. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?

    No

24. Does the project include the removal, replacement, and/or maintenance of *any* structure other than a bridge? (e.g., rest areas, offices, sheds, outbuildings, barns, parking garages, etc.)

    No

25. Will the project involve the use of **temporary** lighting *during* the active season?

    No

26. Will the project install new or replace existing **permanent** lighting?

    No

27. Does the project include percussives or other activities (**not including tree removal/ trimming or bridge/structure work**) that will increase noise levels above existing traffic/ background levels?

    Yes

28. Will the activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the active season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

29. Will *any* activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the inactive season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    No

30. Are *all* project activities that are **not associated with** habitat removal, tree removal/ trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives, limited to actions that DO NOT cause any additional stressors to the bat species?

    Examples: lining roadways, unlighted signage , rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.

    Yes

31. Will the project raise the road profile **above the tree canopy**?

    No

32. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered

    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the active season within undocumented habitat.

33. Are the project activities that are not associated with habitat removal, tree removal/ trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives consistent with a No Effect determination in this key?

    Automatically answered

    Yes, other project activities are limited to actions that DO NOT cause any additional stressors to the bat species as described in the BA/BO

34. Is the habitat removal portion of this project consistent with a Likely to Adversely Affect determination in this key?

    Automatically answered

    Yes, because tree removal that occurs within the NLEB's active season occurs greater than 0.5 miles from the nearest hibernaculum, is less than 100 feet from the existing road/rail surface, and is not in documented NLEB roosting/foraging habitat or travel corridors, and a visual emergence survey has not been conducted

35. **General AMM 1**

    Will the project ensure *all* operators, employees, and contractors working in areas of known or presumed bat habitat are aware of *all* FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable Avoidance and Minimization Measures?

    Yes

36. **Tree Removal AMM 1**

    Can *all* phases/aspects of the project (e.g., temporary work areas, alignments) be modified, to the extent practicable, to avoid tree removal[1] in excess of what is required to implement the project safely?

    Note: Tree Removal AMM 1 is a minimization measure, the full implementation of which may not always be practicable. Projects may still be NLAA as long as Tree Removal AMMs 2, 3, and 4 are implemented and LAA as long as Tree Removal AMMs 3, 5, 6, and 7 are implemented.

    [1] The word "trees" as used in the AMMs refers to trees that are suitable habitat for each species within their range. See the USFWS' current summer survey guidance for our latest definitions of suitable habitat.

    Yes

37. **Tree Removal AMM 3**
    Can tree removal be limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits)?

    Yes

38. For Indiana bat, if applicable, compensatory mitigation measures are required to offset adverse effects on the species (see Section 2.10 of the BA). Please select the mechanism in which compensatory mitigation will be implemented:

    6. Not Applicable

Project Questionnaire

1. Have you made a No Effect determination for *all* other species indicated on the FWS IPaC generated species list?

   Yes

2. Have you made a May Affect determination for *any* other species on the FWS IPaC generated species list?

   No

3. How many acres[1] of trees are proposed for removal between 0-100 feet of the existing road/rail surface?

   [1] If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

   0.16

4. **Please verify:**
   All tree removal will occur greater than 0.5 mile from any hibernaculum.

   Yes, I verify that all tree removal will occur greater than 0.5 miles from any hibernaculum.

5. Is the project location 0-100 feet from the edge of existing road/rail surface?

   Yes

6. Is the project location 100-300 feet from the edge of existing road/rail surface?

   No

7. **Please verify:**
   No documented NLEB roosts or surrounding summer habitat within 150 feet of documented roosts will be impacted between June 1 and July 31.

   Yes, I verify that no documented NLEB roosts or surrounding summer habitat within 150 feet of documented roosts will be impacted during this period.

8. You have indicated that the following Avoidance and Minimization Measures (AMMs) will be implemented as part of the proposed project:
   - *Tree Removal AMM 1*
   - *Tree Removal AMM 3*
   - *General AMM 1*

Avoidance And Minimization Measures (AMMs)

This determination key result includes the committment to implement the following Avoidance and Minimization Measures (AMMs):

TREE REMOVAL AMM 1

Modify all phases/aspects of the project (e.g., temporary work areas, alignments) to avoid tree removal.

TREE REMOVAL AMM 3

Ensure tree removal is limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).

GENERAL AMM 1

Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.

Determination Key Description: FHWA, FRA, FTA Programmatic Consultation For Transportation Projects Affecting NLEB Or Indiana Bat

This key was last updated in IPaC on December 29, 2020. Keys are subject to periodic revision.

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

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

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

February 25, 2021

Melilotus Dube
Bureau of Environment
NH Department of Transportation
7 Hazen Drive, P.O. Box 483
Concord, New Hampshire 03302-0483

Re: NH DOT Project Meredith 42912, Culvert Rehabilitation Project
TAILS: 05E1NE00-2020-F-2354

Dear Ms. Dube:

The U.S. Fish and Wildlife Service (Service) is responding to your request, dated February 16, 2021, to verify that the New Hampshire Department of Transportation (NHDOT) Project 42912 (Project), the proposed culvert rehabilitation project in Meredith, New Hampshire, may rely on the revised February 5, 2018, Programmatic Biological Opinion (BO) for federally funded or approved transportation projects that may affect the northern long-eared bat (*Myotis septentrionalis*) (NLEB). We received your request and the associated LAA Consistency Letter on February 16, 2021 via electronic transmission. This letter provides the Service's response as to whether the Federal Highway Administration may rely on the BO to comply with section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; U.S.C. 1531 *et seq.*) for the Project's effects to the NLEB.

The NHDOT, as the non-Federal agency representative for the Federal Transportation Agency, has determined that the Project may affect, and is likely to adversely affect the NLEB. The Project consists of rehabilitating a culvert carrying an unnamed stream under NH Route 104. Approximately 0.16 acre of tree clearing will be required to construct access roads. Tree clearing may be implemented during the bat active season.

NHDOT also determined the Project may rely on the programmatic BO to comply with section 7(a)(2) of the ESA, because the Project meets the conditions outlined in the BO and all tree clearing related to the proposed work will occur farther than 0.25 mile from documented roosts and farther than 0.5 mile from any known hibernacula. The Service reviewed the LAA Consistency Letter and concurs with NHDOT's determination. This concurrence concludes your ESA section 7 responsibilities relative to this species for this Project, subject to the Reinitiation Notice below.

Conclusion

The Service has reviewed the effects of the proposed Project, which include the NHDOT's commitment to implement the impact avoidance, minimization, and compensation measures as indicated on the LAA Consistency Letter. We confirm that the proposed Project's effects are consistent with those analyzed in the BO. The Service has determined that the Project is consistent with the BO's conservation measures, and the scope of the program analyzed in the BO is not likely to jeopardize the continued existence of the NLEB. In coordination with your agency, the Federal Highway Administration, and the other sponsoring Federal Transportation Agencies, the Service will reevaluate this conclusion annually in light of any new pertinent information under the adaptive management provisions of the BO.

Incidental Take of the Northern Long-eared Bat

The Service anticipates that tree removal associated with the proposed Project will cause incidental take of the NLEB. However, the Project is consistent with the BO, and such projects will not cause take of NLEBs that is prohibited under the final 4(d) rule for this species (50 CFR §17.40(o)). Therefore, this taking does not require exemption from the Service.

Reporting Dead or Injured Bats

The NHDOT, the Federal Highway Administration, its State/local cooperators, and any contractors must take care when handling dead or injured NLEBs that are found at the project site, in order to preserve biological material in the best possible condition and to protect the handler from exposure to diseases, such as rabies. Project personnel are responsible for ensuring that any evidence about determining the cause of death or injury is not unnecessarily disturbed. Reporting the discovery of dead or injured listed species is required in all cases to enable the Service to determine whether the level of incidental take exempted by this BO is exceeded, and to ensure that the terms and conditions are appropriate and effective. Parties finding a dead, injured, or sick specimen of any endangered or threatened species must promptly notify the Service's New England Field Office.

Reinitiation Notice

This letter concludes consultation for the proposed Project, which qualifies for inclusion in the BO issued to the Federal Transportation Agencies. To maintain this inclusion, a reinitiation of this project-level consultation is required where the Federal Highway Administration's discretionary involvement or control over the Project has been retained (or is authorized by law) and if:

1. new information reveals that the Project may affect listed species or critical habitat in a manner or to an extent not considered in the BO;
2. the Project is subsequently modified in a manner that causes an effect to listed species or designated critical habitat not considered in the BO; or
3. a new species is listed or critical habitat designated that the Project may affect.

In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease, pending reinitiation.

We appreciate your continued efforts to ensure that this Project is fully consistent with all applicable provisions of the BO. If you have any questions regarding our response, or if you need additional information, please contact Susi von Oettingen of this office at 603-227-6418.

Sincerely,

DAVID SIMMONS

Digitally signed by DAVID SIMMONS
Date: 2021.02.26 12:47:41 -05'00'

David Simmons
Acting Field Supervisor
New England Field Office

cc: Reading file
Melilotus Dube/NHDOT, via email
ES: SvonOettingen:jd:2-25-21:603-227-6418

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

January 4, 2021

To Whom It May Concern:

This project was reviewed for the presence of federally listed or proposed, threatened or endangered species or critical habitat per instructions provided on the U.S. Fish and Wildlife Service's New England Field Office website:

https://www.fws.gov/newengland/endangeredspecies/index.html (accessed January 2021)

Based on information currently available to us, no federally listed or proposed, threatened or endangered species or critical habitat under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the project area(s). Preparation of a Biological Assessment or further consultation with us under section 7 of the Endangered Species Act is not required. No further Endangered Species Act coordination is necessary for a period of one year from the date of this letter, unless additional information on listed or proposed species becomes available.

Thank you for your cooperation. Please contact us at 603-223-2541 or www.fws.gov/newengland if we can be of further assistance.

Sincerely,

DAVID SIMMONS

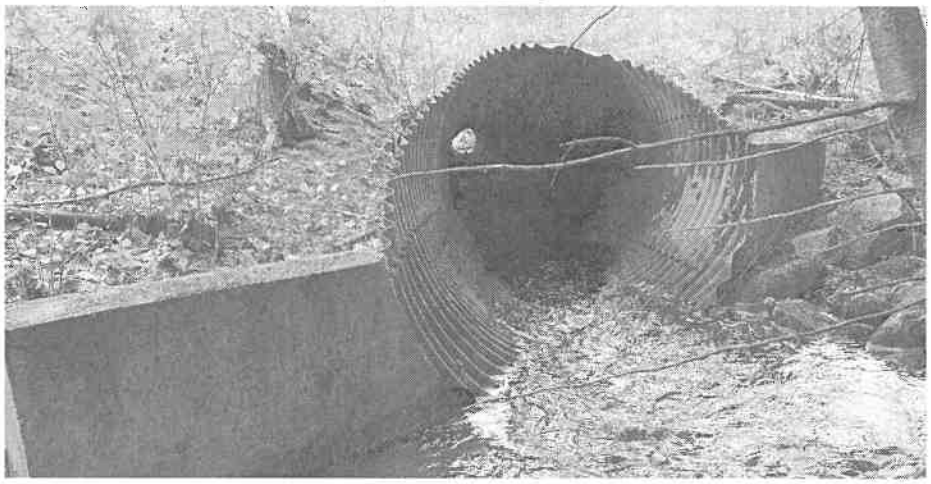
Digitally signed by DAVID SIMMONS
Date: 2021.01.25 16:36:49 -05'00'

David Simmons
Acting Field Supervisor
New England Field Office

New Hampshire Recordation of Bridges that Apply to the Program Comment for Common Post-1945 Concrete & Steel Bridges

Project Name:	Meredith		
State Number:	42912	**FHWA Number:**	X-A004(991)
Form Completed by:	Meli Dube	**Date:**	August 10, 2020
Email if not NHDOT staff:	Click here to enter text.		

Insert Picture



Town	Meredith	**NHDOT Bridge No.**	N/A
Year Built (rebuilt)	1962	**Owner**	NHDOT
Road carrying	NH Route 104	**Over feature**	Unnamed Tier 3 Stream
Bridge/culvert Type	Corrugated Metal Pipe	**Number of Spans**	N/A
Length	178'	**Width**	90"
Abutment style	Concrete Headwall	**Pier style**	N/A
Rail Type	N/A	**Rail installation date:**	N/A
Designer/Engineer (if known)	Unknown	**Bridge Plaques or Engravings?**	None

Reviewed by: Jill Edelmann — NHDOT Cultural Resources Staff

Date Reviewed: 8/11/2020

Approved ☒ Not Approved ☐ Justification:

RPR Number: _____ Reviewed under PA: _____

Created March 27, 2014 Updated September 15, 2014

Please refer to the *NHDOT Guidance on Using the Program Comment for Common Post-1945 Concrete and Steel Bridges*, located on the NHDOT Bureau of Environment Website, for information on using this form: http://www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/cultural.htm

Information on specific bridges can be found on the NHDOT Bureau of Bridge Design **Bridge Summary** Spreadsheet: http://www.nh.gov/dot/org/projectdevelopment/bridgedesign/documents.htm.

(Additional photographs may be attached here if needed).

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Activities with Minimal Potential to Cause Effects

Date Reviewed: (Desktop or Field Review Date)	8/10/2020		
Project Name:	Meredith		
State Number:	42912	**FHWA Number:**	X-A004(991)
Environmental Contact:	Meli Dube	**DOT**	
Email Address:	Melilotus.Dube@dot.nh.gov	**Project Manager:**	Kirk Mudgett

Project Description: The proposed project will address safety concerns at the crossing of NH Route 104 over an unnamed stream in the Town of Meredith approximately 150' south of Corliss Hill Road. The existing crossing is a 90" diameter 178' long corrugated metal pipe in poor condition causing sinkholes in the roadway embankments. The work will involve either replacement or rehabilitation of the existing crossing.

Please select the applicable activity/activities:

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

Appendix B Certification – Activities with Minimal Potential to Cause Effects

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

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

The culvert proposed for repairs is included in the NH Recordation of Bridges that Apply to the Program Comment for Post-1945 Concrete and Steel Bridges and is therefore exempt from Section 106 review. Repair or replacement of non-historic bridges and culverts is allowed under Appendix B Activity 7. If the current culvert is slip-lined or repaired, no additional consultation with NHDOT CR staff is required. If replacement is determined necessary, the impacts will need to be reviewed for potential archaeological concerns.

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

Coordination Efforts:

Has an RPR been submitted to NHDOT for this project?	No	NHDHR R&C # assigned?	Click here to enter text.
Please identify public outreach effort contacts; method of outreach and date:	Initial contact letters were sent to the Town Officials, including the Historical Society, on April 29th, 2020 however no response has been received to date.		

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

☒	**No Potential to Cause Effects**	☐	**No Historic Properties Affected**
This finding serves as the Section 106 Memorandum of Effect. No further coordination is necessary.			
☐	**This project does *not* comply with Appendix B. Review will continue under Stipulation VII of the Programmatic Agreement. Please contact NHDOT Cultural Resources Staff to determine next steps.**		
	NHDOT comments:		

Jill Edelmann — NHDOT Cultural Resources Staff

8/11/2020 — Date

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

Section 106 Programmatic Agreement – Cultural Resources Review Effect Finding

Appendix B Certification – Activities with Minimal Potential to Cause Effects

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

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

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

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

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

US Army Corps
of Engineers ®
New England District

Appendix B

Regional General Permits (GPs)
Required Information and Corps Secondary Impacts Checklist

In order for the Corps of Engineers to properly evaluate your application, applicants must submit the following information along with the New Hampshire DES Wetlands Bureau application or permit notification forms. Some projects may require more information. For a more comprehensive checklist, go to www.nae.usace.army.mil/regulatory, "Forms/Publications" and then "Application and Plan Guideline Checklist." Check with the Corps at (978) 318-8832 for project-specific requirements. For your convenience, this Appendix B is also attached to the State of New Hampshire DES Wetlands Bureau application and Permit by Notification forms.

All Projects:

- Corps application form (ENG Form 4345) as appropriate.
- Photographs of wetland/waterway to be impacted.
- Purpose of the project.
- Legible, reproducible black and white (no color) plans no larger than 11"x17" with bar scale. Provide locus map and plan views of the entire property.
- Typical cross-section views of all wetland and waterway fill areas and wetland replication areas.
- In navigable waters, show mean low water (MLW) and mean high water (MHW) elevations. Show the high tide line (HTL) elevations when fill is involved. In other waters, show ordinary high water (OHW) elevation.
- On each plan, show the following for the project:
- Vertical datum and the NAVD 1988 equivalent with the vertical units as U.S. feet. Don't use local datum. In coastal waters this may be mean higher high water (MHHW), mean high water (MHW), mean low water (MLW), mean lower low water (MLLW) or other tidal datum with the vertical units as U.S. feet. MLLW and MHHW are preferred. Provide the correction factor detailing how the vertical datum (e.g., MLLW) was derived using the latest National Tidal Datum Epoch for that area, typically 1983-2001.
- Horizontal state plane coordinates in U.S. survey feet based on the Traverse Mercator Grid system for the State of New Hampshire (Zone 2800) NAD 83.
- Show project limits with existing and proposed conditions.
- Limits of any Federal Navigation Project in the vicinity of the project area and horizontal State Plane Coordinates in U.S. survey feet for the limits of the proposed work closest to the Federal Navigation Project;
- Volume, type, and source of fill material to be discharged into waters and wetlands, including the area(s) (in square feet or acres) of fill in wetlands, below the ordinary high water in inland waters and below the high tide line in coastal waters.
- Delineation of all waterways and wetlands on the project site,:
- Use Federal delineation methods and include Corps wetland delineation data sheets. See GC 2 and www.nero.noaa.gov/hcd for eelgrass survey guidance.
- GP 3, Moorings, contains eelgrass survey requirements for the placement of moorings.
- For activities involving discharges of dredged or fill material into waters of the U.S., include a statement describing how impacts to waters of the U.S. are to be avoided and minimized, and either a statement describing how impacts to waters of the U.S. are to be compensated for (or a conceptual or detailed mitigation plan) or a statement explaining why compensatory mitigation should not be required for the proposed impacts. Please contact the Corps for guidance.

US Army Corps of Engineers®
New England District

New Hampshire General Permits (GPs)
Appendix B - Corps Secondary Impacts Checklist
(for inland wetland/waterway fill projects in New Hampshire)

1. Attach any explanations to this checklist. Lack of information could delay a Corps 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 5, regarding single and complete projects.
4. Contact the Corps at (978) 318-8832 with any questions.

1. Impaired Waters	Yes	No
1.1 Will any work occur within 1 mile upstream in the watershed of an impaired water? See http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm to determine if there is an impaired water in the vicinity of your work area.*		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 SAS, special wetlands. 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://www2.des.state.nh.us/nhb_datacheck/. The book Natural Community Systems of New Hampshire also contains specific information about the natural communities found in NH.		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?	0.085 acres	
2.7 What is the area of the proposed fill in wetlands?	None	
2.8 What is the % of previously and proposed fill in wetlands to the overall project site?	2.5%	
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://www2.des.state.nh.us/nhb_datacheck/ USFWS IPAC website: https://ecos.fws.gov/ipac/location/index		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: www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/highest_ranking_habitat.htm. • 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 21?	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 Request for Project Review (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 11 GC 8(d) of the GP document**	X	

*Although this checklist utilizes state information, its submittal to the Corps is a Federal requirement.
** If your project is not within Federal jurisdiction, coordination with NH DHR is not required under Federal law.

Supplemental Information:

2.5 - Site area is calculated based on the area within the existing NHDOT ROW and proposed easements within the project's roadway limits. Site area is 3.4 acres.

2.6 - The actual area of previously filled wetlands is unknown. Based on the width of the existing stream channel and NH104 roadway embankments the previously fill area is estimated at 0.085 acres.

4.2 - The existing 100 year floodplain is a Zone A (no elevations). No fill is proposed within the limits of the floodplain shown on the FIRM map.

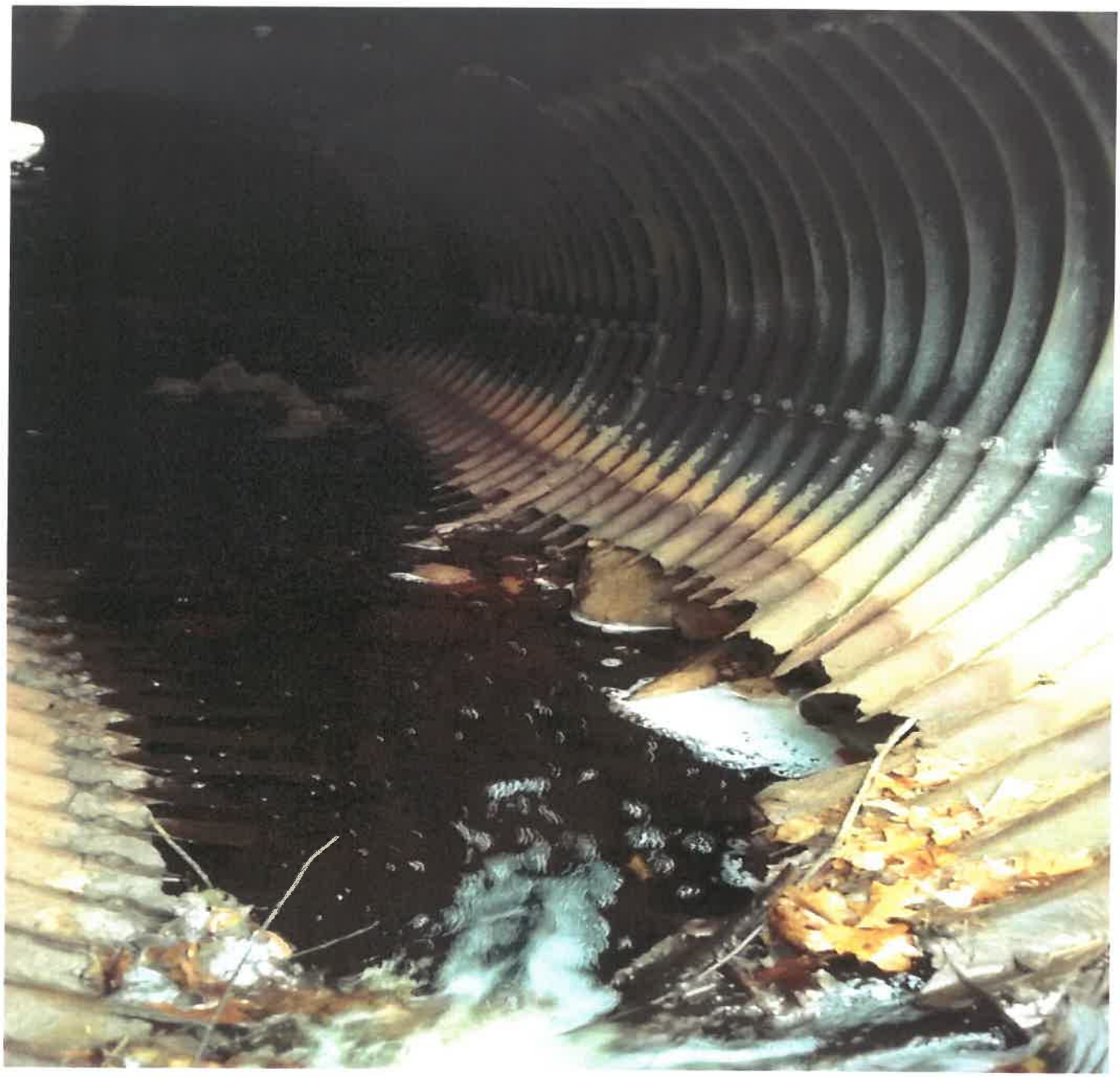
5. The Section 106 Programmatic Agreement Appendix B was used to determine that this project has no potential to cause effects to historic resources, this document is reviewed by NHDOT Bureau of Environment Cultural Resource Program and is n sent to DHR per the terms of the PA.

By NHDOT Highway Design 4/7/2020

Culvert inlet
Wetland #1 (R2UB12) Impact Area A

By NHDOT Highway Design 4/7/2020

Culvert inlet, looking upstream
Wetland #1 (R2UB12), Wetlands 2 & 3 (Banks) Impact Areas A, B, C



By NHDOT Highway Design 11/13/2020

Culvert inlet side, looking downstream, showing missing / detached invert

By NHDOT Highway Design 4/7/2020

Culvert Outlet
Wetland #5 (R2UB12), #6 & #7 (Banks) Impact Areas E, F, G

By NHDOT Highway Design 4/7/2020

Stream, just downstream of outlet
Wetland #5 (R2UB12), #6 & #7 (Banks) No impacts in this photo

By NHDOT Highway Design 4/7/2020

By NHDOT Bureau of Environment 5/18/2020

Access to inlet, looking southwest toward NH104
Wetland #4 (PFO1E), Impact Area D

By NHDOT Highway Design 4/7/2020

Access to inlet, looking northeast toward culvert inlet
Wetland #4 (PFO1E), Impact Area D

By NHDOT Bureau of Environment 5/18/2020

Forested Wetland and where forested wetland ditch originates from; no impacts to area within this photo

By NHDOT Highway Design 4/7/2020

By NHDOT Bureau of Environment 5/18/2020

Access to outlet from Corliss Hill Rd, 24" rcp oulet
Wetland #9 (PEM1E) Impact area I

By NHDOT Highway Design 4/7/2020

By NHDOT Bureau of Environment 5/18/2020

Access to outlet, looking northeast toward Corliss Hill Rd
Wetland #8 (R4SB) Impact area H

Meredith 42912

CONSTRUCTION SEQUENCE

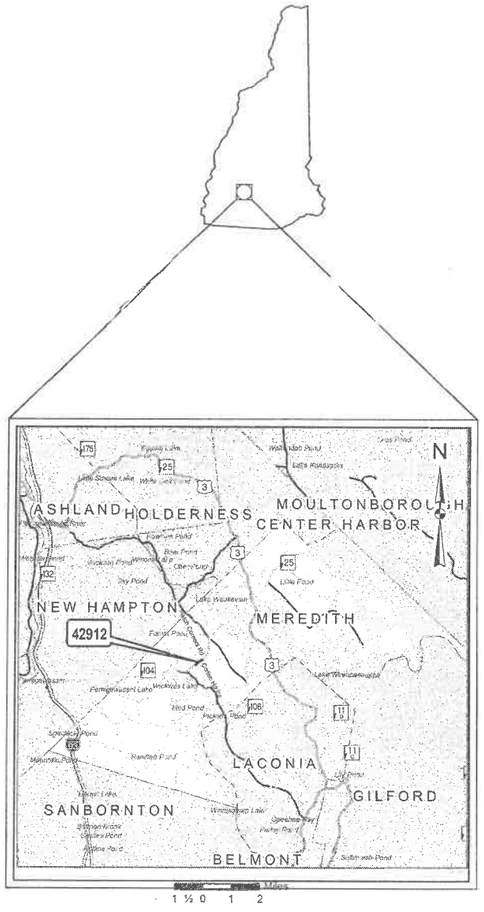
1. Perform any necessary clearing operations for access and staging.
2. Install perimeter sediment controls and install necessary temporary erosion controls as specified on the strategies sheet. Include all staging areas. Set up dewatering basin.
3. Place temporary protection such as mats or stone over geotextile where access roads cross wetlands.
4. At outlet side access, maintain drainage from 24" pipe crossing under Corliss Hill Rd. Temporary extension of the 24" pipe may be required. Drainage may be maintained in a ditch section or temporary pipe along the edge of the access road.
5. Install water diversion at inlet and other sedimentation controls/BMP's as needed
6. Clean water bypass shall be through the existing pipe, unless otherwise approved as part of the Contractor's SWPPP.
7. Clean and inspect existing pipe.
8. Install tunnel liner, removing severely deteriorated, detached, or obstructing portions of the existing pipe as needed as liner installation progresses. Installation may begin at the inlet or outlet as proposed by the Contractor and approved by the Engineer. Extend liner through the existing headwall to match the existing 90" culvert inlet location.
9. Repair cracks and spalls in existing concrete inlet headwall.
10. Seal annular space between inside of existing culvert and outside of liner.
11. Fill annular space with grout.
12. Remove water diversion, and re-establish flow through the culvert.
13. Fill sinkholes on roadway embankment slopes.
14. Place humus, seed, mulch, and temporary slope matting on the embankment slopes.
15. Remove temporary access roads.
16. Stabilize disturbed areas with seed, mulch, and temporary slope matting (where steeper than 4:1). Use wetland seed mix to restore jurisdictional wetland areas.
17. Remove erosion and sediment controls.

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

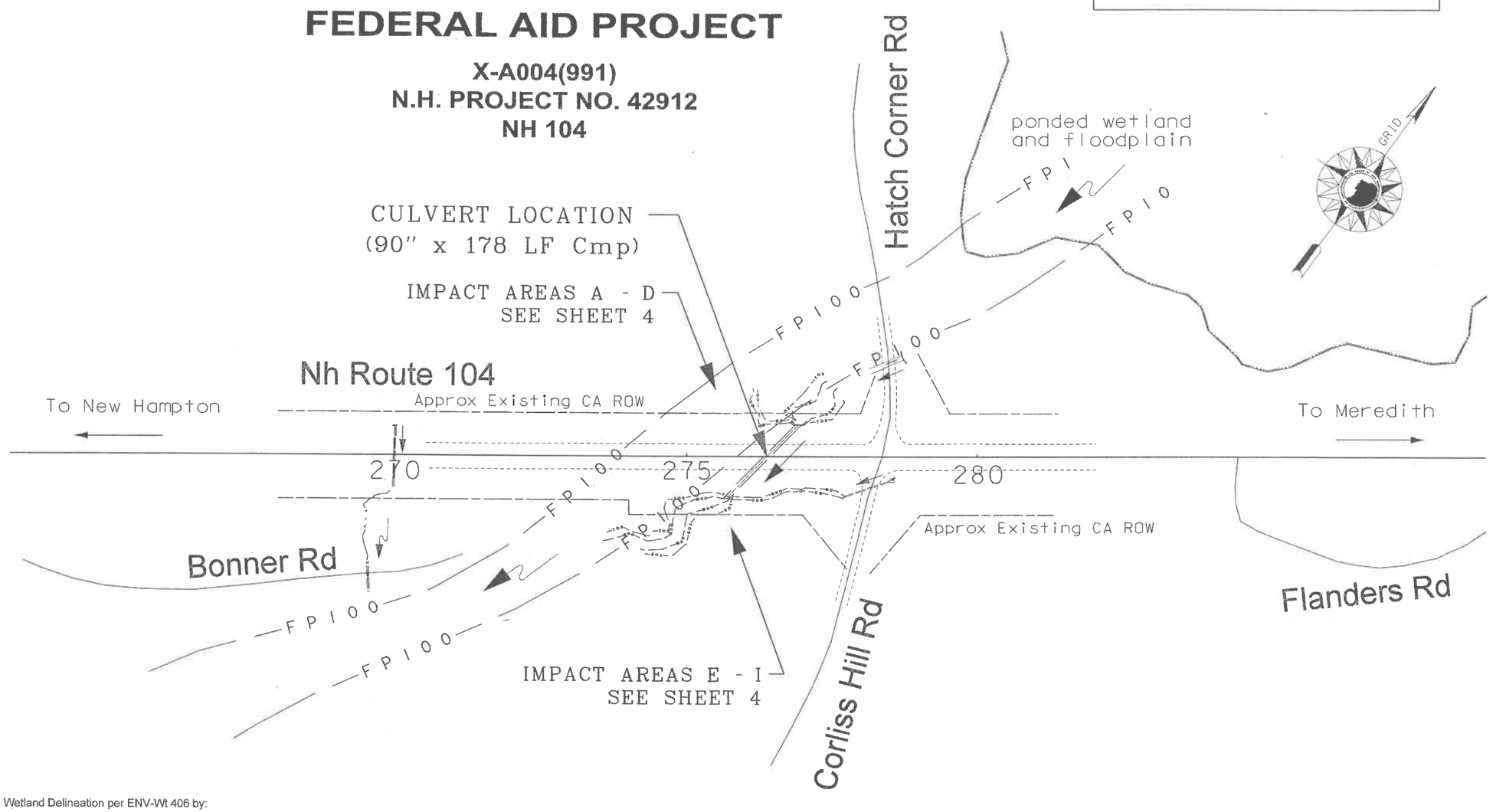
WETLANDS PLANS
FEDERAL AID PROJECT

X-A004(991)
N.H. PROJECT NO. 42912
NH 104

DESIGN DATA	
AVERAGE DAILY TRAFFIC 20 19	12,638
AVERAGE DAILY TRAFFIC 20 XX	N/A
PERCENT OF TRUCKS	8.4% (2014)
DESIGN SPEED	N/A
LENGTH OF PROJECT	600'



LOCATION MAP



INDEX OF SHEETS

Wetland Delineation per ENV-Wt 406 by:
NHDOT (Sarah Large, Andrew O'Sullivan) 5/5/2020

Per Wetland Plans Rule(s)
Env-Wt 311.05

STATE OF NEW HAMPSHIRE
JAMES A. MARSHALL
No. 8232
LICENSED
PROFESSIONAL ENGINEER
3/24/21

Plans Prepared by:
Christopher Carucci, PE

DATE 3/22/2021

TOWN OF MEREDITH
COUNTY OF BELKNAP
SCALE: 1" = 100'

FOR CONSTRUCTION AND ALIGNMENT DETAILS - SEE CONSTRUCTION PLANS

DRAWN BY	CAC	DATE 1/2021
CHECKED BY	JJN	DATE 2/2021

NHDOT THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

NH Route 104
Culvert Rehabilitation
Wetland Impact and
Erosion Control Plans

FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
X-A004(991)	42912	1	7

GENERAL

EDGE OF PAVEMENT
TRAVELED WAY
PROPOSED ROADWAY
existing roadway
(pavement removed outside slope lines)

DRIVEWAYS
(label surface type)

BUILDINGS
(building to be removed)
(label house or type of building)

FOUNDATION
(label type)

LEACH FIELD
leach field

BRIDGE CROSSINGS
STREAM
OVERPASS

STEPS AND WALK
(label type)

INTERMITTENT WATER COURSE

SHORE LINE
river/stream
pond
(label name of water body)

POTENTIAL WET AREA SYMBOL

BRUSH OR WOODS LINE

TREES (PLANS)
(deciduous) (coniferous) (stump)

TREE OR STUMP (CROSS-SECTIONS)
(show station, circumference in feet & type)

HEDGE
(label type)

MONITORING WELL
mon

WELL

FLAG POLE
fp

ORIGINAL GROUND (TYPICALS)

ROCK OUTCROP

ROCK LINE (TYPICALS & SECTIONS ONLY)

GUARDRAIL (label type)
existing
PROPOSED
bgr
cgr

JERSEY BARRIER

CURB (LABEL TYPE)

STONE WALL

RETAINING WALL (LABEL TYPE)
(points toward retained ground)

FENCE (LABEL TYPE)

SIGNS
(single post)
(double post)

GAS PUMP
gp

FUEL TANK (ABOVE GROUND)
ft (label size & type)

STORAGE TANK FILLER CAP
fc

SEPTIC TANK
S

GRAVE
gr

MAILBOX
mb

VENT PIPE
vp

SATELLITE DISH ANTENNA
da

PHONE
ph

GROUND LIGHT/LAMP POST
gl lp

BORING LOCATION
B

TEST PIT
TP

INTERSTATE NUMBERED HIGHWAY
293

UNITED STATES NUMBERED HIGHWAY
3

STATE NUMBERED HIGHWAY
102

SHORELAND - WETLAND

WETLAND DESIGNATION AND TYPE
2
PUB2E

DELINEATED WETLAND — DW —
ORDINARY HIGH WATER — OHW —
TOP OF BANK — TOB —
TOP OF BANK & ORDINARY HIGH WATER — TOBOHW —
NORMAL HIGH WATER — NHW —
WIDTH AT BANK FULL — WBF —
PRIME WETLAND — PWET —
PRIME WETLAND 100' BUFFER — PWET100 —
NON-JURISDICTIONAL DRAINAGE AREA — NJDA —
COWARDIN DISTINCTION LINE — CDL —
TIDAL BUFFER ZONE — TBZ —
DEVELOPED TIDAL BUFFER ZONE — DTBZ —
HIGHEST OBSERVABLE TIDE LINE — HOTL —
MEAN HIGH WATER — MHW —
MEAN LOW WATER — MLW —
VERNAL POOL — VP —
SPECIAL AQUATIC SITE — SAS —
REFERENCE LINE — REF —
WATER FRONT BUFFER — WB50 —
NATURAL WOODLAND BUFFER — NWB150 —
PROTECTED SHORELAND — PS250 —
INVASIVE SPECIES LABEL
I.S. 1
I.S. 11
INVASIVE SPECIES — INV —

FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY — FP500 —
100 YEAR FLOODPLAIN BOUNDARY — FP100 —
FLOODWAY — FW —

ENGINEERING

CONSTRUCTION BASELINE
30 31 32

PC, PT, POT (ON CONST BASELINE)

PI (IN CONSTRUCTION BASELINES)

INTERSECTION OR EQUATION OF TWO LINES

ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)

PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)

SLOPE LINE
CLEARING LINE

CLEARING LINE

SLOPE LINE

SLOPE LINE (FILL)

SLOPE LINE (CUT)

PROFILES AND CROSS SECTIONS:
ORIGINAL GROUND ELEVATION (LEFT) 72.5
FINISHED GRADE ELEVATION (RIGHT) 79.14

STATE OF NEW HAMPSHIRE
MEREDITH
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	42912 stdsymb1-2	42912	2	7

DRAINAGE

MANHOLE

CATCH BASIN — cb — (existing) — (PROPOSED)

DROP INLET — di

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

DRAINAGE PIPE (PROPOSED)

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

UNDERDRAIN (PROPOSED) W/ FLUSHING BASIN

show direction of flow

HEADER (existing & PROPOSED) — (with stone outlet protection)

END SECTION (existing & PROPOSED) — METAL or PLASTIC — RCP

OPEN DITCH (PROPOSED)

EROSION CONTROL/ STONE SLOPE PROTECTION

BOUNDARIES / RIGHT-OF-WAY

RIGHT-OF-WAY LINE — (label type)

RR RIGHT-OF-WAY LINE

PROPERTY LINE — P

PROPERTY LINE (COMMON OWNER) — Z

TOWN LINE — BOW / CONCORD

COUNTY LINE — COOS / GRAFTON

STATE LINE — MAINE / NEW HAMPSHIRE

NATIONAL FOREST

CONSERVATION LAND — LC

BENCH MARK / SURVEY DISK

BOUND — bnd — (PROPOSED)

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

NHDOT PROJECT MARKER

IRON PIPE OR PIN — ip

DRILL HOLE IN ROCK — dh

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

PROPERTY PARCEL NUMBER — 12

HISTORIC PROPERTY — H

UTILITIES

TELEPHONE POLE

POWER POLE

JOINT OCCUPANCY

MISCELLANEOUS/UNKNOWN POLE

GUY POLE OR PUSH BRACE

LIGHT POLE

LIGHT ON POWER POLE

LIGHT ON JOINT POLE

existing — PROPOSED — (plot point at face not center of symbol)

POLE STATUS: REMOVE, LEAVE, PROPOSED, OR TEMPORARY AS APPLICABLE e.g.: R, L, P+04 25.0', T+04 25.0'

RAILROAD — (label ownership)

RAILROAD SIGN

RAILROAD SIGNAL

UTILITY JUNCTION BOX — jb — JB

OVERHEAD WIRE — OW — (label type)

UNDERGROUND UTILITIES

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

SEWER — S — PS

TELEPHONE — T — PT

ELECTRIC — E — PE

GAS — G — PG

LIGHTING — L — PL

INTELLIGENT TRANSPORTATION SYSTEM — ITS — PITS

FIBER OPTIC — FO — PFO

WATER SHUT OFF — WSO

GAS SHUT OFF — GSO

HYDRANT — HYD

MANHOLES

SEWER — MHS

TELEPHONE — MHT

ELECTRICAL — MHE

GAS — MHG

UNKNOWN — U

TRAFFIC SIGNALS / ITS

	existing	PROPOSED
MAST ARM (existing)		30' MA (NOTE ANGLE FROM ℄)
OPTICOM RECEIVER		
OPTICOM STROBE		
TRAFFIC SIGNAL		
PEDESTAL WITH PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON UNIT		
SIGNAL CONDUIT	C	PC
CONTROLLER CABINET	cc	CC
METER PEDESTAL	mp	MP
PULL BOX	pb	PB
LOOP DETECTOR (QUADRUPOLE)		(label size)
LOOP DETECTOR (RECTANGULAR)		(label size)
CAMERA POLE (CCTV)		
FIBER OPTIC DELINEATOR	fod	FOD
FIBER OPTIC SPLICE VAULT		SVF
ITS EQUIPMENT CABINET	its	ITS
VARIABLE SPEED LIMIT SIGN		
DYNAMIC MESSAGE SIGN		
ROAD AND WEATHER INFO SYSTEM		

CONSTRUCTION NOTES

CURB MARK NUMBER - BITUMINOUS	B-1
CURB MARK NUMBER - GRANITE	C-1
CLEARING AND GRUBBING AREA	A
DRAINAGE NOTE	1
EROSION CONTROL NOTE	A
FENCING NOTE	A
GUARDRAIL NOTE	1
ITS NOTE	1
LIGHTING NOTE	A
TRAFFIC SIGNAL NOTE	1

STATE OF NEW HAMPSHIRE
MEREDITH
DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
9-1-2016	42912 stdsymb1-2	42912	3	7

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING
NEW HAMPSHIRE WETLANDS BUREAU (PERMANENT NON-WETLAND)	
NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)	
TEMPORARY IMPACTS	

- # — WETLAND DESIGNATION NUMBER
- # — WETLAND IMPACT LOCATION
- # — WETLAND MITIGATION AREA
- MITIGATION

WETLAND CLASSIFICATION CODES	
PEM1E	PALUSTRINE. EMERGENT. PERSISTENT. SEASONALLY FLOODED/SATURATED
PFO1E	PALUSTRINE. FORESTED.BROAD-LEAVED DECIDUOUS.SEASONALLY FLOODED/SATURATED
R2UB12	RIVERINE. LOWER PERENNIAL. UNCONSOLIDATED BOTTOM. COBBLE GRAVEL / SAND
R4SB	RIVERINE. INTERMITTENT. STREAMBED
BANK	BANK

WETLAND IMPACT SUMMARY

WETLAND NUMBER	WETLAND CLASS-IFICATION	LOCATION	AREA IMPACTS						LINEAR STREAM IMPACTS FOR MITIGATION		
			PERMANENT				TEMPORARY		PERMANENT		
			N.H.W.B. (NON-WETLAND)		N.H.W.B. & A.C.O.E. (WETLAND)				BANK LEFT	BANK RIGHT	CHANNEL
			SF	LF	SF	LF	SF	LF	LF	LF	LF
1	R2UB12	A					1316	58			
2	BANK	B					396	55			
3	BANK	C					130	25			
4	PFO1E	D					428	-			
5	R2UB12	E					383	30			
6	BANK	F					182	27			
7	BANK	G					496	41			
8	R4SB	H					657	125			
9	PEM1E	I					523	-			
		TOTAL	0	0	0	0	4511	361	0	0	0

PERMANENT IMPACTS: 0 SF
TEMPORARY IMPACTS: 4,511 SF
TOTAL IMPACTS: 4,511 SF

(1) ALMSTROM FAMILY REVOCABLE TRUST OF 2019
SLOPE AND DRAINAGE EASEMENT RESERVED IN RETURN OF LAYOUT FOR PROJECT S4212 RECORDED IN BOOK 421 PAGE 483

PROPOSED WORK WILL BE WITHIN EASEMENT RIGHTS GRANTED BY THE 1962 RETURN OF LAYOUT

FEMA Zone A (No Elevations)

POTENTIAL LRS STOCKPILE AREA

NH Route 104

Hatch Corner Rd

Corliss Hill Rd

Power Sub-Station

ponded area

beaver dam

CLEARING LINE

INLET ACCESS

OUTLET ACCESS

APPROX LIMITS OF WORK (TYP.)

Approx Existing CA ROW

approx location abandoned buried cable line

wood sign "Sno-Streakers Amer-Can Legion Post"

NH 104 STA 276+39
REHABILITATE EXISTING 90" X 178' LONG CORRUGATED METAL CULVERT:
CONSTRUCT 178 LF X 76" (NOMINAL) CORRUG. METAL LINER INSIDE 90" CMP.
REPAIR MINOR SPALLS AND CRACKS IN INLET HEADWALL.
REPAIR SINKHOLES ON INLET AND OUTLET SIDE ROADWAY EMBANKMENTS.
CONSTRUCT AND REMOVE TEMPORARY ACCESS ROADS TO INLET AND OUTLET.
RESTORE DISTURBED AREAS TO EXISTING CONDITIONS. USE WETLAND SEED MIX TO RESTORE JURISDICTIONAL WETLAND AREAS.
NO PERMANENT CHANGE TO TOPOGRAPHY. NO PROPOSED CONTOURS.

SEE PROFILE FOR CULVERT SLOPE AND INVERTS

CONTOUR INTERVAL 2'

50 0 50 100
SCALE IN FEET

REVISIONS AFTER PROPOSAL

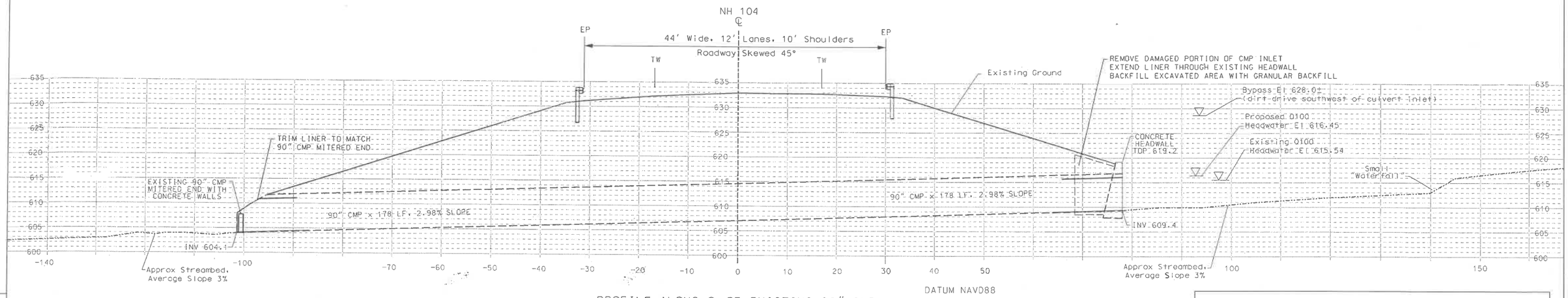
NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED	SEL	DATE 10/20
NEW DESIGN	JJN	DATE 11/20
SHEET CHECKED	CAC	DATE 2/2021
AS BUILT DETAILS		DATE

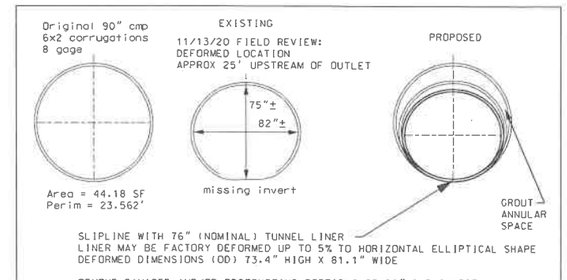
STATE OF NEW HAMPSHIRE
MEREDITH
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
42912wetplans	42912	4	7

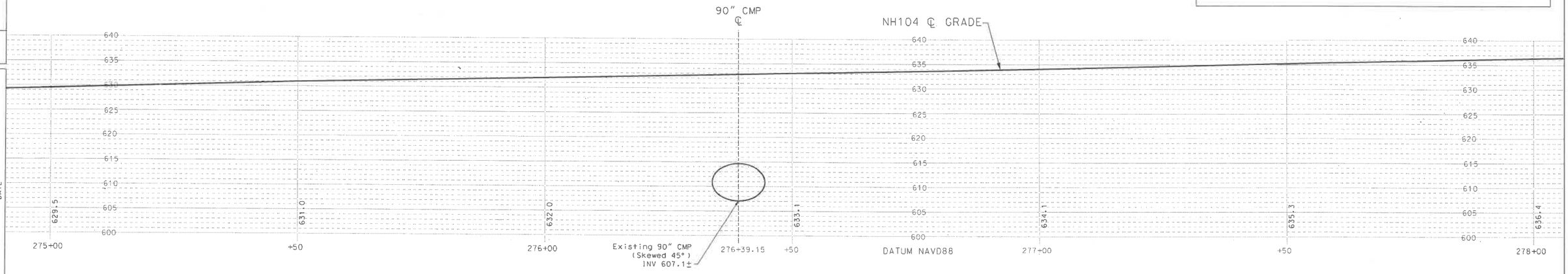


PROFILE ALONG ℄ OF EXISTING 90" CMP



SLIPLINE DETAIL

SCALE 1" = 5'



PROFILE NH ROUTE 104

10 0 10 20

SCALE IN FEET

REVISIONS AFTER PROPOSAL

STATION	DESCRIPTION	STATION	DATE	NUMBER

SDR PROCESSED	DATE
NEW DESIGN	CAC DATE 1/2021
SHEET CHECKED	JJN DATE 2/2021
AS BUILT DETAILS	DATE

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

PROFILES & DETAILS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
42912 Profile_pipe	42912	5	7

EROSION CONTROL STRATEGIES

1. ENVIRONMENTAL COMMITMENTS:
   1.1. THESE GUIDELINES DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH ANY CONTRACT PROVISIONS, OR APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
   1.2. THIS PROJECT WILL BE SUBJECT TO THE US EPA'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT AS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROJECT IS SUBJECT TO REQUIREMENTS IN THE MOST RECENT CONSTRUCTION GENERAL PERMIT (CGP).
   1.3. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE NHDES WETLAND PERMIT, THE US ARMY CORPS OF ENGINEERS PERMIT, WATER QUALITY CERTIFICATION AND THE SPECIAL ATTENTION ITEMS INCLUDED IN THE CONTRACT DOCUMENTS.
   1.4. ALL STORM WATER, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2008) (BMP MANUAL) AVAILABLE FROM THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NHDES).
   1.5. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17, AND ALL, PUBLISHED NHDES ALTERATION OF TERRAIN ENV-WQ 1500 REQUIREMENTS (HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM)
   1.6. THE CONTRACTOR IS DIRECTED TO REVIEW AND COMPLY WITH SECTION 107.1 OF THE CONTRACT AS IT REFERS TO SPILLAGE, AND ALSO WITH REGARDS TO EROSION, POLLUTION, AND TURBIDITY PRECAUTIONS.

2. STANDARD EROSION CONTROL SEQUENCING APPLICABLE TO ALL CONSTRUCTION PROJECTS:
   2.1. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. PERIMETER CONTROLS AND STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AS SHOWN IN THE BMP MANUAL AND AS DIRECTED BY THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARER.
   2.2. EROSION, SEDIMENTATION CONTROL MEASURES AND INFILTRATION BASINS SHALL BE CLEANED, REPLACED AND AUGMENTED AS NECESSARY TO PREVENT SEDIMENTATION BEYOND PROJECT LIMITS THROUGHOUT THE PROJECT DURATION.
   2.3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 645 OF THE NHDOT SPECIFICATIONS FOR ROAD AND BRIDGES CONSTRUCTION.
   2.4. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
      (A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
      (B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
      (C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED;
      (D) [illegible] SLOPE STABILIZATION CONFORMING TO TABLE 1 HAS BEEN PROPERLY INSTALLED
   2.5. ALL STOCKPILES SHALL BE [illegible] PERIMETER CONTROL. IF THE STOCKPILE IS TO REMAIN UNDISTURBED FOR MORE THAN 14 DAYS, MULCHING WILL BE REQUIRED.
   2.6. A WATER TRUCK SHALL BE AVAILABLE TO CONTROL EXCESSIVE DUST AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR.
   2.7. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN UNTIL THE AREA HAS BEEN PERMANENTLY STABILIZED.
   2.8. CONSTRUCTION PERFORMED ANY TIME BETWEEN NOVEMBER 30" AND MAY 1" OF ANY YEAR SHALL BE CONSIDERED WINTER CONSTRUCTION AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
      (A) ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED IN ACCORDANCE WITH TABLE 1.
      (B) ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.
      (C) AFTER NOVEMBER 30" INCOMPLETE ROAD SURFACES, WHERE WORK HAS STOPPED FOR THE SEASON, SHALL BE PROTECTED IN ACCORDANCE WITH TABLE 1.
      (D) WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE PROJECT IS WITHOUT STABILIZATION AT ONE TIME, UNLESS A WINTER CONSTRUCTION PLAN HAS BEEN APPROVED BY NHDOT THAT MEETS THE REQUIREMENTS OF ENV-WQ 1505.02 AND ENV-WQ 1505.05.
      (E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WQ 1505.05) AND INCLUDING THE REQUIREMENTS OF NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30".

GENERAL CONSTRUCTION PLANNING AND SELECTION OF STRATEGIES TO CONTROL EROSION AND SEDIMENT ON HIGHWAY CONSTRUCTION PROJECTS

3. PLAN ACTIVITIES TO ACCOUNT FOR SENSITIVE SITE CONDITIONS:
   3.1. CLEARLY FLAG AREAS TO BE PROTECTED IN THE FIELD AND PROVIDE CONSTRUCTION BARRIERS TO PREVENT TRAFFICKING OUTSIDE OF WORK AREAS.
   3.2. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS.
   3.3. PROTECT AND MAXIMIZE EXISTING NATIVE VEGETATION AND NATURAL FOREST BUFFERS BETWEEN CONSTRUCTION ACTIVITY AND SENSITIVE AREAS.
   3.4. WHEN WORK IS PERFORMED IN AND NEAR WATER COURSES, STREAM FLOW DIVERSION METHODS SHALL BE IMPLEMENTED PRIOR TO ANY EXCAVATION OR FILLING.
   3.5. WHEN WORK IS PERFORMED WITHIN 50 FEET OF SURFACE WATERS (WETLAND, OPEN WATER OR FLOWING WATER), PERIMETER CONTROL SHALL BE ENHANCED CONSISTENT WITH SECTION 2.1.2.1. OF THE 2012 NPDES CONSTRUCTION GENERAL PERMIT.

4. MINIMIZE THE AMOUNT OF EXPOSED SOIL:
   4.1. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS. MINIMIZE THE AREA OF EXPOSED SOIL AT ANY ONE TIME. PHASING SHALL BE USED TO REDUCE THE AMOUNT AND DURATION OF SOIL EXPOSED TO THE ELEMENTS AND VEHICLE TRACKING.
   4.2. UTILIZE TEMPORARY MULCHING OR PROVIDE ALTERNATE TEMPORARY STABILIZATION ON EXPOSED SOILS IN ACCORDANCE WITH TABLE 1.
   4.3. THE MAXIMUM AMOUNT OF DISTURBED EARTH SHALL NOT EXCEED A TOTAL OF 5 ACRES FROM MAY 1" THROUGH NOVEMBER 30", OR EXCEED ONE ACRE DURING WINTER MONTHS, UNLESS THE CONTRACTOR DEMONSTRATES TO THE DEPARTMENT THAT THE ADDITIONAL AREA OF DISTURBANCE IS NECESSARY TO MEET THE CONTRACTORS CRITICAL PATH METHOD SCHEDULE (CPM), AND THE CONTRACTOR HAS ADEQUATE RESOURCES AVAILABLE TO ENSURE THAT ENVIRONMENTAL COMMITMENTS WILL BE MET.

5. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT:
   5.1. DIVERT OFF SITE RUNOFF OR CLEAN WATER AWAY FROM THE CONSTRUCTION ACTIVITY TO REDUCE THE VOLUME THAT NEEDS TO BE TREATED ON SITE.
   5.2. DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM DISTURBED AREAS, SLOPES, AND AROUND ACTIVE WORK AREAS AND TO A STABILIZED OUTLET LOCATION.
   5.3. CONSTRUCT IMPERMEABLE BARRIERS AS NECESSARY TO COLLECT OR DIVERT CONCENTRATED FLOWS FROM WORK OR DISTURBED AREAS.
   5.4. STABILIZE, TO APPROPRIATE ANTICIPATED VELOCITIES, CONVEYANCE CHANNELS OR PUMPING SYSTEMS NEEDED TO CONVEY CONSTRUCTION STORMWATER TO BASINS AND DISCHARGE LOCATIONS PRIOR TO USE.
   5.5. DIVERT OFF-SITE WATER THROUGH THE PROJECT IN AN APPROPRIATE MANNER SO NOT TO DISTURB THE UPSTREAM OR DOWNSTREAM SOILS, VEGETATION OR HYDROLOGY BEYOND THE PERMITTED AREA.

6. PROTECT SLOPES:
   6.1. INTERCEPT AND DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED AND NEWLY ESTABLISHED AREAS AND SLOPES TO A STABILIZED OUTLET OR CONVEYANCE.
   6.2. CONSIDER HOW GROUNDWATER SEEPAGE ON CUT SLOPES MAY IMPACT SLOPE STABILITY AND INCORPORATE APPROPRIATE MEASURES TO MINIMIZE EROSION.
   6.3. CONVEY STORMWATER DOWN THE SLOPE IN A STABILIZED CHANNEL OR SLOPE DRAIN.
   6.4. THE OUTER FACE OF THE FILL SLOPE SHOULD BE IN A LOOSE RUFFLED CONDITION PRIOR TO TURF ESTABLISHMENT. TOPSOIL OR HUMUS LAYERS SHALL BE TRACKED UP AND DOWN THE SLOPE, DISKED, HARROWED, DRAGGED WITH A CHAIN OR MAT, MACHINE-RAKED, OR HAND-WORKED TO PRODUCE A RUFFLED SURFACE.

7. ESTABLISH STABILIZED CONSTRUCTION EXITS:
   7.1. INSTALL AND MAINTAIN CONSTRUCTION EXITS, ANYWHERE TRAFFIC LEAVES A CONSTRUCTION SITE ONTO A PUBLIC RIGHT-OF-WAY.
   7.2. SWEEP ALL CONSTRUCTION RELATED DEBRIS AND SOIL FROM THE ADJACENT PAVED ROADWAYS AS NECESSARY.

8. PROTECT STORM DRAIN INLETS:
   8.1. DIVERT SEDIMENT LADEN WATER AWAY FROM INLET STRUCTURES TO THE EXTENT POSSIBLE.
   8.2. INSTALL SEDIMENT BARRIERS AND SEDIMENT TRAPS AT INLETS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM.
   8.3. CLEAN CATCH BASINS, DRAINAGE PIPES, AND CULVERTS IF SIGNIFICANT SEDIMENT IS DEPOSITED.
   8.4. DROP INLET SEDIMENT BARRIERS SHOULD NEVER BE USED AS THE PRIMARY MEANS OF SEDIMENT CONTROL AND SHOULD ONLY BE USED TO PROVIDE AN ADDITIONAL LEVEL OF PROTECTION TO STRUCTURES AND DOWN-GRADIENT SENSITIVE RECEPTORS.

9. SOIL STABILIZATION:
   9.1. WITHIN THREE DAYS OF THE LAST ACTIVITY IN AN AREA, ALL EXPOSED SOIL AREAS, WHERE CONSTRUCTION ACTIVITIES ARE COMPLETE, SHALL BE STABILIZED.
   9.2. IN ALL AREAS, TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED IN ACCORDANCE WITH THE STABILIZATION REQUIREMENTS (SECTION 2.2) OF THE 2012 CGP. (SEE TABLE 1 FOR GUIDANCE ON THE SELECTION OF TEMPORARY SOIL STABILIZATION MEASURES.)
   9.3. EROSION CONTROL SEED MIX SHALL BE SOWN IN ALL INACTIVE CONSTRUCTION AREAS THAT WILL NOT BE PERMANENTLY SEEDED WITHIN TWO WEEKS OF DISTURBANCE AND PRIOR TO SEPTEMBER 15, OF ANY GIVEN YEAR. IN ORDER TO ACHIEVE VEGETATIVE STABILIZATION PRIOR TO THE END OF THE GROWING SEASON.
   9.4. SOIL TACKIFIERS MAY BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND REAPPLIED AS NECESSARY TO MINIMIZE SOIL AND MULCH LOSS UNTIL PERMANENT VEGETATION IS ESTABLISHED.

10. RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES:
   10.1. TEMPORARY SEDIMENT BASINS (CGP-SECTION 2.1.3.2) OR SEDIMENT TRAPS (ENV-WQ 1506.10) SHALL BE SIZED TO RETAIN, ON SITE, THE VOLUME OF A 2-YEAR 24-HOUR STORM EVENT FOR ANY AREA OF DISTURBANCE OR 3,600 CUBIC FEET OF STORMWATER RUNOFF PER ACRE OF DISTURBANCE, WHICHEVER IS GREATER. TEMPORARY SEDIMENT BASINS USED TO TREAT STORMWATER RUNOFF FROM AREAS GREATER THAN 5-ACRES OF DISTURBANCE SHALL BE SIZED TO ALSO CONTROL STORMWATER RUNOFF FROM A 10-YEAR 24 HOUR STORM EVENT. ON-SITE RETENTION OF THE 10-YEAR 24-HOUR EVENT IS NOT REQUIRED.
   10.2. CONSTRUCT AND STABILIZE DEWATERING INFILTRATION BASINS PRIOR TO ANY EXCAVATION THAT MAY REQUIRE DEWATERING.
   10.3. TEMPORARY SEDIMENT BASINS OR TRAPS SHALL BE PLACED AND STABILIZED AT LOCATIONS WHERE CONCENTRATED FLOW (CHANNELS AND PIPES) DISCHARGE TO THE SURROUNDING ENVIRONMENT FROM AREAS OF UNSTABILIZED EARTH DISTURBING ACTIVITIES.

11. ADDITIONAL EROSION AND SEDIMENT CONTROL GENERAL PRACTICES:
   11.1. USE TEMPORARY MULCHING, PERMANENT MULCHING, TEMPORARY VEGETATIVE COVER, AND PERMANENT VEGETATIVE COVER TO REDUCE THE NEED FOR DUST CONTROL. USE MECHANICAL SWEEPERS ON PAVED SURFACES WHERE NECESSARY TO PREVENT DUST BUILDUP. APPLY WATER, OR OTHER DUST INHIBITING AGENTS OR TACKIFIERS, AS APPROVED BY THE NHDES.
   11.2. ALL STOCKPILES SHALL BE CONTAINED WITH TEMPORARY PERIMETER CONTROLS. INACTIVE SOIL STOCKPILES SHOULD BE PROTECTED WITH SOIL STABILIZATION MEASURES (TEMPORARY EROSION CONTROL SEED MIX AND MULCH, SOIL BINDER) OR COVERED WITH ANCHORED TARPS.
   11.3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH SECTION 645 OF NHDOT SPECIFICATIONS, WEEKLY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 IN. OF RAIN PER 24-HOUR PERIOD. EROSION AND SEDIMENT CONTROL MEASURES WILL ALSO BE INSPECTED IN ACCORDANCE WITH THE GUIDANCE MEMO FROM THE NHDES CONTAINED WITHIN THE CONTRACT PROPOSAL AND THE EPA CONSTRUCTION GENERAL PERMIT.
   11.4. THE CONTRACTOR SHOULD UTILIZE STORM DRAIN INLET PROTECTION TO PREVENT SEDIMENT FROM ENTERING A STORM DRAINAGE SYSTEM PRIOR TO THE PERMANENT STABILIZATION OF THE CONTRIBUTING DISTURBED AREA.
   11.5. PERMANENT STABILIZATION MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS TO STABILIZE AREAS. VEGETATIVE STABILIZATION SHALL NOT BE CONSIDERED PERMANENTLY STABILIZED UNTIL VEGETATIVE GROWTH COVERS AT LEAST 85% OF THE DISTURBED AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL FOR ONE YEAR AFTER PROJECT COMPLETION.
   11.6. CATCH BASINS: CARE SHALL BE TAKEN TO ENSURE THAT SEDIMENTS DO NOT ENTER ANY EXISTING CATCH BASINS DURING CONSTRUCTION. THE CONTRACTOR SHALL PLACE TEMPORARY STONE INLET PROTECTION OVER INLETS IN AREAS OF SOIL DISTURBANCE THAT ARE SUBJECT TO SEDIMENT CONTAMINATION.
   11.7. TEMPORARY AND PERMANENT DITCHES SHALL BE CONSTRUCTED, STABILIZED AND MAINTAINED IN A MANNER THAT WILL MINIMIZE SCOUR. TEMPORARY AND PERMANENT DITCHES SHALL BE DIRECTED TO DRAIN TO SEDIMENT BASINS OR STORM WATER COLLECTION AREAS.
   11.8. WINTER EXCAVATION AND EARTHWORK ACTIVITIES NEED TO BE LIMITED IN EXTENT AND DURATION, TO MINIMIZE POTENTIAL EROSION AND SEDIMENTATION IMPACTS. THE AREA OF EXPOSED SOIL SHALL BE LIMITED TO ONE ACRE, OR THAT WHICH CAN BE STABILIZED AT THE END OF EACH DAY UNLESS A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.
   11.9. CHANNEL PROTECTION MEASURES SHALL BE SUPPLEMENTED WITH PERIMETER CONTROL MEASURES WHEN THE DITCH LINES OCCUR AT THE BOTTOM OF LONG FILL SLOPES. THE PERIMETER CONTROLS SHALL BE INSTALLED ON THE FILL SLOPE TO MINIMIZE THE POTENTIAL FOR FILL SLOPE SEDIMENT DEPOSITS IN THE DITCH LINE.

BEST MANAGEMENT PRACTICES (BMP) BASED ON AMOUNT OF OPEN CONSTRUCTION AREA

12. STRATEGIES SPECIFIC TO OPEN AREAS LESS THAN 5 ACRES:
   12.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500: ALTERATION OF TERRAIN FOR CONSTRUCTION AND USE ALL CONVENTIONAL BMP STRATEGIES.
   12.2. SLOPES STEEPER THAN 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING.
   12.3. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT ALONE.
   12.4. AREAS WHERE HAUL ROADS ARE CONSTRUCTED AND STORMWATER CANNOT BE TREATED THE DEPARTMENT WILL CONSIDER INFILTRATION.
   12.5. FOR HAUL ROADS ADJACENT TO SENSITIVE ENVIRONMENTAL AREAS OR STEEPER THAN 5%. THE DEPARTMENT WILL CONSIDER USING EROSION STONE, CRUSHED GRAVEL, OR CRUSHED STONE BASE TO HELP MINIMIZE EROSION ISSUES.
   12.6. ALL AREAS THAT CAN BE STABILIZED SHALL BE STABILIZED PRIOR TO OPENING UP NEW TERRITORY.
   12.7. DETENTION BASINS SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE A 2 YEAR STORM EVENT.

13. STRATEGIES SPECIFIC TO OPEN AREAS BETWEEN 5 AND 10 ACRES:
   13.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES WILL BE UTILIZED.
   13.2. DETENTION BASINS WILL BE CONSTRUCTED TO ACCOMMODATE THE 2-YEAR 24-HOUR STORM EVENT AND CONTROL A 10-YEAR 24-HOUR STORM EVENT.
   13.3. SLOPES STEEPER THAN A 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS. OTHER ALTERNATIVE MEASURES, SUCH AS BONDED FIBER MATRIXES (BFMS) OR FLEXIBLE GROWTH MEDIUMS (FGMS) MAY BE UTILIZED, IF MEETING THE NHDES APPROVALS AND REGULATIONS.
   13.4. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS.

14. STRATEGIES SPECIFIC TO OPEN AREAS OVER 10 ACRES:
   14.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES AND BETWEEN 5 AND 10 ACRES WILL BE UTILIZED.
   14.2. THE DEPARTMENT ANTICIPATES THAT SOIL BINDERS WILL BE NEEDED ON ALL SLOPES STEEPER THAN 3:1. IN ORDER TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF SEDIMENT IN THE STORMWATER TREATMENT BASINS.
   14.3. THE CONTRACTOR WILL BE REQUIRED TO HAVE AN APPROVED DESIGN IN ACCORDANCE WITH ENV-WQ 1506.12 FOR AN ACTIVE FLOCCULANT TREATMENT SYSTEM TO TREAT AND RELEASE WATER CAPTURED IN STORM WATER BASINS. THE CONTRACTOR SHALL ALSO RETAIN THE SERVICES OF AN ENVIRONMENTAL CONSULTANT WHO HAS DEMONSTRATED EXPERIENCE IN THE DESIGN OF FLOCCULANT TREATMENT SYSTEMS. THE CONSULTANT WILL ALSO BE RESPONSIBLE FOR THE IMPLEMENTATION AND MONITORING OF THE SYSTEM.

TABLE 1
GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES[2]				ROLLED EROSION CONTROL BLANKETS[3]			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES[1]												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES[1]	YES[1]	YES	YES	NO	NO	YES	YES	NO	YES	YES	YES
3:1 SLOPE	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO
4:1 SLOPE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO
WINTER STABILIZATION	4T/AC	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
CHANNELS												
LOW FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
HIGH FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE
HMT	HAY MULCH & TACK	HM	HYDRAULIC MULCH	SNSB	SINGLE NET STRAW BLANKET
WC	WOOD CHIPS	SMM	STABILIZED MULCH MATRIX	DNSB	DOUBLE NET STRAW BLANKET
SG	STUMP GRINDINGS	BFM	BONDED FIBER MATRIX	DNSCB	2 NET STRAW-COCONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCB	2 NET COCONUT BLANKET

NOTES:
1. ALL SLOPE STABILIZATION OPTIONS ASSUME A SLOPE LENGTH ≤10 TIMES THE HORIZONTAL DISTANCE COMPONENT OF THE SLOPE, IN FEET.
2. PRODUCTS CONTAINING POLYACRYLAMIDE (PAM) SHALL NOT BE APPLIED DIRECTLY TO OR WITHIN 100 FEET OF ANY SURFACE WATER WITHOUT PRIOR WRITTEN APPROVAL FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.
3. ALL EROSION CONTROL BLANKETS SHALL BE MADE WITH WILDLIFE FRIENDLY BIODEGRADABLE NETTING.

STATE OF NEW HAMPSHIRE
MEREDITH
DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL STRATEGIES

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12-21-2015	42912erosstrat	42912	6	7

EROSION CONTROL PLAN LEGEND

PC — PERIMETER CONTROL
- SILT FENCE
- EROSION CONTROL MIX BERM
- EROSION CONTROL MIX SOX
- TURBIDITY CURTAIN
- SHEET PILE
- COFFER DAM

NB/PC — NATURAL BUFFER/PERIMETER CONTROL
- SILT FENCE
- EROSION CONTROL MIX BERM
- EROSION CONTROL MIX SOX
- TURBIDITY CURTAIN
- SHEET PILE
- COFFER DAM

CP — CHANNEL PROTECTION
- STONE CHECK DAMS
- STRAW WATTLES
- CHANNEL MATTING
- CLASS D EROSION STONE
- CLASS C STONE

CWB — CLEAN WATER BYPASS
- PUMP THROUGH PIPE
- DRAIN THROUGH PIPE OR CHANNEL

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED SEL DATE 10/20
NEW DESIGN JJN DATE 11/20
SHEET CHECKED CAC DATE 1/21
AS BUILT DETAILS DATE

(1) ALMSTROM FAMILY REVOCABLE TRUST OF 2019
SLOPE AND DRAINAGE EASEMENT RESERVED IN RETURN OF LAYOUT FOR PROJECT S4212 RECORDED IN BOOK 421 PAGE 483

GRID

NH Route 104

Approx Existing CA ROW

Hatch Corner Rd

Corliss Hill Rd

FEMA Zone A (No Elevations)

POTENTIAL LOCATION FOR DEWATERING BASIN

WATER DIVERSION

CLEARING LINE

INLET ACCESS

OUTLET ACCESS

APPROX LIMITS OF WORK (TYP.)

Power Sub-Station

ponded area

beaver dam

field

gate

dirt rd

gravel

grass

wood sign "Sno-Streakers American Legion Post"

NH 104 STA 276+39
REHABILITATE EXISTING 90" X 178' LONG CORRUGATED METAL CULVERT
NO PERMANENT CHANGE TO TOPOGRAPHY, NO PROPOSED CONTOURS.
SEE CONSTRUCTION SEQUENCE INCLUDED IN APPLICATION.
SEE PROFILE FOR CULVERT SLOPE AND INVERTS

CONTOUR INTERVAL 2'

50 0 50 100
SCALE IN FEET

STATE OF NEW HAMPSHIRE
MEREDITH
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLAN

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
42912ercplans	42912	7	7