STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE: October 19, 2022

FROM: Joshua Brown
Wetlands Program Analyst

AT (OFFICE): Department of Transportation
Bureau of Environment

SUBJECT Dredge & Fill Application
Claremont, 27691

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

Forwarded herewith is the application package prepared by NH DOT Bureau of Bridge Design for the subject major impact project. The project is located along NH Route 12A over the Sugar River in the Town of Claremont, NH. The proposed work will entail replacement of the bridge deck, superstructure, and bearings. A majority of the work will not be done in the river and only proposed in-water work is associated with the placement of scour protection at the one scour critical pier in the river.

This project was reviewed at the Natural Resource Agency Coordination Meetings on May 20, 2020 and March 16, 2022. A copy of the minutes has been included with this application package. A copy of this application and plans can be accessed on the Departments website via the following link: http://www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/wetland-applications.htm.

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

Mitigation was determined to not be required as the proposed work is for the protection of existing infrastructure.

The lead people to contact for this project are Jason Tremblay, Bureau of Bridge Design (271-1614 or Jason.A.Tremblay@dot.nh.gov) or Andrew O'Sullivan, Wetlands Program Manager, Bureau of Environment (271-3226 or Andrew.O'Sullivan@dot.nh.gov).

A payment voucher has been processed for this application (Voucher # 697085) in the amount of $12,738.

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

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

\\dot.state.nh.us\data\Environment\PROJECTS\CLAREMONT\27691\Wetlands\Application Submission Documents\WETAPP - Coverletter_Claremont.doc

Claremont, NH
Bridge 072/127
NH 12A over the
Sugar River

NH Standard Dredge & Fill Application

Prepared By:

McFarland Johnson

Claremont, New Hampshire
Project 27691
X-A003(590)

October 2022

Claremont 27691
Bridge 072/127 Rehabilitation
NHDES Standard Dredge & Fill Permit Application
October 2022

Contents

NHDES Standard Dredge and Fill Wetlands Permit Application Form

STANDARD DREDGE AND FILL WETLANDS PERMIT APPLICATION

Water Division/Land Resources Management
Wetlands Bureau

Check the Status of your Application

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

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

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): USFWS Official Species List includes northern long-eared bat, dwarf wedgemussel, jesup's milk-vetch, and candidate species monarch butterfly. ○ NHB Project ID #: NHB22-0855 ○	☒ 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: NA	☐ Yes ☒ No
For dredging projects, is the subject property contaminated? • If yes, list contaminant: NA	☐ 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): 3.25 sq mi	

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

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

This project will address Bridge 072/127, which carries NH Route 12A over the Sugar River in Claremont. The project is a non-federal bridge rehabilitation and scour protection project. The bridge is a 1967 three-span steel girder bridge with a concrete deck.

The rehabilitation will entail replacement of the bridge deck, superstructure, and bearings. This work will not be located within the river. The only proposed in-water work is associated with the placement of scour protection at the one scour critical pier in the river. This work will be completed within a cofferdam. Construction access will require a temporary bulkhead off the bank of the river, most likely in the NE quadrant, and a temporary work trestle to reach the pier.

SECTION 3 - PROJECT LOCATION

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

ADDRESS: Bridge 072/127, which carries NH Route 12A over the Sugar River

TOWN/CITY: Claremont

TAX MAP/BLOCK/LOT/UNIT: ROW

US GEOLOGICAL SURVEY (USGS) TOPO MAP WATERBODY NAME: Sugar River

☐ N/A		
(Optional) LATITUDE/LONGITUDE in decimal degrees (to five decimal places):	43.398° North -72.394° West	
SECTION 4 - APPLICANT (DESIRED PERMIT HOLDER) INFORMATION (Env-Wt 311.04(a)) If the applicant is a trust or a company, then complete with the trust or company information.		
NAME: NH Department of Transportation, Attn: Jason Tremblay, PE		
MAILING ADDRESS: 7 Hazen Drive		
TOWN/CITY: Concord	STATE: NH	ZIP CODE: 03301
EMAIL ADDRESS: jason.a.tremblay@dot.nh.gov		
FAX:	PHONE: (603) 271-3226	
ELECTRONIC COMMUNICATION: By initialing here: JAT, 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.: Christine Perron		
COMPANY NAME: McFarland Johnson		
MAILING ADDRESS: 53 Regional Drive		
TOWN/CITY: Concord	STATE: NH	ZIP CODE: 03301
EMAIL ADDRESS: cperron@mjinc.com		
FAX:	PHONE: 603 225 2978	
ELECTRONIC COMMUNICATION: By initialing here CJP, I hereby authorize NHDES to communicate all matters relative to this application electronically.		
SECTION 6 - PROPERTY OWNER INFORMATION (IF DIFFERENT THAN APPLICANT) (Env-Wt 311.04(b)) If the owner is a trust or a company, then complete with the trust or company information. ☒ Same as applicant		
NAME:		
MAILING ADDRESS:		
TOWN/CITY:	STATE:	ZIP CODE:
EMAIL ADDRESS:		
FAX:	PHONE:	
ELECTRONIC COMMUNICATION: By initialing here , I hereby authorize NHDES to communicate all matters relative to this application electronically.		

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

Describe how the resource-specific criteria have been met for each chapter listed above (please attach information about stream crossings, coastal resources, prime wetlands, or non-tidal wetlands and surface waters):
Env-Wt 400: A wetlands and surface waters delineation was completed in May 9th 2019. The river is subject to protection under the Shoreland Water Quality Protection Act; Shoreland buffer zones were drawn from the OHW line and are included in project mapping.

Env-Wt 500: The proposed project is covered under Env-Wt 527 Public Highways. The proposed project has been designed in accordance with the criteria specified in Env-Wt 527.04 and is consistent with RSA 482-A:1, 483-B, 485-A, and 212-A. The purpose of the proposed project is to address an existing bridge.

Env-Wt 600: N/A

Env-Wt 700: N/A

Env-Wt 900: The bridge is a Tier 3 stream crossing. The proposed project is covered under Env-Wt 904.09 Repair, Rehabilitation, or Replacement of Tier 3 and Tier 4 Existing Legal Crossings. The proposed project has been designed in accordinace with the criteria specified for a rehabilitation under Env-Wt 904.09.

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: Day: Year:

(☒ N/A - Mitigation is not required)

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

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

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

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

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

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

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

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

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

JURISDICTIONAL AREA		PERMANENT			TEMPORARY		
		SF	LF	ATF	SF	LF	ATF
Wetlands	Forested Wetland			☐			☐
	Scrub-shrub Wetland			☐			☐
	Emergent Wetland			☐			☐
	Wet Meadow			☐			☐
	Vernal Pool			☐			☐
	Designated Prime Wetland			☐			☐
	Duly-established 100-foot Prime Wetland Buffer			☐			☐
Surface Water	Intermittent / Ephemeral Stream			☐			☐
	Perennial Stream or River	310	61	☐	20,995	142	☐
	Lake / Pond			☐			☐
	Docking - Lake / Pond			☐			☐
	Docking - River			☐			☐
Banks	Bank - Intermittent Stream			☐			☐
	Bank - Perennial Stream / River			☐	10,540	281	☐
	Bank / Shoreline - Lake / Pond			☐			☐
Tidal	Tidal Waters			☐			☐
	Tidal Marsh			☐			☐
	Sand Dune			☐			☐
	Undeveloped Tidal Buffer Zone (TBZ)			☐			☐
	Previously-developed TBZ			☐			☐
	Docking - Tidal Water			☐			☐
TOTAL		310	61		**31,535**	**423**	

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):	31,845 SF	× $0.40 =	$	12,738
Seasonal docking structure:	SF	× $2.00 =	$	
Permanent docking structure:	SF	× $4.00 =	$	
Projects proposing shoreline structures (including docks) add $400 =			$	
Total =			$	
The application fee for minor or major impact is the above calculated total or $400, whichever is greater =			$	12,738

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: JAT CJP	To the best of the signer's knowledge and belief, all required notifications have been provided.
Initials: JAT CJP	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: JAT CJP	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: JAT CJP	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): Jason A. Tremblay	PRINT NAME LEGIBLY: Jason Tremblay	DATE: 10/17/2022
SIGNATURE (APPLICANT, IF DIFFERENT FROM OWNER):	PRINT NAME LEGIBLY:	DATE:
SIGNATURE (AGENT, IF APPLICABLE): Christine Perron	PRINT NAME LEGIBLY: Christine Perron	DATE: 10/13/2022

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.

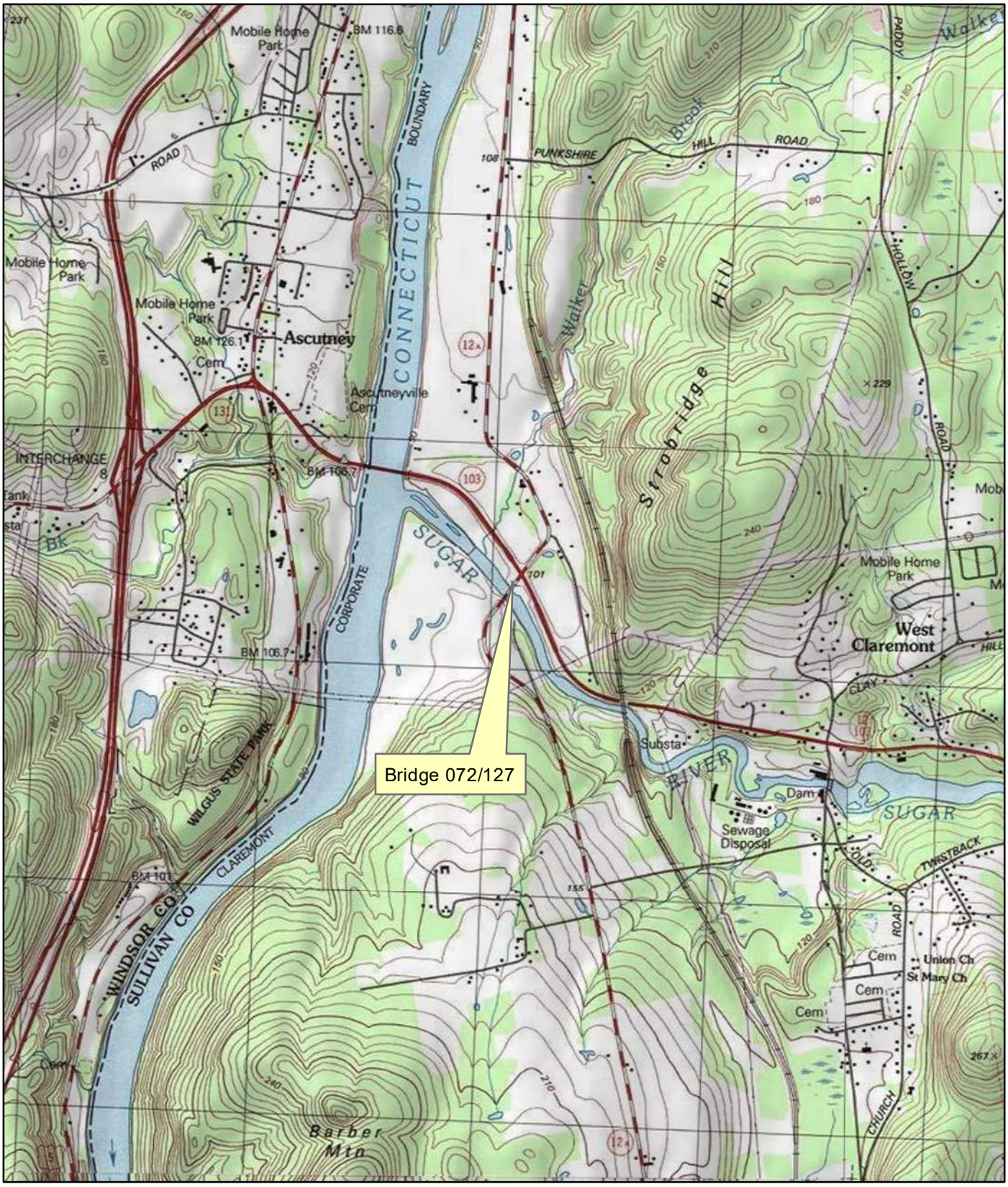
TOWN/CITY CLERK SIGNATURE:	PRINT NAME LEGIBLY: State Agency - Exempt per RSA 482-A:3, I(a)(1)
TOWN/CITY:	DATE:

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

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

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

Location Map



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NH DEPARTMENT OF TRANSPORTATION
CLAREMONT 27691

LOCATION MAP

SCALE :	DATE :	FIGURE :
1 inch = 2,000 feet	SEPTEMBER 2022	1

McFarland Johnson

Attachment A: Minor and Major Projects

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

Water Division/Land Resources Management
Wetlands Bureau
Check the Status of your Application

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

APPLICANT'S NAME: NH Department of Transportation **TOWN NAME:** Claremont, NH 03743

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.
THERE IS NO PRACTICABLE ALTERNATIVE THAT WOULD HAVE LESS ADVERSE IMPACT ON THE RIVER WHILE ADDRESSING THE SAFETY AND STRUCTURAL NEEDS OF THE BRIDGE. THE SCOUR PROTECTION IS NEEDED TO PROTECT THE EXISTING INFRASTRUCTURE, AND WAS DESIGNED WITH TE SMALLEST FOOTPRINT POSSIBLE. ADDITIONALLY, THE RIPRAP WILL BE PARTIALLY EMBEDDED TO MINIMIZE IMPACTS TO THE FLOODWAY.

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

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

N/A - The proposed project does not involve any impacts to tidal or non-tidal marshes

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

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

The proposed project will maintain all existing hydrologic connections. There are no fringe wetland systems or tributaries located adjacent to the Sugar River within the project area. Flow in the Sugar River will be maintained and at least a portion of the channel will remain open throughout the duration of construction. The riprap placement will be completed within a cofferdam and a portion of the channel will remain unimpeded during construction. Construction access will require a temporary bulkhead off the bank of the river in one quadrant of the bridge, most likely in the northeast quadrant, and a temporary work trestle from the bulkhead.

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 proposed project has minimized and avoided impacts to wetlands and other areas of jurisdiction under RSA 482-A to the maximum extent practicable by reducing the footprint of the riprap and partially embedding the riprap to minimize impacts to the floodway. Additionally, a portion of the channel will remain open during construction to maintain habitat connectivity. NH Natural Heritage Bureau identified eastern waterleaf (Hydrophyllum virginianum) and large-fruited sanicle (Sanicula trifoliata) as ocurring in the vicinity of the project area. USFWS Official Species List listed northern long-eared bat, dwarf wedgemussel (Alasmidonta heterodon), and jesup's milk-vetch (Astragalus robbinsii var jesupii) as potentially occuring in the vicinity of the project area. National Marine Fisheries Services confirmed that an Essential Fish Habitat Assessment is not required because EFH consultations are not currently required for the Connecticut River watershed.NHDOT completed an acoustic presence/absence survey for bat species of concern and a bridge assessment was completed on May 9, 2019. Based on survey results, the federally listed northern long-eared bat can be assumed absent from the site and consultation with the USFWS on this species will fall under the 4(d) rule. Using the USFWS determination key, it was determined that the project may affect northern long-eared bat. The proposed project's effects are consistent with those analyzed in the Programmatic BO. The USFWS concurs that the project is not likely to jeopardize the continued existence of the northern long-eared bat. A rare plant survey was conducted on May 26, 2022 and located no rare plants within the project area; therefore, the project will not result in impacts to any rare plant species. A freshwater mussel survey was completed in the Sugar River upstream and downstream of the project area on September 17, 2018. No live mussels, mussel shells, or old shell fragments were found within the survey area. The survey also determined that the habitat within the project area is considered poor. Therefore, there are no anticipated impacts to the federally endangered dwarf wedgemussel as a result of this project. The report was provided to NH Fish & Game and NH Fish & Game confirmed they have no concerns.

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

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

The proposed project is not anticipated to impact public commerce, navigation, or recreation.

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 rehabilitation will include replacing the bridge deck, superstructure, and bearings, as well as placing scour protection in the river at the northern pier. The proposed scour protection method is partially embedded riprap, which will extend approximately 1 foot above the existing channel. Based on the hydraulic analysis, the proposed riprap will not result in an increase in base flood elevation within the floodway. There are no fringe wetlands systems in the project area.

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.

There are no natural riverine forested wetland systems or scrub-shrub marsh complexes located within the proposed project impacts. Impacts to these resource area types are not proposed.

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

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

N/A - There are no palustrine wetland impacts. Therefore, the proposed project is not anticipated to impact any wetlands that would result in a detrimental impact to adjacent drinking water supply and/or 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.

Impacts to the channel of the Sugar River have been avoided and minimized to the maximum extent practicable. The decision to replace only the superstructre eliminated the need for additional impacts associated with replacement of the existing bridge piers. However, it was determined that scour protection is required around the northern bridge pier to protect the existing infrastructure. The footprint of the scour protection has been minimzed to the extent possible to reduce impacts to the channel of the Sugar River.

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.

The proposed project does not involve the construction of shoreline structures over surface waters.

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

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

N/A - The proposed project does not involve the construction of shoreline structures over surface waters.

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

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

N/A - The proposed project does not involve the construction of shoreline structures.

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

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

N/A - The proposed project does not involve the construction of shoreline structures.

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

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

N/A - The proposed project does not involve the construction of shoreline structures over surface waters.

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

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

N/A - The proposed project does not involve the construction of shoreline structures.

PART II: FUNCTIONAL ASSESSMENT
REQUIREMENTS Ensure that project meets the requirements of Env-Wt 311.10 regarding functional assessment (Env-Wt 311.04(j); Env-Wt 311.10).
FUNCTIONAL ASSESSMENT METHOD USED: N/A There are no wetland in the project area
NAME OF CERTIFIED WETLAND SCIENTIST (FOR NON-TIDAL PROJECTS) OR QUALIFIED COASTAL PROFESSIONAL (FOR TIDAL PROJECTS) WHO COMPLETED THE ASSESSMENT:
DATE OF ASSESSMENT:
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.

Supplemental Narrative

NHDES MAJOR IMPACT WETLANDS PERMIT APPLICATION

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

CLAREMONT, 27691

BRIDGE NO. 072/127 SUPERSTRUCTURE REPLACEMENT

CLAREMONT, NEW HAMPSHIRE

SUPPLEMENTAL NARRATIVE

McFarland Johnson

Contents

1.0 Introduction

The proposed project will rehabilitate Bridge 072/127, which carries NH Route 12A over the Sugar River in the City of Claremont (Figure 1). The purpose of the project is to address deterioration and scour concerns at Bridge 072/127. The bridge is on the NHDOT's Red List of deficient structures and is coded as scour critical.

Constructed in 1967, Bridge 072/127 has a total length of 281 feet and a total width of 32.7 feet (28 feet curb-to-curb). The bridge consists of a three-span continuous steel girder superstructure supporting a reinforced concrete deck and is on the NHDOT Red List of Deficient structures due to poor deck condition and a scour critical rating during floods.

1.1 Purpose

The purpose of the proposed project is to address the serious condition of the existing bridge deck and scour concerns, to maintain safe passage of vehicles and pedestrians along NH Route 12A over the Sugar River.

1.2 Need

The bridge is on the NHDOT's Red List of deficient structures and is coded as scour critical.

2.0 Existing Conditions

2.1 Roadway & Bridge

Constructed in 1967, Bridge 072/127 has a total length of 281 feet and a total width of 32.7 feet (28 feet curb-to-curb). The bridge consists of a three-span continuous steel girder superstructure supporting a reinforced concrete deck and is on the NHDOT Red List of Deficient structures due to poor deck condition and a scour critical rating during floods. The bridge was rehabilitated in 1990 under NHDOT Project 11165. NH Route 12A has an Average Annual Daily Traffic (AADT) of 1700 vehicles with 7% trucks based on 2019 traffic counts.

2.2 Jurisdictional Resources

A wetlands and surface waters delineation was completed by McFarland-Johnson, Inc. in May 2019. The only jurisdictional resource in the project area is the Sugar River and its banks. The ordinary high water and top of bank of the Sugar River were delineated. At the location of Bridge No. 072/127, the Sugar River is a sixth order, perennial stream, with a watershed area of approximately 3.25 square miles. The stream crossing is classified as a Tier 3 stream crossing based on the watershed size pursuant to the NHDES Stream Crossing Rules (Env-Wt 900). The Sugar River has a Cowardin Classification of R2UB1.

According to the NHDES Wetlands Permit Planning Tool (WPPT) there are no Priority Resource Areas (PRAs) mapped in the vicinity of the proposed project.

According to the WPPT and the 2020 NH Wildlife Action Plan (WAP) mapping, the Sugar River is identified as a warmwater fishery.

2.3 Rare Species / Fish and Wildlife

2.3.1 NH Natural Heritage Bureau

The proposed project was submitted to and reviewed by the New Hampshire Natural Heritage Bureau (NHB) via the online NHB DataCheck Tool. According to the NHB DataCheck Results Letter (NHB22-0855) dated March 16, 2022, eastern waterleaf (*Hydrophyllum virginianum*) and large-fruited sanicle (*Sanicula trifoliata*) have historically been documented south of the project area, with large-fruited sanicle observations greater than 20 years ago. The NHB noted that large-fruited sanicle is best identified when in fruit in mid to late July. If a spring survey is completed, it would only be possible to identify sanicle to the genus level. Eastern waterleaf could be identified vegetatively in spring or summer. Based on the project schedule, a survey was conducted on May 26, 2022 with a commitment to follow up with a later survey if plants in the *Sanicula* genus were identified. The survey did not identify Eastern waterleaf or any species in the *Sanicula* genus and a follow up survey was not completed. Based on the results of the survey, the project will not result in impacts to any rare plant species.

2.3.2 US Fish and Wildlife Service

The US Fish & Wildlife Service (USFWS) Information, Planning, and Conservation System (IPaC) web tool was utilized to determine if federally listed species have the potential to occur in the project area. According to IPaC, the federally threatened northern long-eared bat (NLEB), the federally endangered Dwarf Wedgemussel, and federally endangered Jesup's Milk-vetch are potential concerns in this region of New Hampshire.

NHDOT completed an acoustic presence/absence survey for bat species of concern and a bridge assessment was completed on May 9, 2019. Based on survey results, the federally listed northern long-eared bat can be assumed absent from the site and consultation with the USFWS on this species will fall under the 4(d) rule. The acoustic survey also determined that the state-listed little brown bat was likely present at the site. However, there are no suitable roosting sites for this species in the project area and impacts to this species are not anticipated. The project adheres to the criteria and conditions as outlined in the Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat (January 2016). Using the USFWS determination key, it was determined that the project may affect northern long-eared bat. The proposed project's effects are consistent with those analyzed in the Programmatic BO. The USFWS concurs that the project is not likely to jeopardize the continued existence of the northern long-eared bat

A freshwater mussel survey was completed in the Sugar River upstream and downstream of the project area on September 17, 2018. No live mussels, mussel shells, or old shell fragments were found within the survey area. The survey also determined that the habitat within the project area is considered poor due to coarse rocky substrates, strong flows, and shallow depth. Therefore, there are no anticipated impacts to the federally endangered dwarf wedgemussel as a result of this project. The report was provided to NH Fish & Game and USFWS. NH Fish & Game confirmed that there are no concerns with the work as proposed and no further mussel surveys are required.

The monarch butterfly is a candidate for listing under the ESA. The USFWS will review the monarch's status each year until resources are available to begin developing a proposal to list the monarch as threatened or endangered under the ESA. The candidate status of the monarch does not provide protection under the ESA, and no further coordination with the USFWS is required at this time. Monarch habitat includes non-forested, non-shrubby areas where there is potential for nectar species (flowering plants) and/or milkweed plants, including, but not limited to, regularly or semi-regularly mowed areas within the ROW and where a clear zone is maintained. The proposed project area includes some potential monarch habitat, but the project would not permanently change that habitat and no monarch conservation measures are included in the project at this time. Following construction, roadside areas would continue to provide potential habitat.

Jesup's Milk-vetch (Astragalus robbinsii var. jesupii) was listed in the IPaC review as potentially occurring within the vicinity of the project area. The plant grows in calcareous rock outcrops with flood-deposited silt. Suitable habitat exists as portions of the project area are located within the floodplain of Sugar River, with marginal rock and ledge outcropping along the shoreline. A rare species survey was conducted on May 26, 2022, this species was not identified within the project area during the survey.

2.3.3 NH Wildlife Action Plan

The NHF&G developed the New Hampshire Wildlife Action Plan (WAP), which includes ranked habitat tiers that identify the highest quality habitats across the state. The NHF&G created the WAP habitat tiers based on NHF&G biological data, landscape data, and human influence/disturbance information. Habitats are separated into three ranking tiers including, 1) Highest Ranked Habitat in the State, 2) Highest Ranked Habitat in the Biological Region, and 3) Supporting Landscapes.

According to the 2020 WAP mapping, the proposed project is located within an area identified as Highest Ranked Habitat in the State. The WAP habitat mapping is a coarse filter, landscape level mapping tool, and while Highest Ranked Habitat in the State is identified within the project limits along the Sugar River and the adjacent areas, the proposed project is located in a previously disturbed area associated with the existing bridge and NH Route 12A roadway corridor. Impacts on wildlife from the proposed action will be temporary and short-term in nature. The proposed action is not anticipated to result in any changes to terrestrial wildlife or aquatic organism passage or connectivity at the bridge location.

2.4 Floodplains and Floodways

The Sugar River is a FEMA-mapped regulatory floodway with a 100-year floodplain (Zone AE) on both sides of the river.

The project was reviewed by the NH National Flood Insurance Program Assistant Coordinator on April 28, 2022. To comply with the National Flood Insurance Program, any placement of fill in the floodway would require hydrologic and hydraulic analyses. A hydraulic analysis was completed for the project and confirmed that there will be no increase in base flood elevation.

2.5 Geomorphic Characteristics

In the vicinity of Bridge 072/127, the Sugar River has an average bankfull width of 170 feet and a broad floodprone width that averages approximately 2,000 feet, resulting in an entrenchment ratio of 11.8 (slightly entrenched). The estimated bankfull depth is between 2 feet and 4 feet, resulting in moderate to high width/depth ratio. Based on these characteristics, this is a Rosgen Type C channel. This channel type has a high potential for channel instability and lateral movement. However, the banks in the vicinity of the bridge appear to be stable, with natural vegetation and no evidence of scour. The existing bridge is 281 feet in length and accommodates bankfull width through the span, as well as a portion of the floodplain.

2.6 Cultural and Historic Resources

A Request for Project review (RPR) was submitted to the New Hampshire Department of Historic Resources (DHR) in April 2019. NHDHR confirmed that the project area is considered archaeologically sensitive. The bridge has been documented under the post-1945 Program Comment and no survey is required.

Independent Archaeological Consulting LLC (IAC) conducted a Phase IA Archaeological Sensitivity Assessment and a Phase IB Intensive Archaeological Investigation in October 2019 and identified areas of archaeological concern. No work is proposed in the archaeologically sensitive areas and there will be language in the contract to prohibit any construction activities in those areas. Therefore, NHDHR concurs that no additional surveys are required and the project will not affect any historic or archaeologic resources. A No Historic Properties Affected Memo was issued on July 13, 2022.

3.0 Proposed Project

The following sections describe the proposed work, resource area impacts, avoidance and minimization measures, and additional components of the project.

3.1 Bridge Repairs and Replacement

The rehabilitation will include replacing the bridge deck superstructure and bearings, as well as placing scour protection in the river at the northern pier. A new haunched steel plate girder superstructure with a composite reinforced concrete deck slab is proposed. The proposed roadway cross section is a 30'-8" curb to curb width with 3'-4" shoulders and 12'-0" travel lanes in each direction, with an overall out to out width of 34'-8”. The proposed bridge rehabilitation and repair work is located outside of jurisdictional resource areas and is not anticipated to result in any impacts to wetlands, surface waters, or banks.

3.2 Scour Countermeasures

The proposed scour protection method is partially embedded riprap, which will extend approximately 1 foot above the bottom of the existing channel. Based on the hydraulic analysis completed by TranSystems, the proposed riprap will not result in an increase in base flood elevation within the floodway. The riprap placement will be completed within a cofferdam and a portion of the channel will remain unimpeded during construction. Construction access will require a temporary bulkhead off the

bank of the river in one quadrant of the bridge, most likely in the northeast quadrant, and a temporary work trestle from the bulkhead.

3.3 Wetland and Surface Water Impacts

3.3.1 Wetlands

There are no fringe wetlands located along the Sugar River within the project area.

3.3.2. Vernal Pools

No vernal pools were identified within the Study Area or were observed in the vicinity of the proposed project.

3.3.3 Surface Waters

The proposed project is anticipated to result in 310 SF / 61 LF of permanent channel impacts associated with the installation of the riprap around the existing bridge piers for scour protection.

In addition to the proposed permanent impacts, temporary impacts are required for construction access and the installation of perimeter controls including the temporary water diversion structures. The proposed project will result in 20,995 SF / 142 LF of temporary channel impacts, and 10,540 SF / 281 LF of temporary bank impacts. Temporary impacts and disturbed areas will be restored following the completion of construction.

3.4 Avoidance and Minimization Measures

Avoidance and minimization measures were limited by the location of the existing infrastructure as well as the need for scour protection and repairs to the existing drainage outlet. The footprint of the proposed riprap was reduced to the smallest area that would provide the necessary scour protection based on the hydraulics at the site. Flow within the channel of the Sugar River will be maintained throughout the duration of the project, minimizing impacts to fish and other aquatic organisms. Temporary water diversion structures and soil erosion and sediment controls will also help reduce water quality impacts from the proposed project

3.5 Water Quality / Stormwater Treatment

Section 303(d) of the Clean Water Act requires each state to submit a list of impaired waters to the US EPA every two years to identify surface waters that are impaired by pollutants, not expected to meet water quality standards within a reasonable time, and require the development of a Total Maximum Daily Load (TMDL) study. This list is prepared by NHDES as outlined in the Draft Section 305(b) and 303(d) Consolidated Assessment and Listing Methodology. According to the NHDES 303(d) list (most recent available), the Sugar River (NHRIV801060407-16) is listed as impaired by pH and mercury.

The proposed project will result in a slight increase in pavement width, with a total increase in impervious surface area of approximately 1,500 sq ft. Runoff from the project area is not currently treated. Runoff from the approaches flows into catch basins that outlet on the roadway slopes and runoff from the bridge deck drains through scuppers. It was determined that the exiting catch basins have sufficient capacity to accept runoff from the bridge deck, and that the spread on the bridge is within the allowable limit of

spread per the NHDOT Manual on Drainage Design for Highways. Therefore, the proposed project will eliminate the scuppers and direct runoff to the existing catch basins. No changes in the drainage outlets are proposed. With the minimal increase in impervious area and the elimination of the bridge scuppers, the proposed project is not expected to result in an adverse impact on water quality and will not cause or contribute to surface water impairments.

4.0 Mitigation

Based on discussion and comments received from the New Hampshire Department of Environmental Services (NHDES) staff at the May 20, 2020 and March 16, 2022 NHDOT Natural Resource Agency Coordination Meetings, the proposed project is considered maintenance and repairs to protect existing infrastructure and, therefore, mitigation is not required for the proposed impacts.

NHDES Avoidance and Minimization Checklist

AVOIDANCE AND MINIMIZATION CHECKLIST

Water Division/Land Resources Management
Wetlands Bureau

Check the Status of your Application

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

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

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

The following definitions and abbreviations apply to this worksheet:

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

SECTION 1 - CONTACT/LOCATION INFORMATION		
APPLICANT LAST NAME, FIRST NAME, M.I.: NH Department of Transportation		
PROJECT STREET ADDRESS: Bridge No. 072/127 / NH Route 12A	PROJECT TOWN: Claremont	
TAX MAP/LOT NUMBER: ROW		
SECTION 2 - PRIMARY PURPOSE OF THE PROJECT		
Env-Wt 311.07(b)(1)	Indicate whether the primary purpose of the project is to construct a water-access structure or requires access through wetlands to reach a buildable lot or the buildable portion thereof.	☐ Yes ☒ No

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

The purpose of the proposed project is to replace the deteriorating bridge superstructure and install scour protection around the existing pier in order to maintain a structurally sound and safe crossing structure.

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

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

NHDES Avoidance and Minimization Narrative

AVOIDANCE AND MINIMIZATION WRITTEN NARRATIVE

Water Division/Land Resources Management

Wetlands Bureau

Check the Status of your Application

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

APPLICANT'S NAME: NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION TOWN NAME: CLAREMONT

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

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

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

NO

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

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

NO

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

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

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

NOT APPLICABLE

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

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

There is no practicable alternative that would have less adverse impact on the river while addressing the safety and structural needs of the bridge. The scour protection is needed to protect the existing infrastructure, and was designed with the smallest footprint possible. Additionally, the riprap will be partially embedded to minimize impacts to the floodway.

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

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

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

The location of the proposed impacts was constrained by the location of the existing infrastructure and bridge piers. The footprint of the permanent impacts associated with the scour protection was minimized to the maximum extent practicable, while still providing the necessary scour protection for the existing bridge pier footing. The proposed scour protection was designed to be partially embedded in order to avoid constricting the channel at the bridge location.

Natural Resource Agency Coordination Meeting Minutes

BUREAU OF ENVIRONMENT
CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: May 20, 2020
LOCATION OF CONFERENCE: John O. Morton Building
ATTENDED BY:

NHDOT
Sarah Large
Ron Crickard
Andrew O'Sullivan
Matt Urban
Mark Hemmerlein
Ron Kliner
Meli Dube
Phil Brogan
Mike Mozer
David Scott
Tobey Reynolds
Jason Abdulla
Maggie Baldwin
Rebecca Martin
Anthony Weatherbee
Carol Niewola
Will Stanfield
Bill Saffian

ACOE
Rick Kristoff

EPA
Beth Alafat

Federal Highway Administration
Jaimie Sikora

NHDES
Lori Sommer
Karl Benedict

NH Fish & Game
Carol Henderson

The Nature Conservancy
Pete Steckler

Consultants/Public Participants
Christine Perron
Nathan Rosencranz
Peter Walker
Greg Goodrich
Leslie Palmer
John Pelletier
John Gorham
Marv Everson
Jennifer Doyle-Breen
Richard Devanna
Beatrice Hunt
Todd Dwyer

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.)

NOTES ON CONFERENCE:

Meeting Minutes
Postponed finalizing the April 15, 2020 meeting minutes until June.

Claremont, #27691
Christine Perron from McFarland Johnson provided an overview of the project area and resources identified to date. This project will address Bridge 072/127, which carries NH Route 12A over the Sugar River in Claremont. The project is a non-federal bridge rehabilitation and scour protection project. The bridge is a 1967 three-span steel girder bridge with a concrete deck. It is on the NHDOT red list of bridges due to the poor condition of the deck, and the bridge is also rated as scour critical during floods.

The Sugar River is subject to the NH Shoreland Water Quality Protection Act, and the need for a Shoreland permit is anticipated. The bridge is considered a Tier 3 steam crossing under the NHDES stream crossing rules. The river is not considered a navigable water for the purposes of US Coast Guard jurisdiction. A delineation was completed and the only jurisdictional areas within the project are the bank and channel of the river. The Sugar River is a FEMA-mapped regulatory floodway with a 100-year floodplain (Zone AE) on both sides of the river.

The NH Natural Heritage Bureau reviewed the project and does not anticipate any impacts to rare species or natural communities. The federally listed northern long-eared bat and dwarf wedgemussel have the potential to occur within the project area according to the USFWS IPAC webtool. When the project was initiated, NH Fish & Game asked that a mussel survey be completed for the project. The survey was completed by Biodrawversity and found generally poor mussel habitat within the project area with no live mussels, mussel shells, or shell fragments. The report will be forwarded to NH Fish & Game and USFWS.

The Sugar River is a predicted coldwater fishery according to the NHDES Aquatic Restoration Mapper. It is also designated as Essential Fish Habitat for Atlantic salmon; however, the National Marine Fisheries Services is not currently consulting on projects located within the Connecticut River watershed and an EFH Assessment is not required.

Nate Rosencranz from TranSystems provided an overview of proposed work. The rehabilitation will include painting the steel, replacing bridge bearings, and deck patching. This work will not be located within the river. The only proposed in-water work is associated with the placement of scour protection at the one scour critical pier in the river. The proposed protection method is A-Jacks. To avoid an increase in base flood elevation, the A-Jacks will be embedded in the stream channel. This work will be completed within a cofferdam. Construction access will require a temporary bulkhead off the bank of the river, most likely in the northeast quadrant, and a temporary work trestle to reach the pier.

Based on the project's current schedule, preliminary design will be completed through 2020, with final design and permitting taking place in early 2021. The project will be discussed at future meetings as design progresses and preliminary impacts are available. The current advertising date for the project is September 2021.

Karl Benedict asked if the cofferdam would require a bypass of the river. N. Rosencranz responded that the cofferdam would be around one pier only, so only a portion of the river would be blocked.

K. Benedict noted that coordination with NHFG should occur to determine if any time of year restrictions were warranted for the protection of fisheries. He also noted that revegetation of impacted banks should be proposed in accordance with Shoreland requirements.

Lori Sommer commented that she was glad that the A-Jacks installation would be done in the dry to alleviate water quality concerns. She stated that the proposed A-Jacks entailed protection of existing infrastructure and no mitigation would be required.

Carol Henderson noted that this river is heavily stocked with rainbow trout and is a popular fishing spot. She asked that fishing access not be blocked during construction and noted that there may be a trail along the river that is used for fishing access. C. Perron replied that she was not aware of a trail but would look into it. The only restrictions during construction would be related to maintaining a safe buffer around the work zone.

Rick Kristoff asked for a copy of the mussel survey report. He noted that he would need to see confirmation that the proposed work would not impact flood storage. N. Rosencranz stated that a hydraulic report will be completed to document this.

Beth Alafat and Pete Steckler did not have any comments on the project.

Amy Lamb noted (via email) that the NHB review memo is out of date and an updated memo should be requested.

Sarah Large asked if the new stream crossing rules that address maintenance of an existing tier 3 crossing would need to be addressed in the permit application. K. Benedict replied that the application materials should note that the crossing would not be changing. He didn't think the project would need to be considered an alternative design.

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

Webster, # 40810

Peter Walker opened the meeting by orienting the attendees to the project location. The Clothespin Bridge spans the Blackwater River on Clothespin Bridge Road in Webster. The site is located in a rural portion of the town, and is located downstream of the US Army Corps of Engineers Blackwater Flood Control Dam. Frost Land and Detour Road are located on the west and east side of the bridge, respectively. One residence on Clothespin Bridge Road has a direct view of the bridge site, and presents a constraint to the design of the project – this home and its garage are located relatively close to the road. The river above the bridge is relatively steep, but transitions to a flatter reach below the bridge.

Greg Goodrich reviewed the engineering details. The bridge was rehabilitated in 1939, following a flood event. The existing bridge is a 65-foot long, single span, steel beam bridge with a reinforced concrete deck. Inspections have resulted in the following ratings: the deck is rated in serious condition, the superstructure is fair, and the substructure is in poor condition. The bridge is currently posted for load (E-2). The condition of the bridge, and the poor roadway geometry has led to the decision to replace the bridge entirely. Shifting the east abutment to south will help correct alignment issues. The current proposed design has considered the NHDES stream crossing rules and incorporates wildlife shelves on both the west and east abutments. The proposed design would relocate the west abutment further from the stream to open the bridge span in an effort to address NHDES stream crossing rules.

BUREAU OF ENVIRONMENT
CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: March 16, 2022
LOCATION OF CONFERENCE: Virtual meeting held via Zoom

ATTENDED BY:

NHDOT
Andrew O'Sullivan
Matt Urban
Jon Evans
Joshua Brown
Julie Avenant
Margaret Baldwin
Michael Mozer
Jennifer Reczek
Meli Dube
Jason Ayotte
Gerard Bedard
John Stockton
Anthony Weatherbee
Hannah Gibson
Jason Tremblay

ACOE
Mike Hicks

EPA
Jean Brochi

NHDES
Karl Benedict
Lori Sommer
Christian Williams

NHB
Jessica Bouchard

NH Fish & Game
John Magee

Federal Highway
Jamie Sikora

The Nature Conservancy
Pete Steckler

Consultants/ Public Participants
David McNamara
Lee Carbonneau
Stephen Hoffman
Sam White
Evan Lowell
Christine Perron
Brian Gargan

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

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John Magee asked for confirmation that the proposed PGR would be installed to match existing grades. Mr. Hoffmann confirmed that this material will be embedded, and final grades will approximately match the existing grades with minor deviations due to the larger substrate size.

Mike Hicks asked about USCG coordination and Section 106 consultation. Mr. Hoffmann explained that NHDOT was coordinating with the USCG and that Section 106 Consultation had been completed under DOT's Programmatic Agreement.

Jessica Bouchard confirmed that a NHB occurrence was located in the vicinity, but no impacts were anticipated from the proposed project.

Pete Steckler and Jeannie Brochi had no additional comments.

Jon Evans added that he wanted to discuss the proposed project with Darrell Elliot and the Bureau of Construction to talk about the constructability of the project. Mr. Evans also added that potential impacts to the State Forest lands would require additional coordination with FHWA regarding 4(f) as this was not discussed in the initial review. Mr. Hoffmann explained that the potential ROW impacts had recently been identified and have not been finalized at this time. However, additional coordination with DNCR and FHWA will occur if impacts are required. Jamie Sikora concurred with this approach, and Christine Perron asked if the entire state forest would be considered a Section 4(f) Resource. Mr. Sikora confirmed that the State Forest is multi-use public land that would not necessarily be protected under Section 4(f) and that only specific components of the State Forest such as trails and parking areas could potentially be considered a protected resource.

Submitted by:

Stephen Hoffmann
McFarland Johnson, Inc.

Claremont, #27691 (Non-Fed):

Christine Perron from McFarland Johnson provided an overview of the project area and resources identified to date. This project will address Bridge 072/127, which carries NH Route 12A over the Sugar River in Claremont. The project is a non-federal bridge rehabilitation and scour protection project. The bridge is a 1967 three-span steel girder bridge with a concrete deck. It is on the NHDOT red list of bridges due to the poor condition of the deck, and the bridge is also rated as scour critical during floods.

The Sugar River is subject to the NH Shoreland Water Quality Protection Act, and the need for a Shoreland permit is anticipated. The bridge is considered a Tier 3 steam crossing under the NHDES stream crossing rules. The river is not considered a navigable water for the purposes of US Coast Guard jurisdiction. A delineation was completed and the only jurisdictional areas within the project are the bank and channel of the river. There are no Priority Resource Areas in the project area. The Sugar River is a FEMA-mapped regulatory floodway with a 100-year floodplain (Zone AE) on both sides of the river.

The NH Natural Heritage Bureau review from 2020 noted two state-listed plant species south of the bridge. Through coordination at that time, it was determined that potentially suitable habitat for these species does occur near the bridge, and it was agreed that a plant survey would be completed this spring within areas of potential impact. Continued coordination with the Natural Heritage Bureau will occur.

NHDOT staff completed an acoustic presence/absence survey for bat species of concern. Based on survey results, the federally listed northern long-eared bat can be assumed absent from the site and consultation with the USFWS on this species will fall under the 4(d) rule. The acoustic survey also determined that the state-listed little brown bat was likely present at the site. However, there is no suitable roosting sites for this species in the project area and impacts to this species are not anticipated.

When the project was initiated, NH Fish & Game asked that a mussel survey be completed for the project. The survey was completed by Biodrawversity in 2020 and found generally poor mussel habitat within the project area with no live mussels, mussel shells, or shell fragments. The report was forwarded to NH Fish & Game and USFWS.

The Sugar River is classified as a warmwater fishery according to the NHDES Wetland Permit Planning Tool. It is also designated as Essential Fish Habitat for Atlantic salmon; however, the National Marine Fisheries Services is not currently consulting on projects located within the Connecticut River watershed and an EFH Assessment is not required. Coordination with John Magee and the regional fisheries biologist at NH Fish & Game in 2020 indicated that there were no concerns regarding fisheries.

An overview of proposed work was provided. The rehabilitation will include replacing the bridge superstructure and bridge bearings, as well as placing scour protection in the river at the northern pier. The proposed scour protection method is now partially embedded riprap, which will extend approximately 1 foot above the existing channel. Based on the hydraulic analysis completed by TranSystems, the proposed riprap will not result in an increase in base flood elevation within the floodway. The riprap placement will be completed within a cofferdam and a portion of the channel will remain unimpeded during construction. Construction access will require a temporary bulkhead off the bank of the river in one quadrant of the bridge, most likely in the northeast quadrant, and a temporary work trestle from the bulkhead.

Proposed impacts from the riprap placement will consist of approximately 1,134 sq ft / 61 linear feet of permanent channel impact. Impact calculations are still considered preliminary and temporary impacts have not yet been quantified.

Karl Benedict noted that the timing of the mussel survey so far in advance of construction should be reviewed with NH Fish & Game. He also noted that a detailed construction sequence should be provided in the permit application and should especially describe the temporary bulkhead.

Lori Sommer confirmed that the proposed riprap entailed protection of existing infrastructure and no mitigation would be required.

John Magee asked for more information on the temporary trestle. C. Perron responded that it would consist of a work platform atop temporary piles driven into the channel.

John also asked if the proposed riprap would impact water velocities, noting that his concern would be that additional erosion/scour could occur given that the fine sediments in the channel are very erodible, although he also added that any change was likely to be minimal. Evan Lowell responded that maximum velocities without riprap are 3.7 feet per second (fps), and 3.71 fps with riprap. Although these numbers are based only on the average cross-sectional velocities, John agreed that any effect on velocities would likely be a non-issue.

John added that he would follow up regarding the timing of the mussel survey, noting that the survey did conclude that the habitat in the project area was poor for mussels.

Mike Hicks confirmed that, as a non-federally funded project requiring Army Corps authorization, the Army Corps would be the lead federal agency.

Jessie Bouchard noted that further consideration should be given to the timing of the plant survey since one species is best identified when in fruit in mid to late July. If a spring survey is completed, it would only be possible to identify that species to the Genus level. The second species could be identified vegetatively in spring or summer. Christine commented that she would review the project schedule to determine the best approach for the plant survey.

Jeannie Brochi and Pete Steckler did not have any comments on the project.

Jon Evans asked that the project team schedule a meeting to discuss constructability with the Bureau of Construction and BOE Environmental Coordinator.

Submitted by:

Christine Perron
McFarland Johnson, Inc

Londonderry, #41715 (X-A004(724)):

Gerard Bedard introduced the project, explaining that this is the first time it is being presented at the Natural Resource Agency Coordination meeting. The project is in Londonderry at the intersection of Stonehenge Road with NH Route 28. Traffic on Stonehenge Road has difficulty turning onto NH 28 and experiences long delays during peak times requiring intersection control to improve operations and safety. Environmental resource data collection has begun, with wetland delineations and stream assessments planned for this spring and a Nuttall's reed grass survey planned for late summer. Two improvement concepts are being consider – signalized intersection and roundabout. One signalizes the intersection and widens NH 28 to add a northbound left turn lane, and a short southbound right turn lane, and the second option considers a roundabout requiring auxiliary lanes for the NH 28 southbound and Stonehenge roadway approaches.

Wetland Functional Assessment Worksheet

WETLANDS FUNCTIONAL ASSESSMENT WORKSHEET

Water Division/Land Resource Management
Wetlands Bureau

Check the Status of your Application

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

APPLICANT LAST NAME, FIRST NAME, M.I.: NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

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

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

SECTION 1 - LOCATION (USACE HIGHWAY METHODOLOGY)	
ADJACENT LAND USE: Roadway and agricultural	
CONTIGUOUS UNDEVELOPED BUFFER ZONE PRESENT? ☐ Yes ☒ No	
DISTANCE TO NEAREST ROADWAY OR OTHER DEVELOPMENT (in feet): 0'	
SECTION 2 - DELINEATION (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)	
CERTIFIED WETLAND SCIENTIST (if in a non-tidal area) or QUALIFIED COASTAL PROFESSIONAL (if in a tidal area) who prepared this assessment: Christine Perron (CWS No. 294)	
DATE(S) OF SITE VISIT(S): 05/09/2019	DELINEATION PER ENV-WT 406 COMPLETED? ☒ Yes ☐ No
CONFIRM THAT THE EVALUATION IS BASED ON: ☒ Office and ☒ Field examination.	
METHOD USED FOR FUNCTIONAL ASSESSMENT (check one and fill in blank if "other"): ☒ USACE Highway Methodology. ☐ Other scientifically supported method (enter name/ title):	

SECTION 3 - WETLAND RESOURCE SUMMARY (USACE HIGHWAY METHODOLOGY; Env-Wt 311.10)	
WETLAND ID: Sugar River	LOCATION: (LAT/ LONG) 43.398/-72.394
WETLAND AREA: N/A Stream Channel	DOMINANT WETLAND SYSTEMS PRESENT: Perennial Stream
HOW MANY TRIBUTARIES CONTRIBUTE TO THE WETLAND? 5	COWARDIN CLASS: R2UB1
IS THE WETLAND A SEPARATE HYDRAULIC SYSTEM? ☐ Yes ☒ No if not, where does the wetland lie in the drainage basin? lower	IS THE WETLAND PART OF: ☐ A wildlife corridor or ☐ A habitat island? IS THE WETLAND HUMAN-MADE? ☐ Yes ☒ No
IS THE WETLAND IN A 100-YEAR FLOODPLAIN? ☒ Yes ☐ No	ARE VERNAL POOLS PRESENT? ☐ Yes ☒ No (If yes, complete the Vernal Pool Table)
ARE ANY WETLANDS PART OF A STREAM OR OPEN-WATER SYSTEM? ☒ Yes ☐ No	ARE ANY PUBLIC OR PRIVATE WELLS DOWNSTREAM/ DOWNGRADIENT? ☐ Yes ☒ No
PROPOSED WETLAND IMPACT TYPE: fill (riprap)	PROPOSED WETLAND IMPACT AREA: 310 SF

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

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

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

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

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE (Reference #)	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☐ Yes ☐ No		☐ Yes ☐ No	
2	☐ Yes ☐ No		☐ Yes ☐ No	
3	☐ Yes ☐ No		☐ Yes ☐ No	
4	☐ Yes ☐ No		☐ Yes ☐ No	
5	☐ Yes ☐ No		☐ Yes ☐ No	
6	☐ Yes ☐ No		☐ Yes ☐ No	
7	☐ Yes ☐ No		☐ Yes ☐ No	
8	☐ Yes ☐ No		☐ Yes ☐ No	
9	☐ Yes ☐ No		☐ Yes ☐ No	
10	☐ Yes ☐ No		☐ Yes ☐ No	
11	☐ Yes ☐ No		☐ Yes ☐ No	
12	☐ Yes ☐ No		☐ Yes ☐ No	
13	☐ Yes ☐ No		☐ Yes ☐ No	
14	☐ Yes ☐ No		☐ Yes ☐ No	

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

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

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

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

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

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

VERNAL POOL ID NUMBER	DATE(S) OBSERVED	PRIMARY INDICATORS PRESENT (LIST)	SECONDARY INDICATORS PRESENT (LIST)	LENGTH OF HYDROPERIOD	IMPORTANT NOTES
1					
2					
3					
4					
5					

SECTION 6 - STREAM RESOURCES SUMMARY

DESCRIPTION OF STREAM: Sugar River	STREAM TYPE (ROSGEN):
HAVE FISHERIES BEEN DOCUMENTED? ☒ Yes ☐ No	DOES THE STREAM SYSTEM APPEAR STABLE? ☒ Yes ☐ No
OTHER KEY ON-SITE FUNCTIONS OF NOTE: warmwater fishery	

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

FUNCTIONS/ VALUES	SUITABILITY (Y/N)	RATIONALE	PRINCIPAL FUNCTION/VALUE? (Y/N)	IMPORTANT NOTES
1	☒ Yes ☐ No		☐ Yes ☒ No	Disturbance in project area from existing bridge abutments/piers
2	☒ Yes ☐ No	2, 5, 11	☐ Yes ☒ No	
3	☒ Yes ☐ No	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17	☒ Yes ☐ No	Documented warmwater fishery
4	☐ Yes ☒ No		☐ Yes ☒ No	stream channel provides limited flood storage, no adjacent wetlands
5	☒ Yes ☐ No	7	☐ Yes ☒ No	Groundwater discharge into stream channel
6	☒ Yes ☐ No	2	☐ Yes ☒ No	While the Sugar River does provide habitat for state and federally listed species, surveys of the project area did not identify the presence of any listed species.
7	☐ Yes ☒ No	2, 4	☐ Yes ☒ No	While sources of excess nutrients may be present in upland/upstream, high gradient stream channel and high water velocity with the course substrate make this not suitable for nutrient retention
8	☒ Yes ☐ No	4, 5, 6, 10	☐ Yes ☒ No	Stream provides fish habitat, export of nutrients downstream
9	☒ Yes ☐ No	3, 6, 8	☐ Yes ☒ No	Sugar river provides some scenic visual/aesthetic value
10	☐ Yes ☒ No	1, 2, 10	☐ Yes ☒ No	High water velocities, limited sediment trapping potential
11	☐ Yes ☒ No	N/a	☐ Yes ☒ No	No wetlands adjacent to stream that provide shoreline anchoring function
12	☒ Yes ☐ No	7, 11, 14, 16, 17, 22, 27	☒ Yes ☐ No	Sugar River is warmwater fishery, has scenic/aesthetic value, and provides multiple functions
13	☒ Yes ☐ No	2, 5, 6, 7	☐ Yes ☒ No	At this location, the Sugar River does provide some recreational benefits, however, access to the river at this location is limited.

14	☒ Yes ☐ No	1, 3, 4, 5, 17	☒ Yes ☐ No	

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

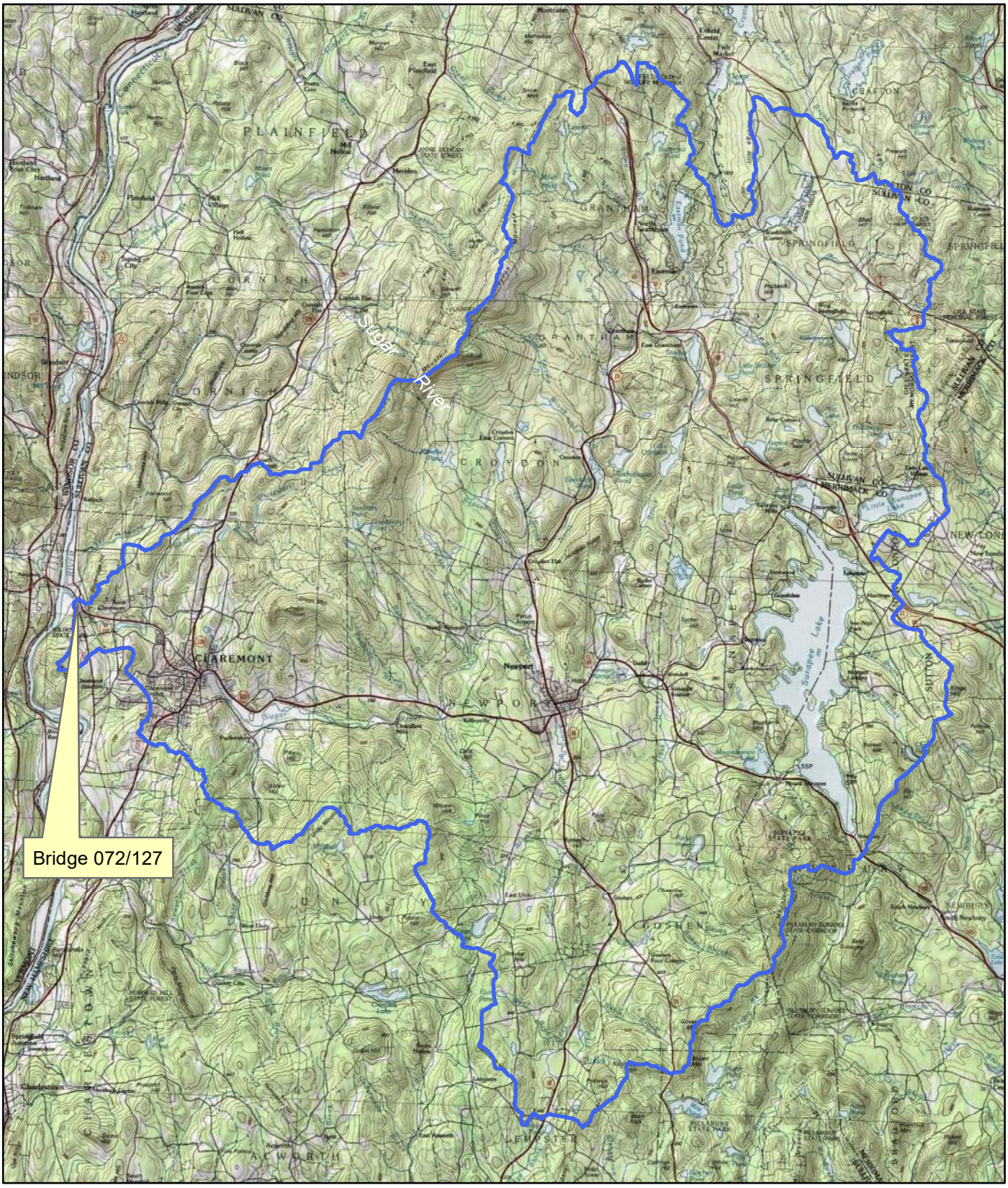
☐ Wildlife and vegetation diversity/abundance list.

☒ Photograph of wetland.

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

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

USGS Watershed Map



Sugar River Watershed (3.25 sq mi)

N

NH DEPARTMENT OF TRANSPORTATION
CLAREMONT 27691

WATERSHED

SCALE :	DATE :	FIGURE :
1 inch = 16,892 feet	OCTOBER 2022	2

McFarland Johnson

Env-Wt 904.09 Stream Crossing Rules

NHDES MAJOR IMPACT WETLANDS PERMIT APPLICATION

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

CLAREMONT, 27691

BRIDGE NO. 072/127 SUPERSTRUCTURE REPLACEMENT

CLAREMONT, NEW HAMPSHIRE

NHDES STREAM CROSSING RULES

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

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

The proposed project is considered rehabilitation of an existing legal crossing. Bridge No. 072/127 was originally constructed in 1967 and is on the NHDOT Red List of Deficient structures due to poor deck condition and a scour critical rating during floods. The project proposes replacement of the bridge deck superstructure and bearings, as well as installation of scour protection in the river at the northern pier. At the location of the existing bridge, the Sugar River has a watershed size of approximately 3.25 square miles. Based on the size of the watershed, the existing structure is a Tier 3 stream crossing. There are no Priority Resource Areas (PRAs) in the vicinity of the proposed project.

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

Not applicable. The proposed project involves repairs/rehabilitation of an existing bridge span.

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

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

The existing crossing does not have a history of causing or contributing to flooding that damages the crossing or other human infrastructure or protected species habitat. This finding is certified by a professional engineer in the enclosed Hydraulic Report.

(2) The proposed stream crossing will:

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

The proposed project meets the general criteria specified in Env-Wt 904.01. The project will not result in a barrier to sediment transport and will not obstruct aquatic organism passage. Changes in erosion, aggradation, or scouring are not anticipated. The results of the hydraulic analysis show that changes in maximum velocities due to the addition of riprap around one pier are negligible.

Geomorphic compatibility of the existing structure will be maintained.

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

The hydraulic capacity of the existing bridge will be maintained. The proposed scour protection will be partially embedded to avoid impacting the hydraulic capacity and base flood elevation, as described in the enclosed hydraulic report.

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

Aquatic organism passage will be maintained.

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

Stream connectivity will be maintained.

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

The proposed project is not anticipated to cause or contribute to an increase in the frequency of flooding or overtopping of the banks upstream or downstream from the crossing. The hydraulic opening of the existing bridge will be

maintained and the proposed scour protection will be partially embedded to avoid impacts to the base flood elevation.

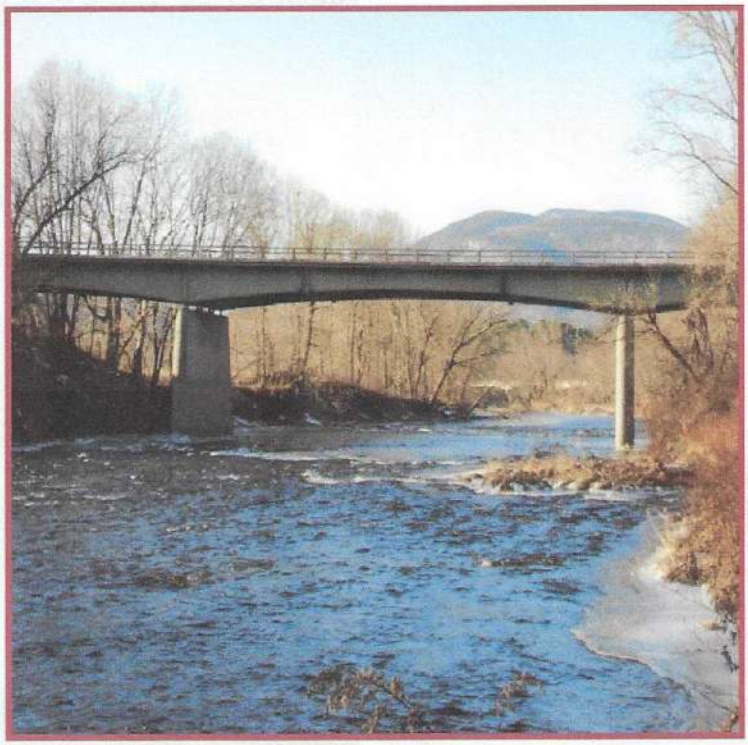
(d) Repair, rehabilitation, or replacement of a tier 4 stream crossing shall comply with Env-Wt 904.07(d)

Not applicable. The Sugar River a freshwater river and Bridge 072/127 is a Tier 3 stream crossing.

Hydraulic and Hydrological Study

Project Number: 27691

Hydraulic and Hydrological Study



NH Route 12A
over
Sugar River

Br. No. 072/127

Claremont, New Hampshire

August 2020

STATE OF NEW HAMPSHIRE
JOHN K. MCWHORTER III
No. 16322
LICENSED PROFESSIONAL ENGINEER

10/12/22

TranSystems

EXPERIENCE | Transportation

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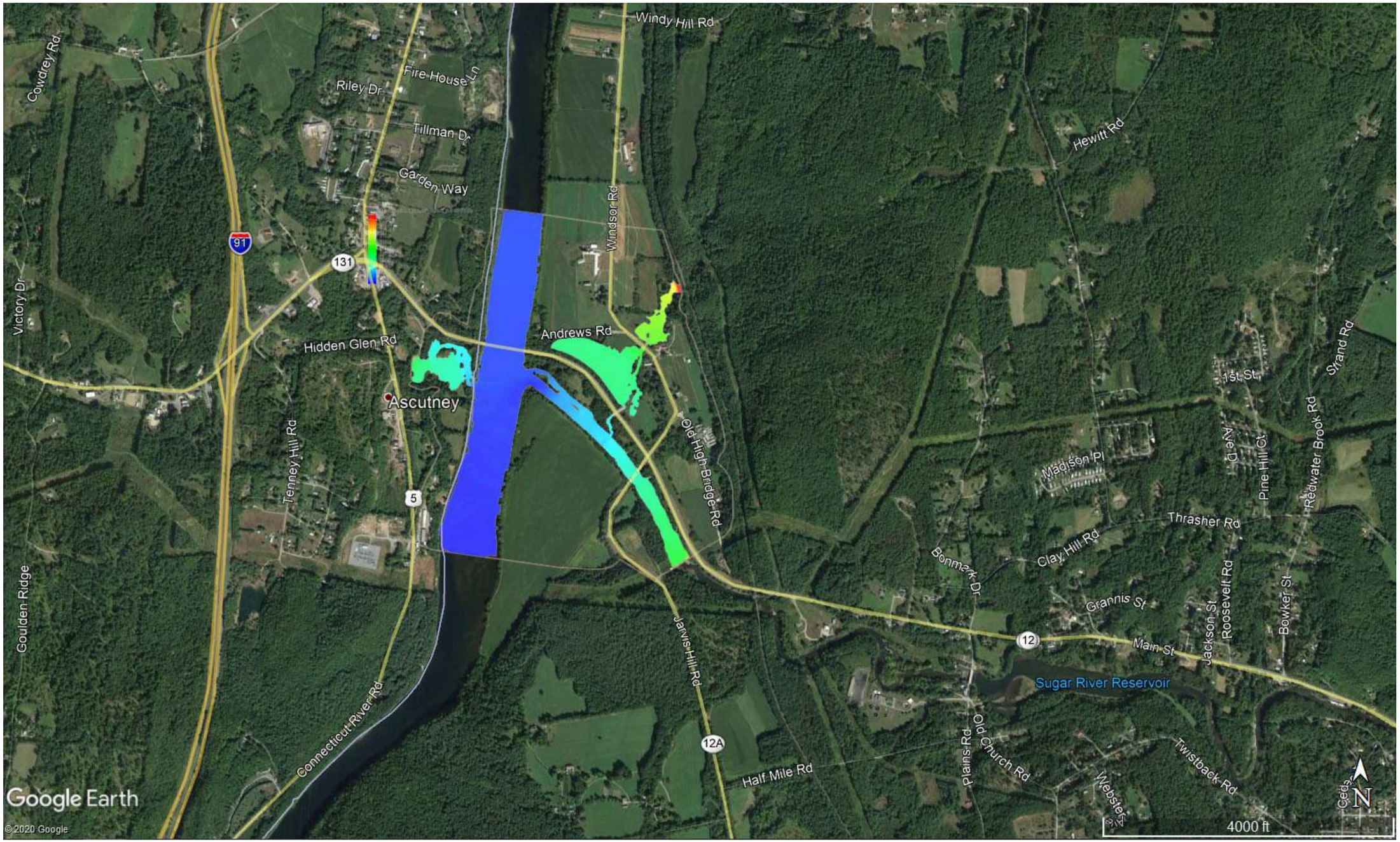
Removed for brevity in the wetland permit application. Available upon request.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Cowdrey Rd
Riley Dr
Fire House Ln
Tillman Dr
Garden Way
Windsor Rd
Hewitt Rd
91
131
Victory Dr
Hidden Glen Rd
Andrews Rd
Ascutney
Tenney Hill Rd
5
Old High Bridge Rd
1st St
Strand Rd
Madison Pl
Pine Hill Ct
Redwater Brook Rd
Thrasher Rd
Clay Hill Rd
Bonmark Dr
Grannis St
Jackson St
Roosevelt Rd
Bowker St
12
Main St
Sugar River Reservoir
Coulden Ridge
Connecticut River Rd
Jarvis Hill Rd
12A
Half Mile Rd
Plains Rd
Old Church Rd
Twistback Rd
Google Earth
© 2020 Google
4000 ft
N

Areas of Interest: Two-Dimensional Model Extents and Upstream Sugar River Reservoir

Sullivan County - Claremont, New Hampshire

TranSystems
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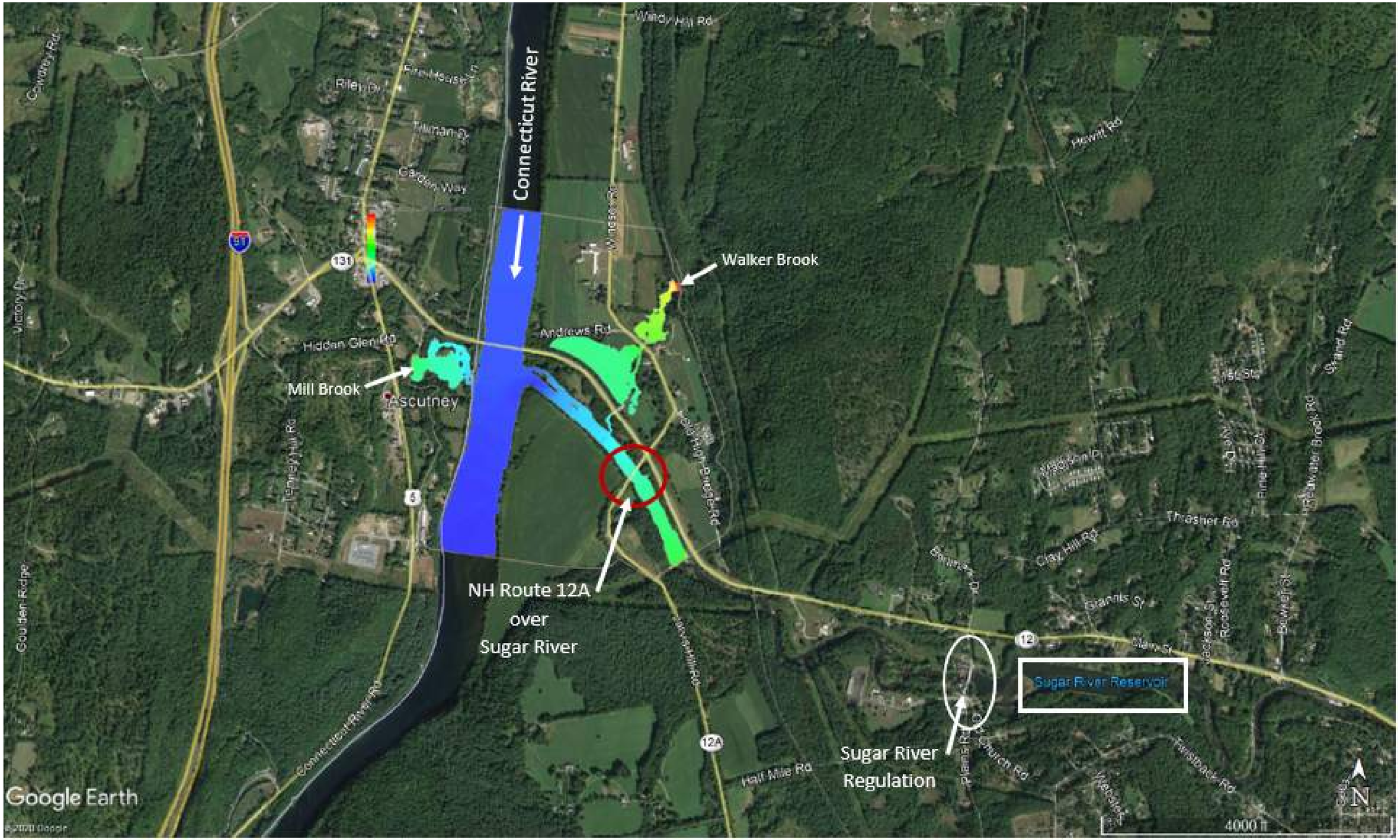

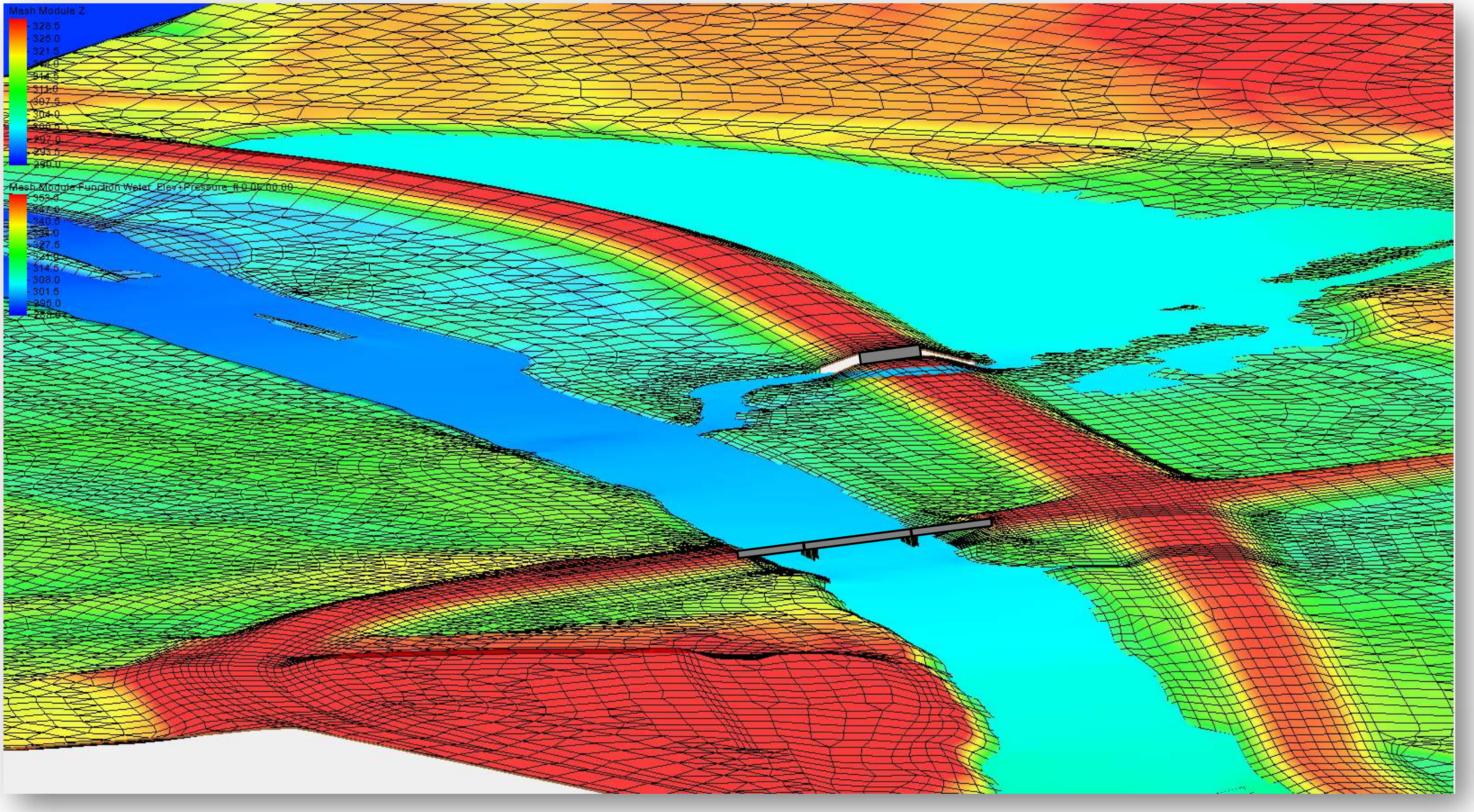
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325.0
321.5
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314.5
311.0
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353.5
347.0
340.5
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327.5
321.0
314.5
308.0
301.5
295.0

Section I:
Scour Analysis Report

TranSystems
EXPERIENCE | Transportation

NH Route 12A over Sugar River - Scour Analysis Report

August 2020: Sullivan County – Claremont, New Hampshire

1.0 Executive Summary

TranSystems is preparing plans for the replacement of the existing superstructure on the NH Route 12A (Jarvis Hill Road) bridge over the Sugar River. Since this bridge has already been coded as scour critical (see current POA in appendix) TranSystems developed an independent scour analysis for the purpose of confirming the current scour rating and to provide recommendations for scour countermeasures. The results from our scour analysis confirmed that the western intermediate pier is scour critical and the use of A-Jacks should be installed as a scour countermeasure.

2.0 Introduction

This report presents TranSystems' scour analysis of the existing three-span bridge carrying NH Route 12A over the Sugar River in Claremont, New Hampshire. The study reach extends from 1,300 feet upstream of NH Route 12A to the western floodplain extents of the Connecticut River; just over the Vermont state line.

The Connecticut River was included within the hydraulic model to help determine the worst-case scour conditions at NH Route 12A. Multiple abnormal flooding conditions were simulated to obtain the highest velocities (worst-case scour conditions) around the existing piers. The largest velocity results were obtained by coupling the 100-year and 500-year Sugar River storms with the normal flow or 2-year storm of the Connecticut River. This combination of storm events ensures no influence from the Connecticut River which would reduce velocities at the project site as its floodstage increases. Omitting the Connecticut River influence resembles the structure of the HEC-RAS 1D model used in the previous Plan of Action Report.

3.0 Project Description

3.*1* *Setting*

The Sugar River watershed is 275.67 square miles at its mouth (the confluence with the Connecticut River). At the NH Route 12A Bridge the water shed area is marginally smaller at 272.33 square miles. The main channel slope, measured by the bounding 20 foot contour crossings of the USGS quadrangle maps VT Windsor and NH Claremont North, is 22.0 feet/mile. The main channel slope as calculated by USGS using "Stream Slope 10 and 85 Method" is 25.9 feet/mile. The main channel slope in the vicinity of the bridge calculated based on project survey is 43.8 feet/mile. Channel slope within the study/ two-dimensional hydraulic model is dynamic, changing with each contour line or survey data point present within the channel.

The two existing bridge piers are located within the main channel. Both piers are tapering concrete wall piers approximately 3 feet in width, 43 feet in length at the base, 32 feet in length at the bridge superstructure, and 26 feet in height. The foundation of the west pier consists of a spread footing 9 feet wide by 46 feet long by 3 feet tall and the foundation of the east pier consists of a spread footing 8 feet wide by 45 feet long by 2 feet tall. Foundation depth and potential pier scour depth call into question whether the piers are scour critical or not. A scour critical pier refers to a pier's foundation having a depth lesser than that of the predicted scour to occur during the base flood event (100-year storm).

3.*2* *Flood History*

USGS Gage 01152500, Sugar River at West Claremont, NH, is located approximately 2.1 miles upstream of NH Route 12A and contains 91 years of recorded gage data. The historical flood of record occurred in 1936 and was equivalent to a 116-year storm event at the gage; however the project bridge was not constructed until 1967. This interpolation was calculated using weighted gage equations adopted from USGS's StreamStats Data-Collection Station Report for the gage. The ten largest storm events captured by the gage in regards to discharge are outlined in Table 3.

Table 3.1: USGS Gage 01152500 Data

NWIS Gage Data (1928-present)		
Year	Peak Record (cfs)	Weighted Interpolation (year)
1936	14,000	**115.7**
1938	13,100	**84.9**
1934	10,500	**34.7**
2006	9,740	**26.7**
1978	8,920	**20.1**
2007	8,460	**17.2**
1987	8,440	**17.0**
1953	8,170	**15.5**
1960	7,760	**13.5**
1951	7,530	**12.5**

4.0 *Field Data Collection*

NHDOT conducted a project field survey of the study area in June/ July of 2019. The primary intent of the survey was to collect channel geometry and detailed bathymetry in the vicinity of the bridge for use in hydraulic modeling. Additional channel geometry outside of the survey limits was extrapolated from the survey, but the channel centerline elevations were adopted from FEMA's Flood Insurance Study (FIS) #33019CV002A. Topographic data for the remaining model outside of survey extents was acquired from the Federal Geographic Data Committee's (FGDC) available LiDAR titled "LiDAR data for Connecticut River Watershed with FEMA HQ – Winnipesaukee AOI and WMNF AOI QL2 LiDAR New Hampshire State Plane Data Set". Connecticut River bathymetry was also derived from FEMA FIS #33019CV002A.

Both the project survey and the available LiDAR (completed in 2015) were in the North American Datum (NAD) 2011 New Hampshire State Plane horizontal projection and the North American Vertical Datum of 1988 (NAVD 88). The FEMA data was prepared in in New Hampshire State Plane, FIPSZONE 2800 and also utilizes the NAVD 88. For ease of constructability, the hydraulic model display projection was set to the projection listed below and references the NAVD 88 in U.S. Survey Feet:

NAD_1983_2011_StatePlane_New_Hampshire_FIPS_2800_Ft_US

WKT:
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5.0 Hydrology

5.*1* *Hydrology Analysis*

The watershed associated to the Sugar River is moderately sloped and doubles in steepness in the vicinity of the bridge (22.0 feet/mile to 43.8 feet/mile). The contributing drainage area is 275.67 square miles at Sugar River's mouth, 272.33 square miles at NH Route 12A over Sugar River, and 269.00 square miles at upstream gage 01152500. An analysis of various discharges and their respective sources was conducted to determine the appropriate values for the study. Ultimately, larger discharges were calculated by USGS's StreamStats program at the project site utilizing current regression equations. Additional hydrological evaluation included upstream gage data, regression equations gage data, weighted gage data, USGS PeakFQ Regulated Gage data, and a set of discharges present in FEMA FIS #33019CV001A. Typically, the gage data is lower than the regression equation gage data and the weighted values combine them appropriately. Since the upstream gage 1152500 has 90 years of recorded data, the weighted values closely resemble the gage data. Further analysis indicated that the recorded gage data was classified as regulated. Upstream of the project location, but downstream of the gage (at Plains Road) there is a permanent spillway which forms the Sugar River Reservoir behind it. Gage data was imported into USGS's PeakFQ program to calculate the regulated peakflows skewed to the station. The results were similar to other discharge values indicating the spillway does not hold back flood events. FEMA FIS values closest to the project are recorded at the confluence of North Branch Sugar River. Since the watershed at this location is nearly 70 square miles smaller than the watershed associated with the project, the FEMA discharges were disregarded.

5.*2* *Hydrology Selection –Scour Analysis*

For the sole purpose of a scour analysis, the discharges producing "worst-case" results at the bridge piers are required and were selected for use in this study. USGS's StreamStats regression equation values at NH Route 12A were used. A comparison of available discharges, the source of the data, location of the data, and the respective watershed areas attributed to each source are presented in Table 5.1.

Table 5.1: Hydrology Comparison

Source	StreamStats	USGS PeakFQ	StreamStats			FEMA FIS
Location	NH Route 12A	Gage 01152500	Calculated Gage Data			Confluence of North Branch Sugar River
Sq. Mi.	273.33 (sq. mi.)	269.00 (sq. mi.)	269.00 (sq. mi.)			204.10 (sq. mi.)
	Peak	Peak	Peak	Regression	Weighted	Peak
Year	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
500	**18200**	16730	17200	21700	17600	18200
200	-	14320	14800	18200	15000	-
100	**14100**	12640	13000	15800	13200	13028
50	**12200**	11070	11400	13700	11500	10417
25	**10600**	9587	9800	11600	9950	-
10	**8610**	7744	7980	9120	8010	7252
5	**6970**	6400	6590	7370	6610	-
2	**4840**	4556	4680	4970	-	-

*Note: **Emboldened** values used in study*

Flood events from the Connecticut River impact the elevations at the project site. Therefore the flood event discharges along the Connecticut River are also needed for the analysis. The Connecticut River was determined to be a regulated waterway resulting in inaccurate StreamStats discharges and the nearest gage was too far upstream to be considered in discharge analysis at Sugar River. FEMA FIS values for the Connecticut River at the confluence of Sugar River were used in this study.

Walker Brook and Mill Brook discharges were determined by StreamsStats at the confluence with Sugar River and the Connecticut River; respectively.

5.3 *Hydrology Selection – Hydraulic Analysis*

Coincidental occurrence refers to the varying amount of time different size basins will take to reach their respective peak flows. A smaller basin with a relative short time of concentration will achieve its peak discharge before a larger basin with a longer time of concentration. This causes the smaller basin's peak flow to be reached as the larger basin is at a fraction of its peak flow. The Connecticut River watershed of 4,698 square miles is considerably larger than the Sugar River watershed of 273 square miles and thus the storm duration and subsequent peak discharges will occur at different times. A storm event of greater magnitude would be expected to occur on the Sugar River while a storm of lesser magnitude would be occurring on the Connecticut River due to this. The Connecticut River to Sugar River watershed area ratio is 17.19:1. Per HEC-22 Table 7-3 watershed areas closest to 10:1 shall include the designated storm frequencies coupling between Main Stem (Connecticut River) and Tributary (Sugar River) for

hydraulic simulations. Since the 50-year and 500-year frequency coupling is not directly called out and these events are commonly considered major storm events, the frequency coupling was assumed to match that of the 100-year frequency coupling.

Table 5.2: Coincidental Occurrence Frequencies (HEC-22 Table 7-3)

Table 7-3. Frequencies for Coincidental Occurrence.				
Area Ratio	Frequencies for Coincidental Occurrence			
	10-Year Design		100-Year Design	
	Main Stream	Tributary	Main Stream	Tributary
10,000 to 1	1 10	10 1	2 100	100 2
1,000 to 1	2 10	10 2	10 100	100 10
100 to 1	5 10	10 5	25 100	100 25
10 to 1	10 10	10 10	50 100	100 50
1 to 1	10 10	10 10	100 100	100 100

While coincidental occurrence storm are predicted to represent the most accurate hydraulic scenarios, an equivalent storm frequency coupling was simulated for the 100-year event to compare to FEMA elevations and the floodplain delineation produced by the two-dimensional model. The equivalent base flood storm includes the same storm magnitude inflow of the Sugar River, the same storm magnitude inflow of the Connecticut River, and the same magnitude storm exit water surface elevation at the downstream extents of the hydraulic model.

The results of the Connecticut River Base/ Sugar River 100-year simulation, the Coincidental Occurrence Connecticut River 50-year/ Sugar River 100-year, and the Equivalent Frequency Connecticut River 100-year/ Sugar River 100-year were compared to confirm that the worst-case scenario for scour was the abnormal flooding event of the Connecticut River base flood coupled with the Sugar River 100-year event. These results are summarized in Table 6.3 below.

6.0 *Existing Conditions*

6.*1* *Model Setup*

Hydraulic analysis for the existing conditions was performed using the Sedimentation and River Hydraulics - Two-Dimensional (SRH-2D) program within the Surface-water Modeling Systems 13.0.13 (SMS) interface. The two programs create a robust representation of the real world topography and

accurately accounts for flow in the x and y directions opposed to its one-dimensional predecessor's downstream direction of flow. Capturing flow in the x and y directions at user specified intervals has allowed for precise local data in the vicinity of the piers to be extracted from the model during post processing. The program computes five main variables which can be manipulated using the dataset calculator to produce any desired variable. These variables include water surface elevation, water depth, velocity, shear stress, and Froude number. Additionally, discharge (cfs) can be captured across any user specified location.

For this analysis, the starting water surface elevations at the downstream limit of the model (approximate FEMA station 106500 on the Connecticut River) were set based on the FEMA profiles found in FIS #33019CV002A. The model simulation begins as dry and begins to fill based on the inflows assigned to the Sugar River, Connecticut River, and Walker Brook (north of the project site flowing south through two culverts and into Sugar River downstream of the bridge). Mill Brook, a stream flowing west to the Connecticut River from Vermont, was also included in the model since its outflow has potential to influence the confluence of Sugar River into the Connecticut River. Once the model downstream limits reach the assigned water surface elevations the model begins to stabilize until discharge across monitor lines becomes constant. This point is referred to as model continuity and is essential in a steady flow analysis as it ensures the peak conditions have been achieved.

A two-dimensional mesh was constructed with larger elements outside areas of interest and heavily concentrated elements in and around the bridge limits. The purpose of the mesh is to outline/ capture the topography within the model limits. Meshing techniques were utilized to capture rapid changes in topographical data such as roadway embankments and channel banks. The aforementioned topographical data was merged together and assigned to the mesh based on the following priorities:

- **Base layer –** FGDC LiDAR
- **Intermediate layer –** FEMA based channel geometry (bathymetry) embedment into LiDAR
- **Forefront layer –** NHDOT project survey burned into place overwriting lower overlapping layers

Additional meshing techniques were used to capture the tapering pier geometry present in the project survey. The area of the pier at the intersection with the steel beams and the bridge abutments were modeled as holes in the mesh per FHWA guidance. This ensures head loss and that flow distribution around these areas are calculated realistically and effectively. The final hydraulic model has a perimeter of 3.25 miles and encompasses 0.60 square miles consisting of 60,100 elements.

Manning's "n" values were applied to areas of the model with respect to NHDOT Bridge Design Manual v2.0, FEMA FIS #33019CV001A, project photographs, and available aerial imagery. A single monitor line was placed upstream of the bridge for model simulation purposes and additional monitor lines were placed within the bridge limits between the holes in the mesh representing abutments and piers to capture the discharge under each span per storm event.

6.*2* *Existing Conditions Results*

The following bullets summarize the significant results of the existing conditions hydraulic analysis coupling the Sugar River 100-year storm with the Connecticut River normal flow (2-year storm) and the Sugar River 500-year storm with the Connecticut River normal flow (2-year storm).

- The Connecticut River will not backflow into the Sugar River.
- Sugar River discharge is maintained within the main channel upstream and downstream of the bridge.
- Sugar River discharge does not elevate to reach the bridge abutments.
- Variable velocities are present across the upstream and downstream face of the bridge.
- The bridge does not experience pressure flow.

6.*3* *Existing Conditions Results with Respect to Scour Analysis*

Approximately 100 feet upstream of the bridge the main channel decreases in elevation and the channel produced by the 100-year storm contracts from approximately 197 feet to approximately 154 feet resulting in an abrupt increase of velocities across the channel. At the point of contraction the river also shifts a few degrees westward directing discharge away from the east pier and marginally towards the west pier. This results in the highest shear stress at the bridge computed along the eastern face of the west pier. The flow shift and increased distance from the channel bank to the west pier allows for heightened velocities from the center of the channel to be diverted around the west pier, reach a maximum velocity at the southwest corner of the pier, and be directed through the western approach span. The 100-year and 500-year inflows assigned to the Sugar River were 14,100 cfs and 18,200 cfs; respectively. The distribution of discharges per span are recorded in Table 6.1 and Table 6.2.

Table 6.1: Existing Conditions Flow Distribution of 100-year Strom

Existing Conditions Flow Distribution (100-year Sugar River)					
West Span		Central Span		East Span	
2,044	cfs	10,902	cfs	1,155	cfs

Table 6.2: Existing Conditions Flow Distribution of 500-Year Storm

Existing Conditions Flow Distribution (500-year Sugar River)					
West Span		Central Span		East Span	
2,619	cfs	14,330	cfs	1,694	cfs

As desired for an accurate scour analysis, local results were computed around the existing piers. These results are summarized in tables, visually, and graphically in Section II – Hydraulic Analysis Results.

6.4 *Existing Conditions Scour Analysis*

The Bridge Scour coverage within SMS was utilized to export data needed for the scour analysis to FHWA's Hydraulic Toolbox for the scour computations. This method allows the user to specify the approach section, contracted section, channel banks, abutment toes, and pier parameters increasing the accuracy of the data used for the scour analysis. The user then applies the desired two-dimensional simulation output and soil gradation to the coverage to generate an output file for FHWA's Hydraulic Toolbox. The output values of the Bridge Scour tool for both the 100-year and 500-year storms are included in Section II – Hydraulic Analysis Results.

Once opened within hydraulic toolbox, the input values and pier parameters were confirmed. Channel bed and bridge deck elevations were then input to generate an elevation view of the predicted scour results. A comprehensive record of scour related parameters and results are included in Section II – Hydraulic Analysis Results. Scour results for determining worst case scenario are summarized in Table 6.3. Scour results used for this study, coupling the Connecticut Base Flood with the Sugar River storms, are summarized in Table 6.4.

Table 6.3: 100-Year Scour Comparison to Determine "Worst-Case"

	Sugar River	Connecticut River		Hydraulic Toolbox Scour	
	Inflow (yr)	Inflow (yr)	Outflow (yr)	West Pier (ft)	East Pier (ft)
Scour Analysis					
100-Year	100	2	2	10.61	12.48
Coincidental Occurrence					
100-Year	100	50	50	6.93	8.19
Equivalent Storm Events					
100-Year	100	100	100	6.64	8.32

The main channel contraction scour was determined to be live bed scour by Hydraulic Toolbox. The applied contraction scour depth is 0.75 feet for the 100-year scour analysis and 1.23 feet for the 500-year scour analysis. Storm waters do not reach the bridge's abutments, therefore there was no abutment scour calculated.

Table 6.4: Scour Analysis Summary

	Sugar River	Connecticut River		Hydraulic Toolbox Scour	
	Inflow (yr)	Inflow (yr)	Outflow (yr)	West Pier (ft)	East Pier (ft)
Scour Analysis					
100-Year	100	2	2	10.61	12.48
500-Year	500	2	2	11.22	12.59
Contraction Scour Included – Total Scour at Piers				West Pier (ft)	East Pier (ft)
100-Year	100	2	2	11.36	13.22
500-Year	500	2	2	12.45	13.82

6.5 *Existing Conditions Results with Connecticut River Influence*

The 100-year equivalent storm behaves the same as the coincidental occurrence 100-year storm. Both simulations produce the same flow behavior at the confluence of the rivers and same floodplain delineation induced by the Connecticut River influence, but produce one major difference. The water surface elevations of the 100-year equivalent storm were around 319.8 feet, closely matching the FEMA FIRM elevations of 320 feet, and the water surface elevations of the 100-year coincidental occurrence storm were around 318.3 due to the lower downstream boundary conditions and reduced discharge coming down the Connecticut River. Velocities are reduced by approximately 60% due to influence of the Connecticut River and thus do not produce worst case scour results. Hydraulic results for all simulations are summarized in Table 6.5.

Table 6.5: H&H Summary Table

				Roadway 331.9 (ft)				Low Chord 323.2 (ft)	
				At Upstream Face of Bridge				Flow Overtopping Bridge	Flow Overtopping Bridge
	Sugar River	Connecticut River		Water Surface (ft)		Velocity (ft/s)			
	Inflow (yr)	Inflow (yr)	Outflow (yr)	Max	Avg	Max	Avg		
Scour Analysis									
500-Year	500	2	2	307.31	305.99	11.18	7.20	No	No
100-Year	100	2	2	305.47	304.35	10.05	6.50	No	No
Coincindental Occurrence									
500-Year	500	100	100	319.72	319.70	1.22	0.36	No	No
100-Year	100	50	50	318.47	318.34	3.70	2.42	No	No
50-Year	50	25	25	317.06	316.94	3.46	2.24	No	No
10-Year	10	5	5	313.59	313.50	2.99	1.92	No	No
Equivalent Storm Events									
100-Year	100	100	100	319.74	319.75	1.08	1.42	No	No

7.0 *Discussion*

The predicted scour for both the 100-year and 500-year event exceed the depth of the footings under both the west pier and the east pier. Per the bridge card, the west pier is supported by hardpan and the east pier is supported on ledge rock. Since ledge rock is not a material subject to scour, the east pier is not scour critical. Since the theoretical scour depth exceeds the footing depth under the west pier and it is founded on hardpan (a dense layer of soil, typically of clay, found beneath the uppermost soil layer) the west pier is scour critical. Substructure component elevations relative to theoretical scour depths are summarized in Table 7.1.

Table 7.1: Substructure to Scour Summary

Substructure Unit	Roadway Elevation (ft)	Low Chord Elevation (ft)	Footing Elevation (ft)		Streambed Elevation (ft)			CHA 100-Year Scour (ft)	TranSystems 100- Year Scour (ft)
			Top	Bottom	As builts 1996	CHA Field 2009	NHDOT Survey 2019		
Left Abutment	333.8	326.9	323.0	320.5	324.5	324.5 (US)	324 (US)	N/A	N/A
West Pier	333.2	323.9	290.7	287.7	293.0	292.4 (DS)	293.5 (DS)	274.4	282.1
East Pier	332.5	323.2	291.0	288.0	293.0	292.1 (US)	293.5 (US)	N/A	280.3*
Right Abutment	331.9	325.0	321.3	318.8	322.5	322.0 (US)	322 (US)	N/A	N/A

*Elevation not achievable due to presence of ledge rock under pier.

8.0 *Recommendations*

To address the scour critical condition at the western pier, the installation of a scour countermeasure is recommended. Several methods were considered including traditional riprap, partially grouted riprap and A-Jacks. The A-Jacks product is recommended for several reasons. The success of partially grouted riprap relies heavily on the experience of the contractor. If too much grout is used then the installation becomes monolithic and loses its ability to self-adjust with changes in bed elevation. Traditional riprap may be difficult to install underneath the existing bridge and access will be a challenge for installation. The A-Jacks system offers a uniform size structure that is interlocking and can be placed either singly or in groups. The AJ-24, 2 foot version, can be placed by hand. In addition, NHDOT has had success with this product on past projects.

A-Jacks will not raise water surface elevations at the bridge. A simulation was run with the channel elevations raised around the west pier to represent the A-Jacks placed on top of the channel bed (approximate 1.0 foot raise in channel bed). The A-Jacks width around the pier was modeled as equal to the predicted scour depth (12.45 feet) per CONTECH specifications. A visual representation of this is noted in Section II – Hydraulic Analysis Results and a summary of the expected base flood with and without A-Jacks presented is summarized in Table 8.1.

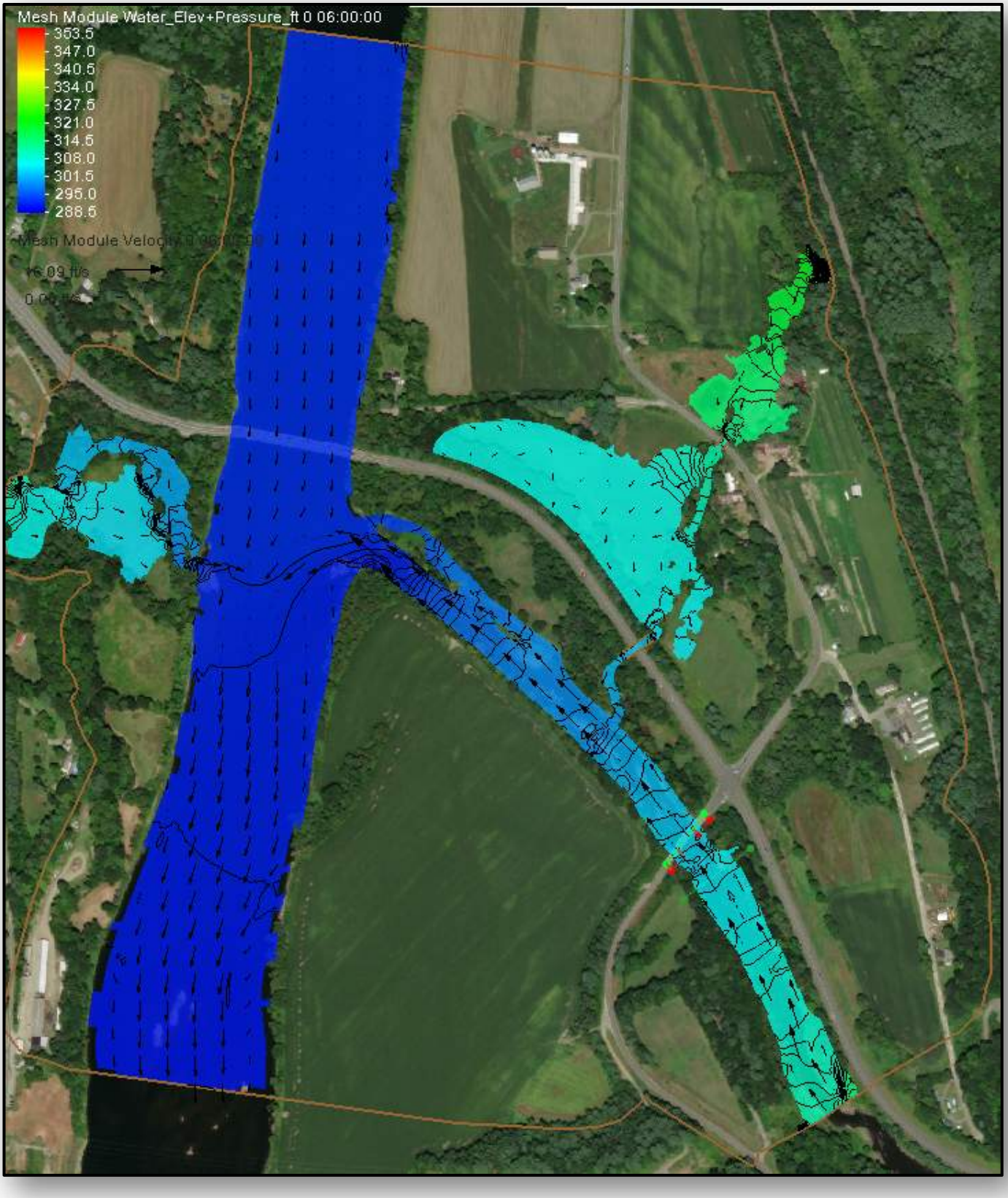
Table 8.1: A-Jacks Placement Water Surface Results

				At Upstream Face of Bridge			
	Sugar River	Connecticut River		Water Surface (ft)		Velocity (ft/s)	
	Inflow (yr)	Inflow (yr)	Outflow (yr)	Max	Avg	Max	Avg
Coincindental Occurrence							
Without A-Jacks 100-Year	100	50	50	318.47	318.34	3.70	2.42
With A-Jacks 100-Year	100	50	50	318.45	318.33	3.71	2.49

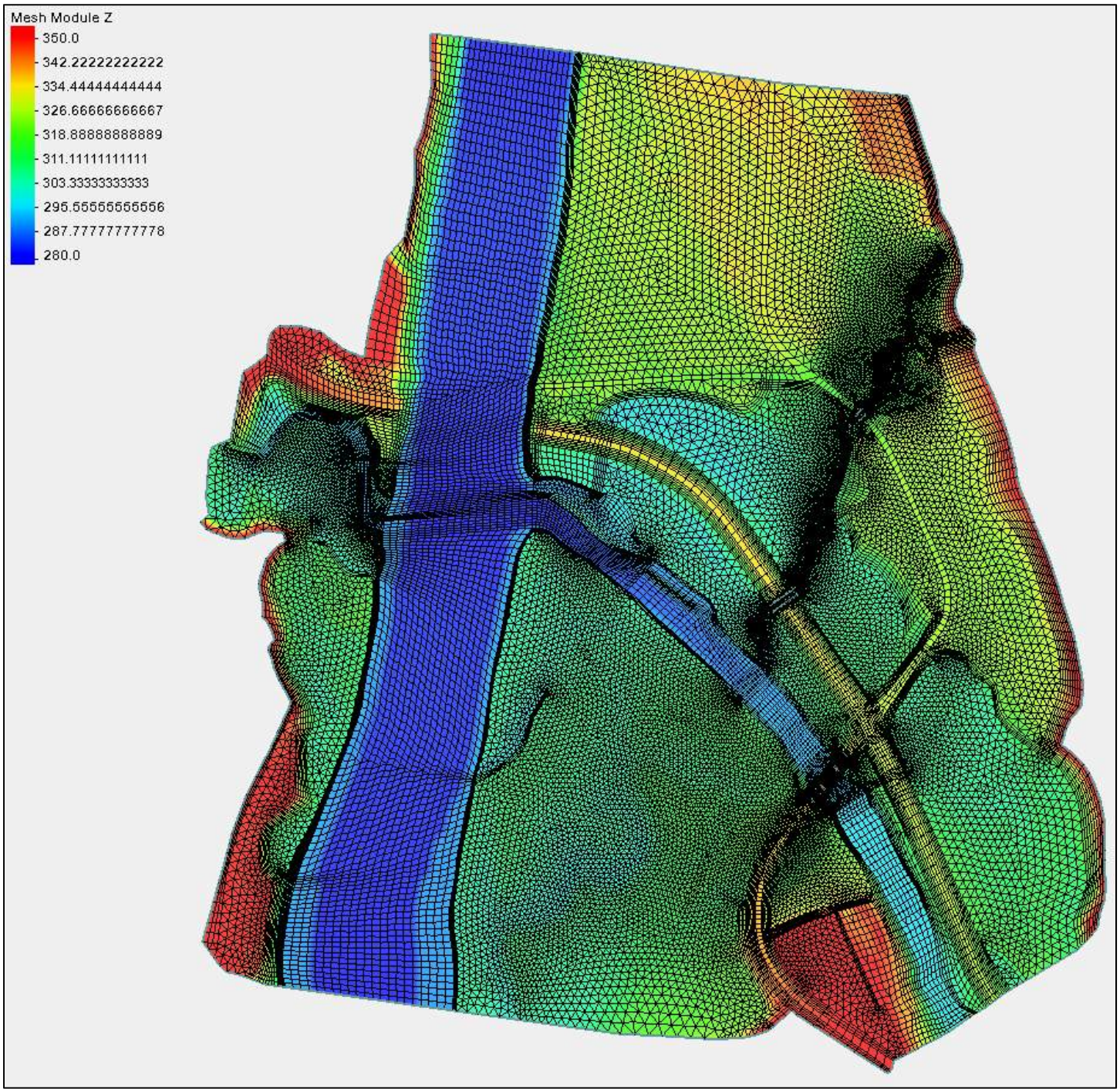
Section II:
Hydraulic Analysis & Results

NH Route 12A over Sugar River - Hydraulic Analysis & Results

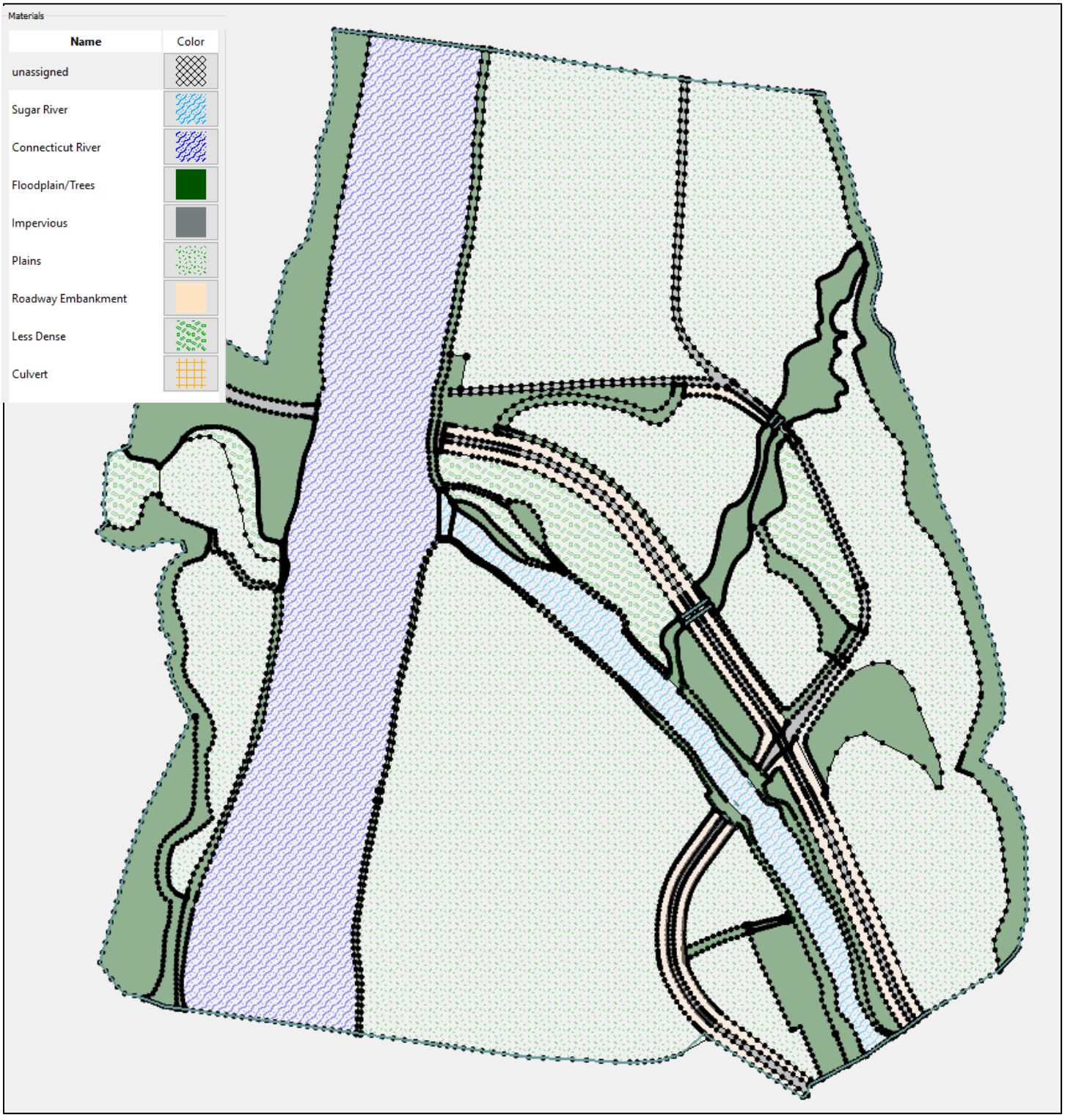
Two-Dimensional Model Extents:



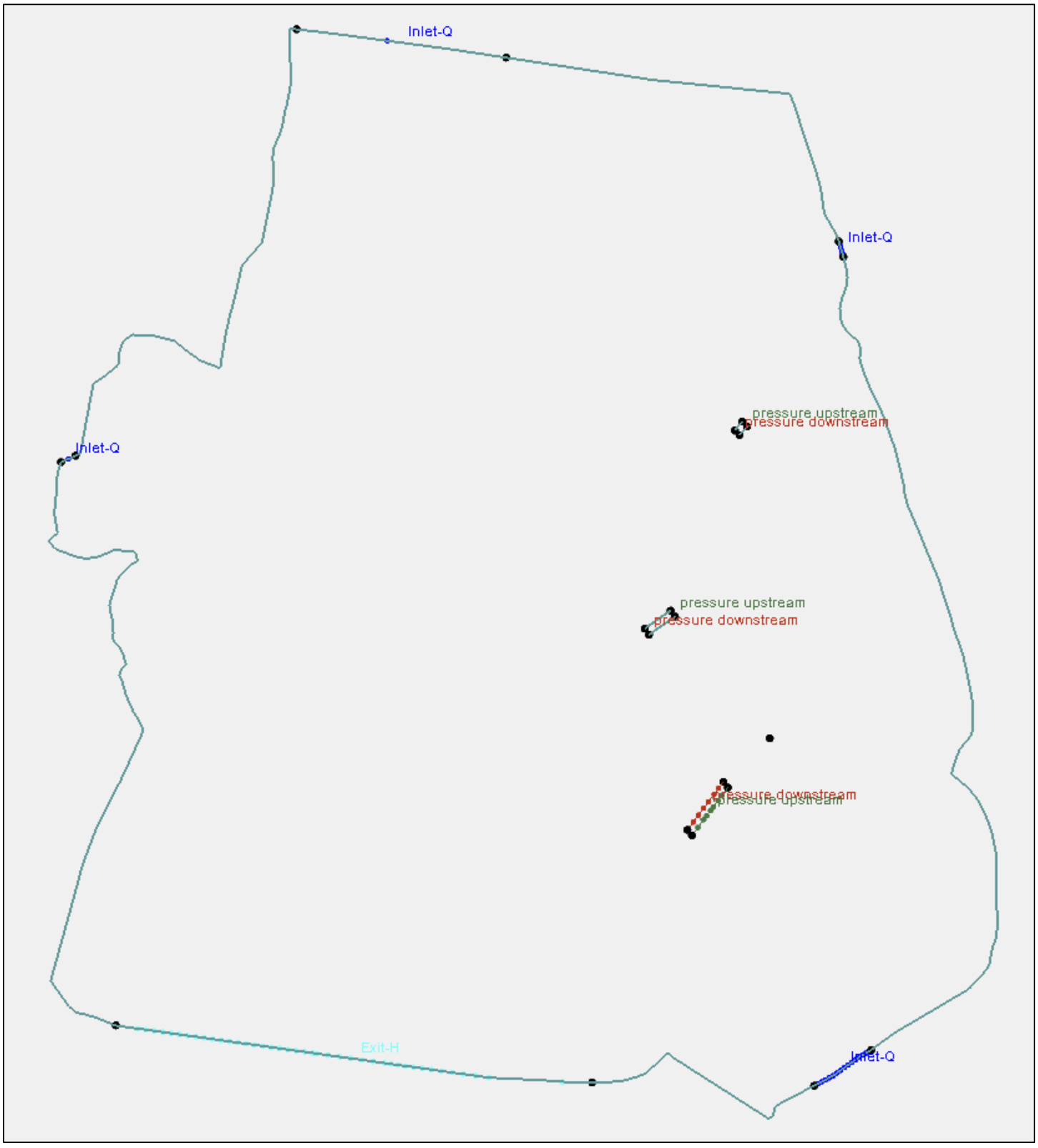
Two-Dimensional Model Mesh (elevation values)



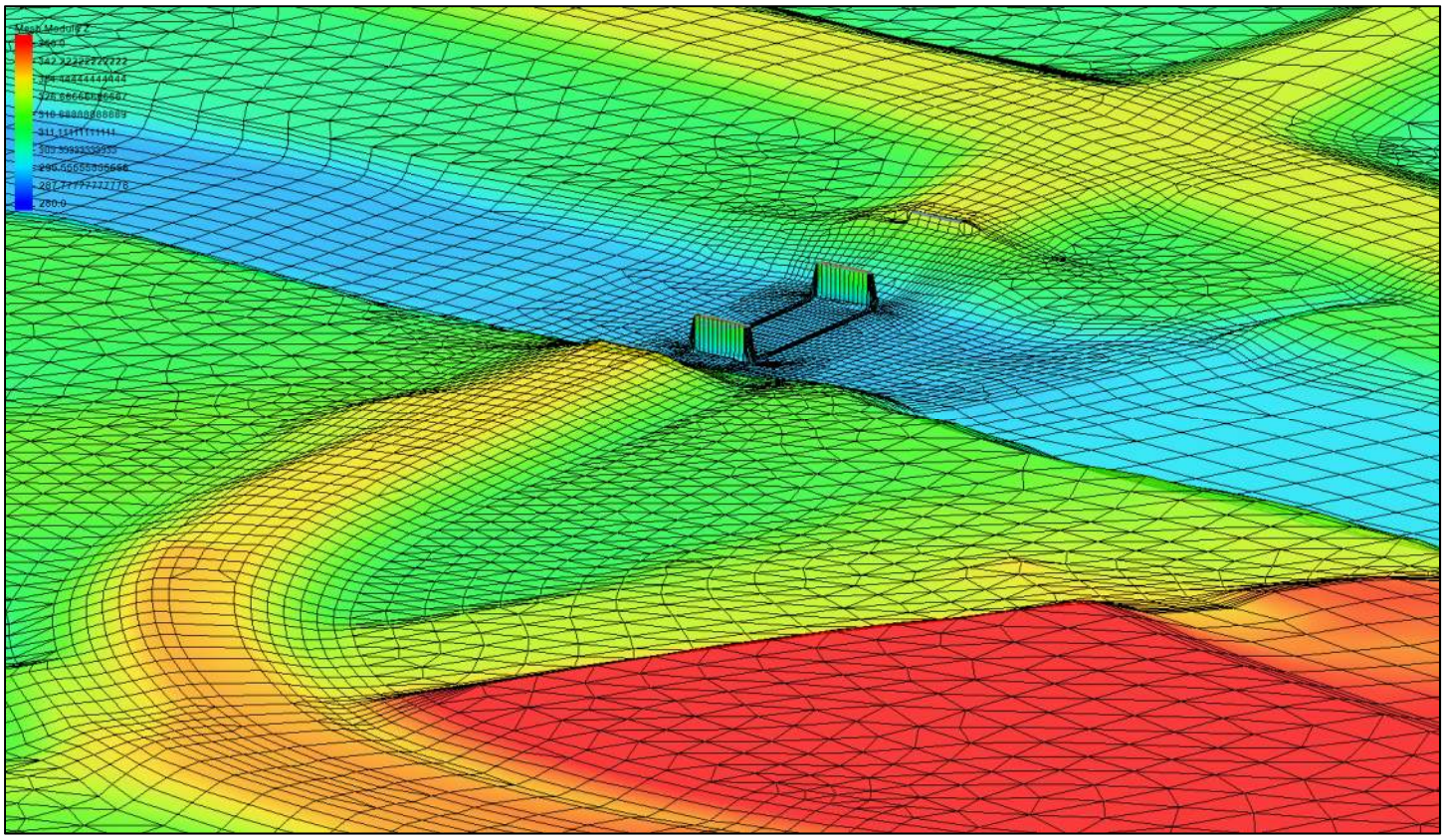
Two-Dimensional Materials Coverage (Mannings “n” value determination)



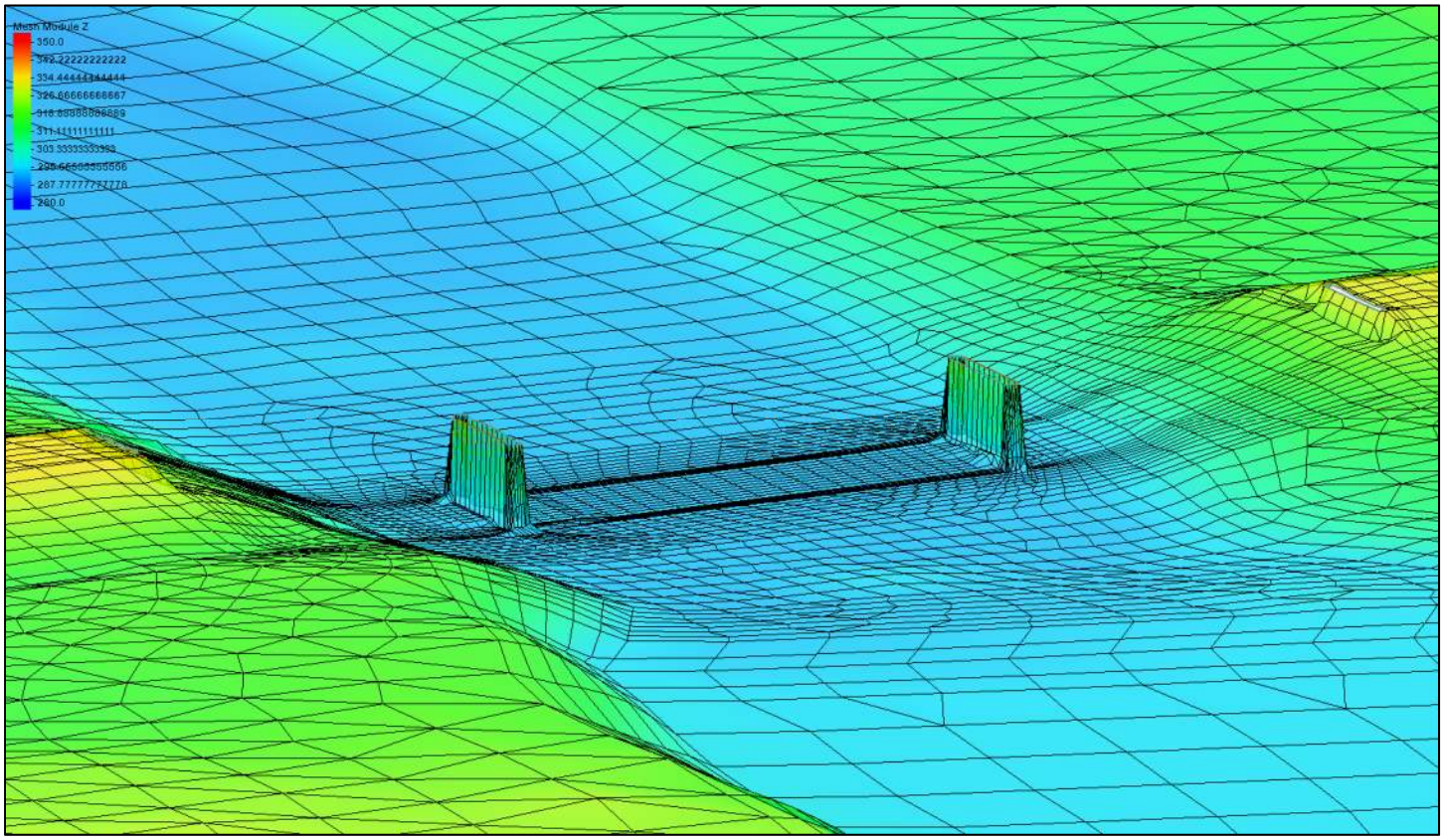
Two-Dimensional Model Boundary Conditions (discharge inflow and outflow/ culvert and bridge parameters)



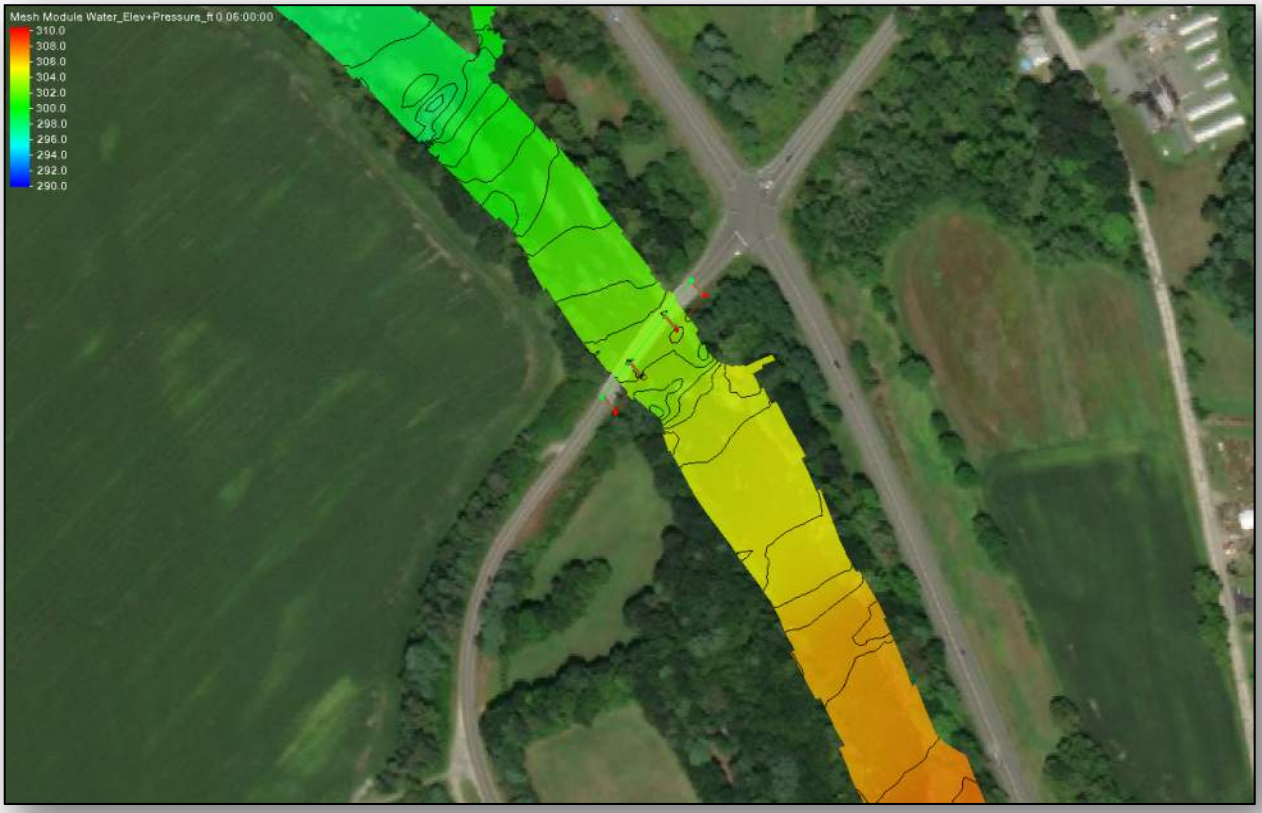
Model geometry along NH Route 12A



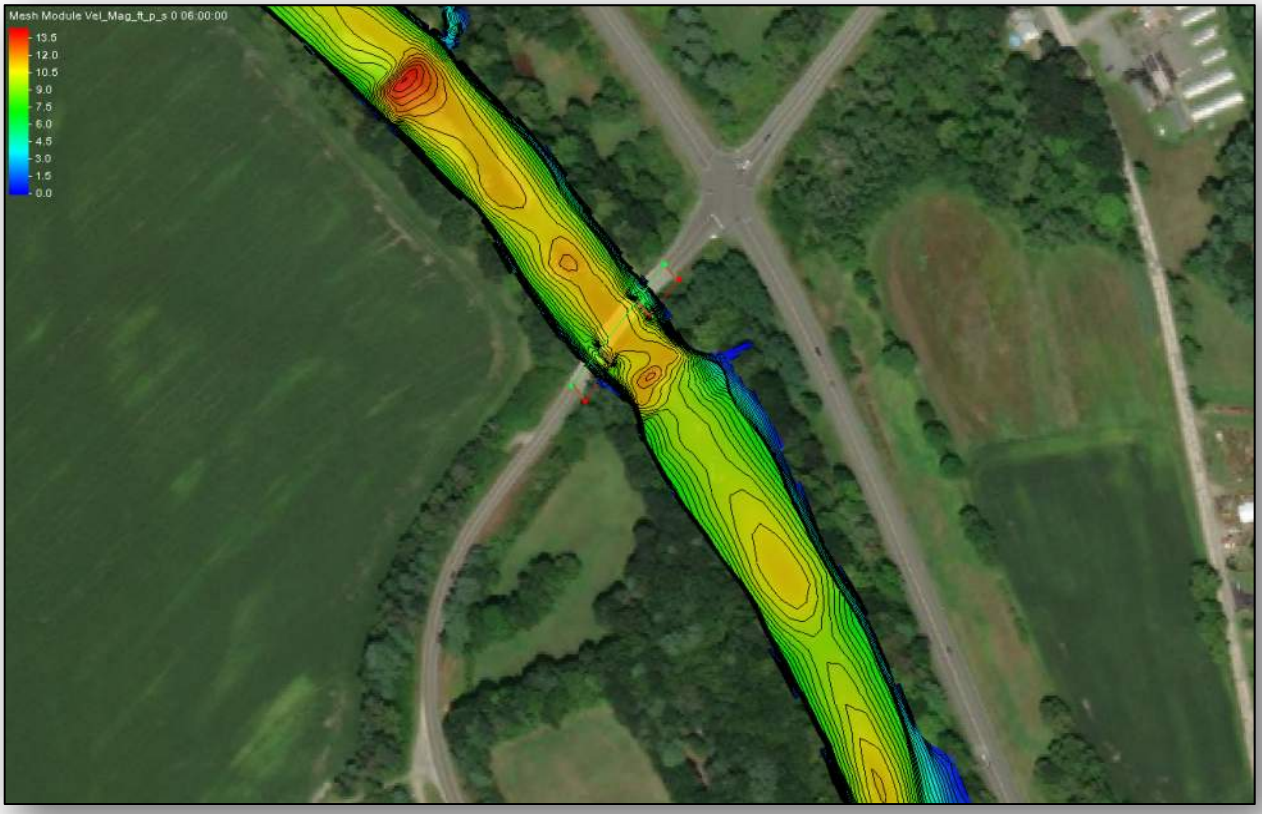
Model geometry at NH Route 12A over Sugar River



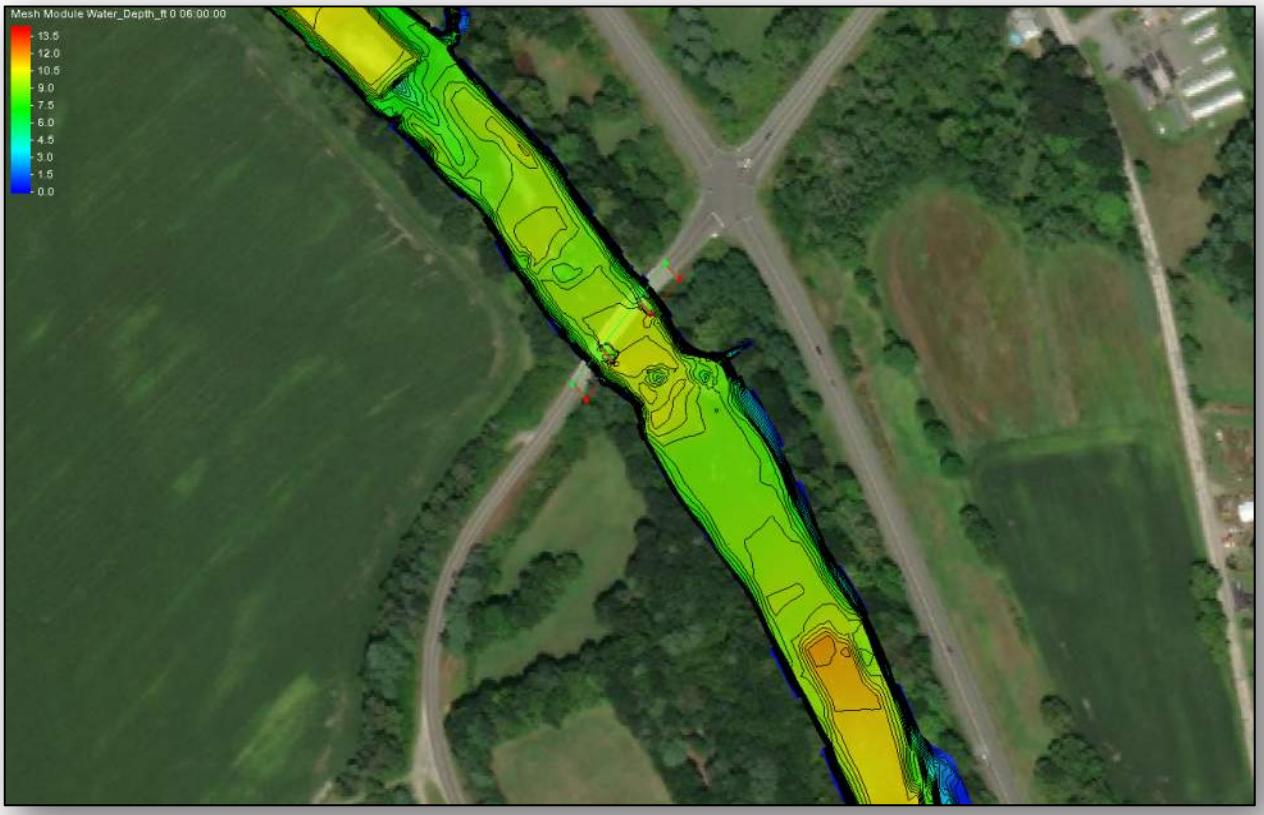
Water Surface Elevation (ft):



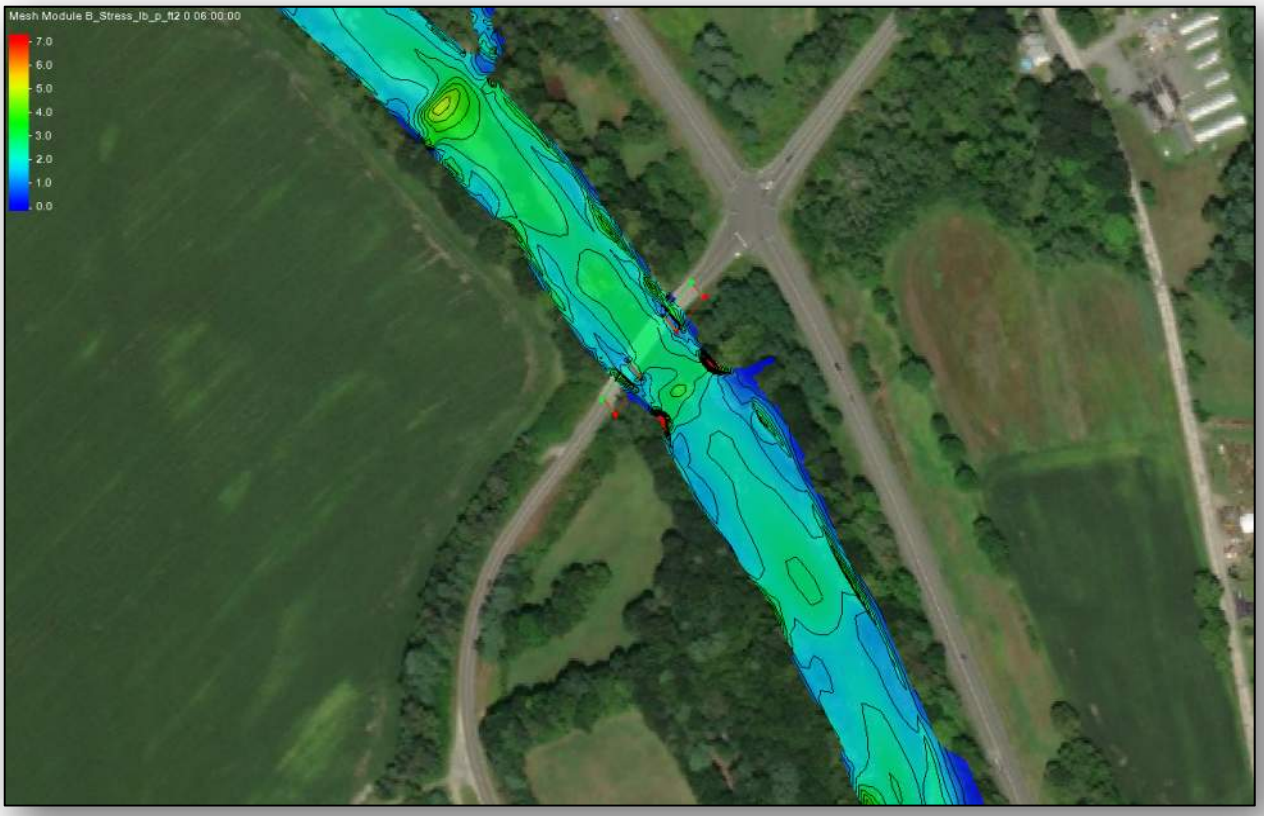
Velocity (ft/s):



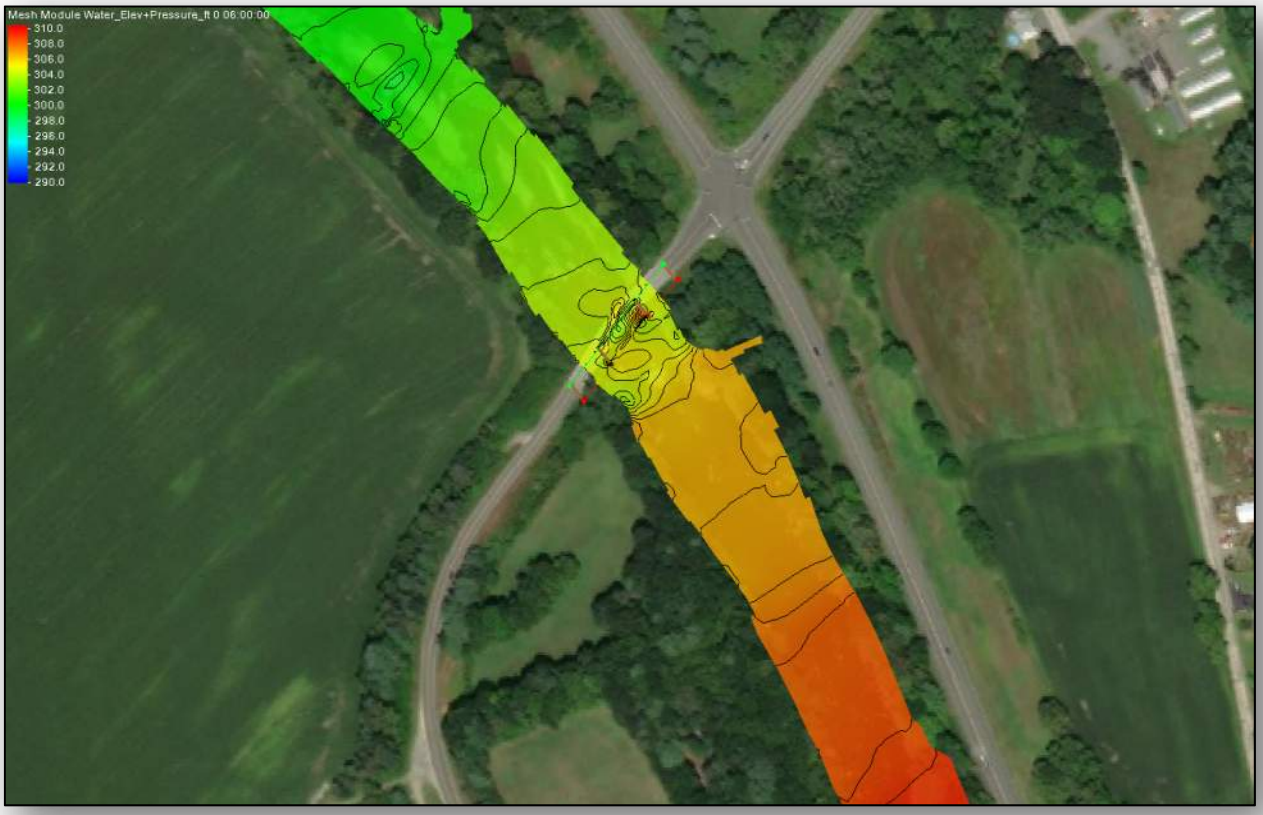
Water Depth (ft):



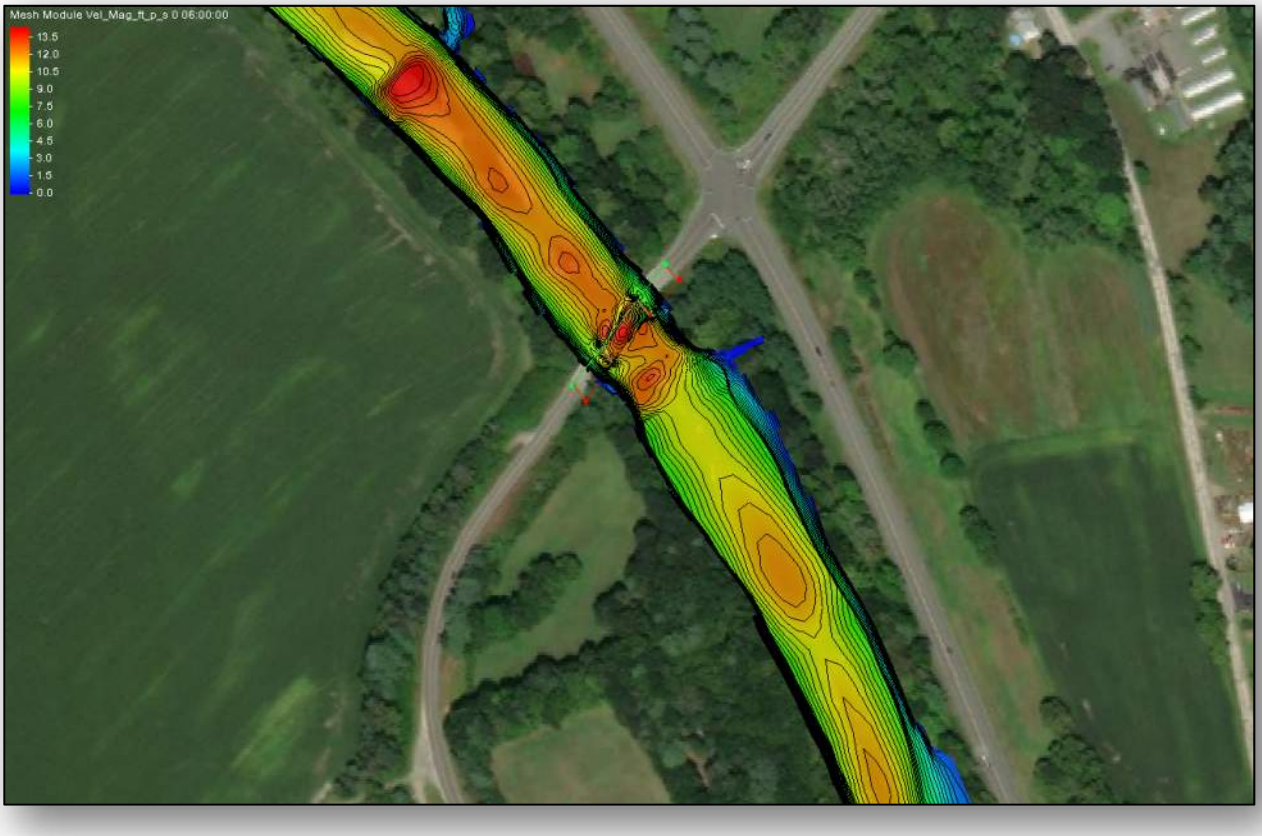
Stress (lbs/ft^2):



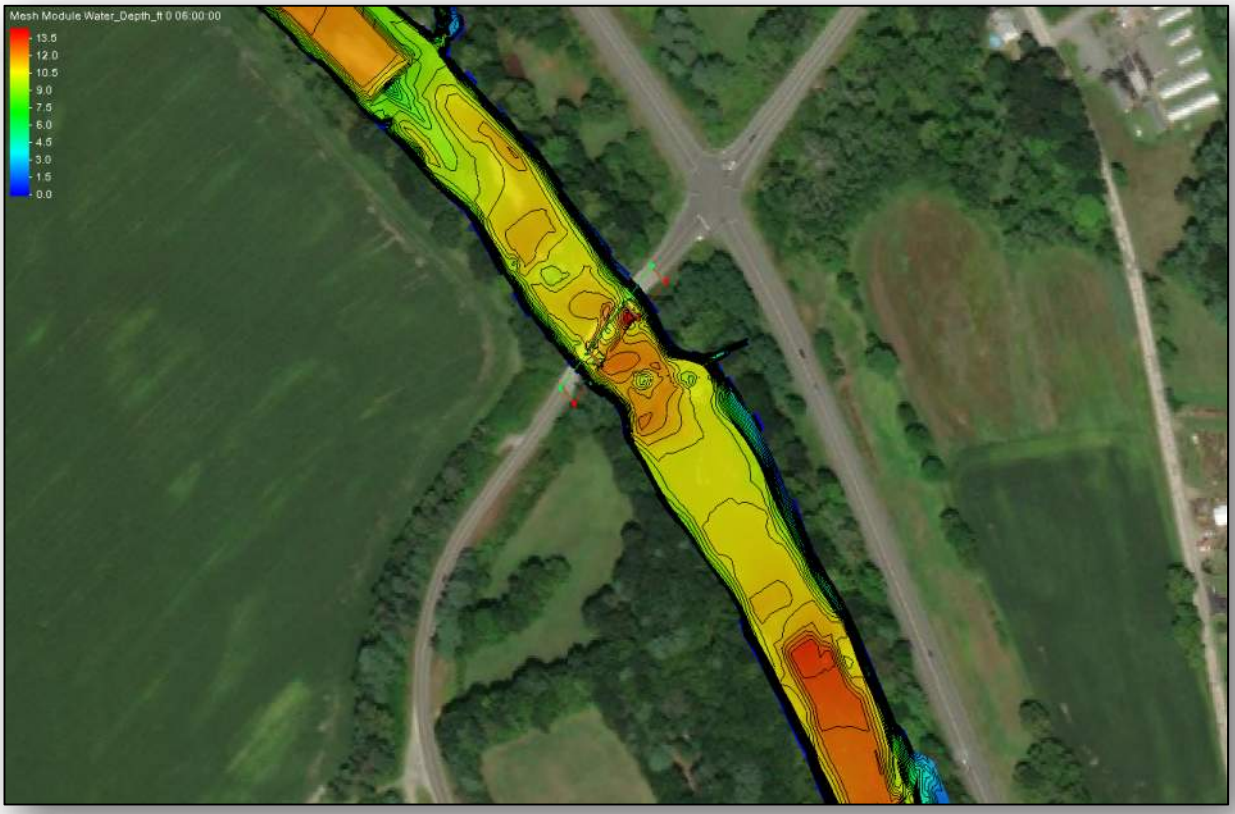
Water Surface Elevation (ft):



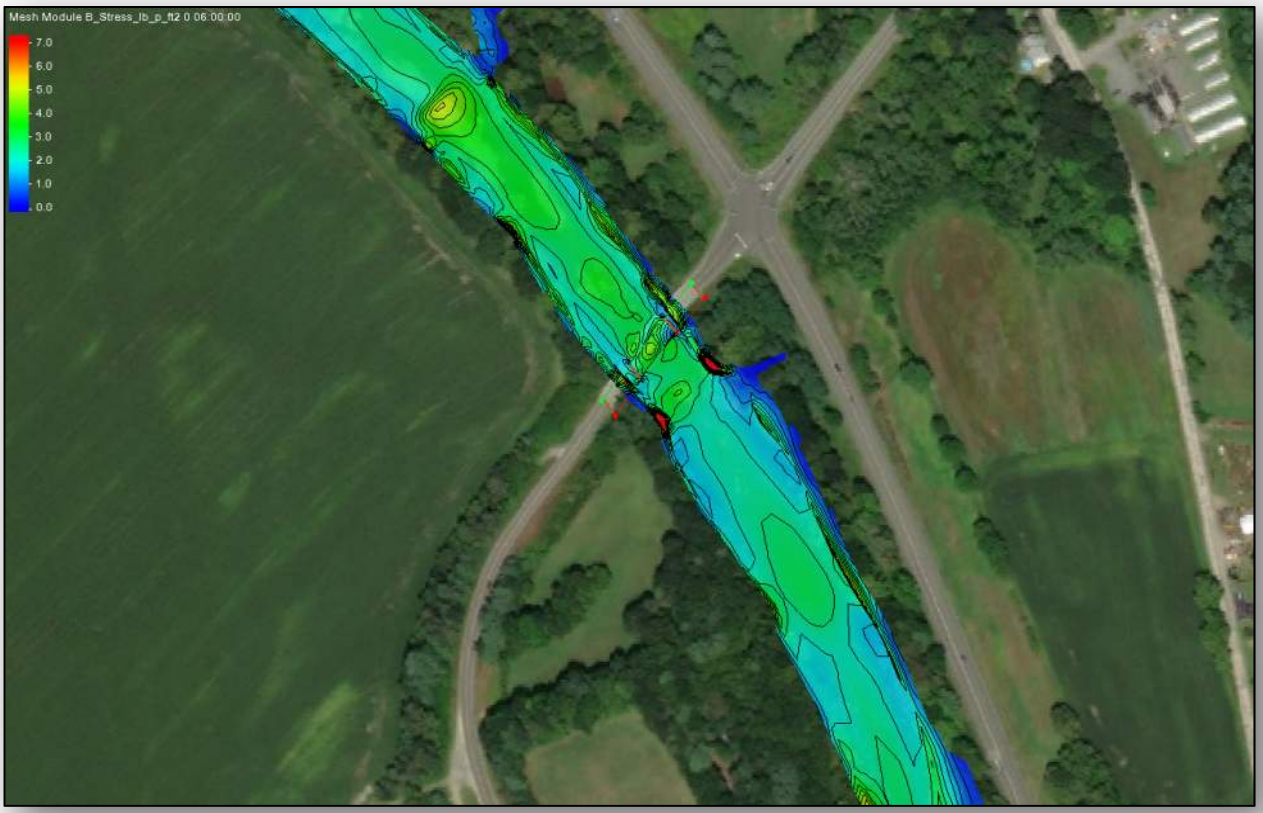
Velocity (ft/s):



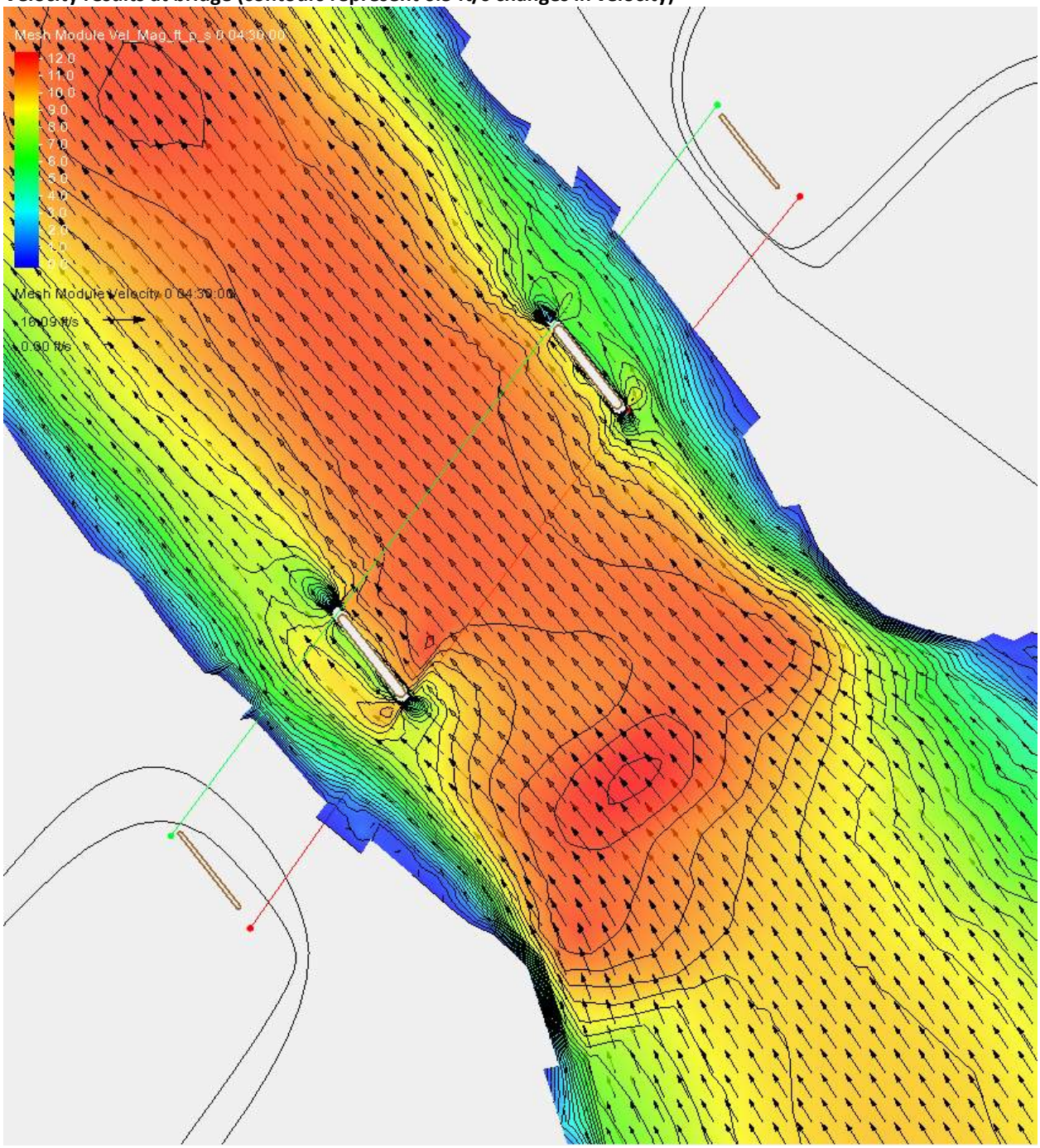
Water Depth (ft):



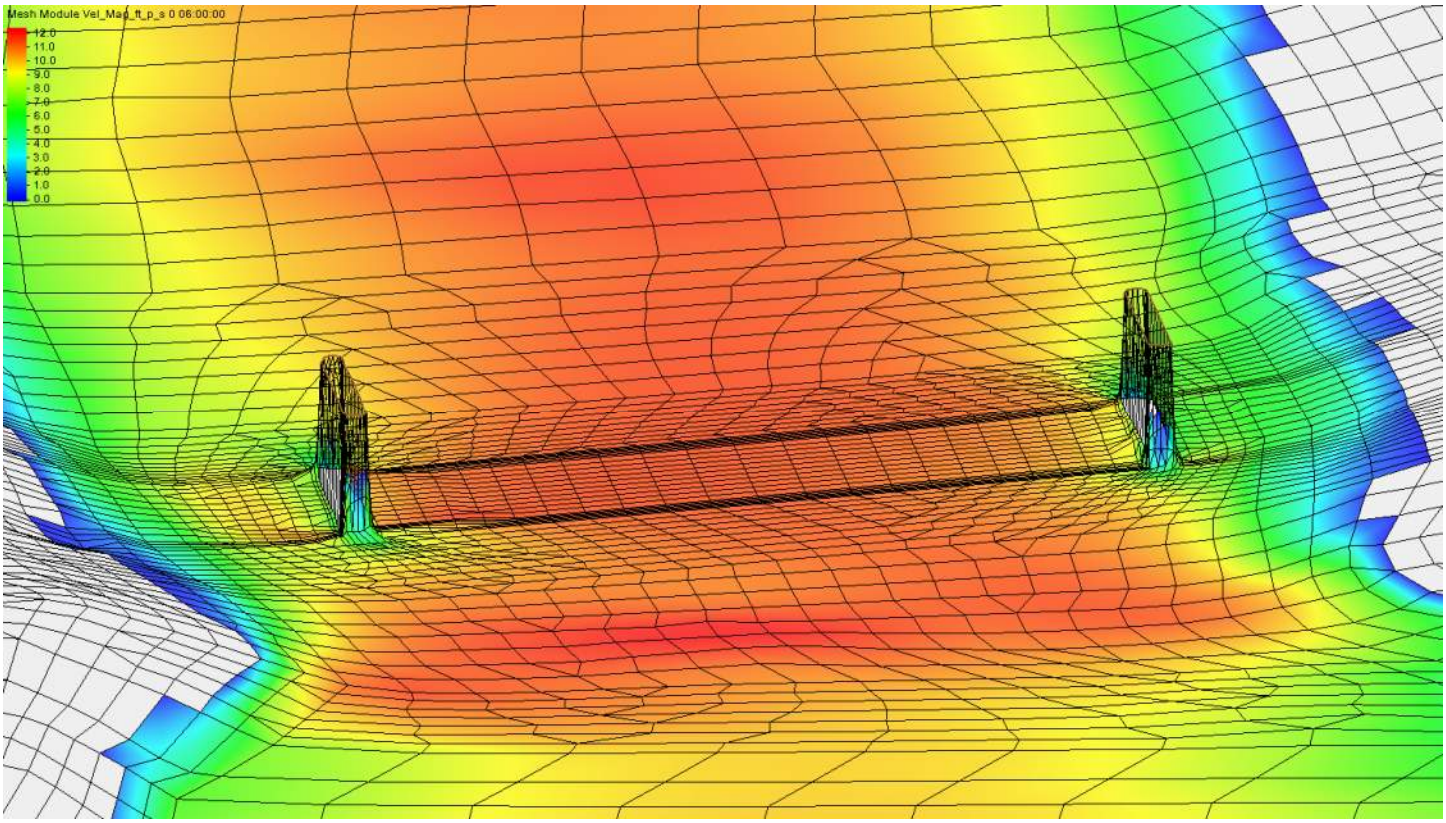
Stress (lbs/ft^2):



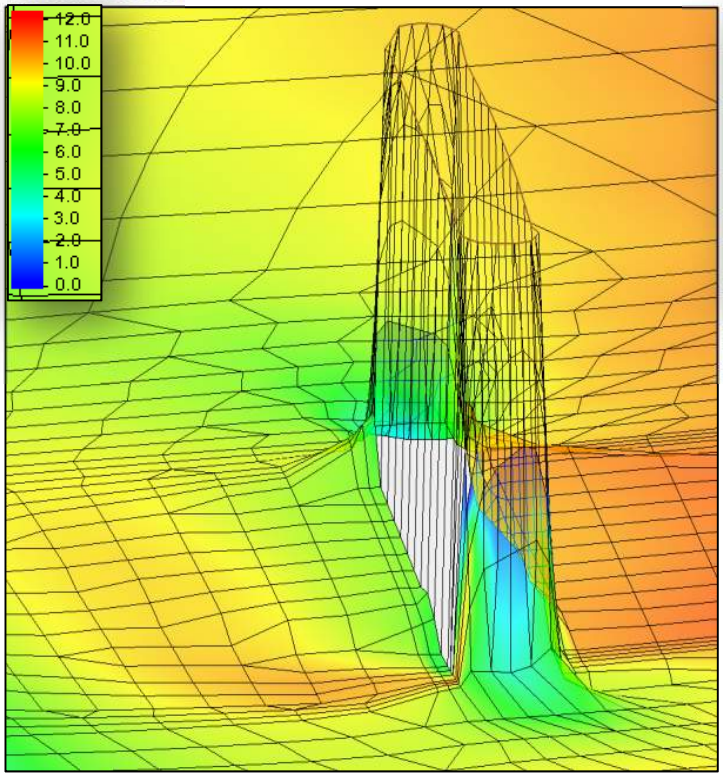
Velocity results at bridge (contours represent 0.5 ft/s changes in velocity)



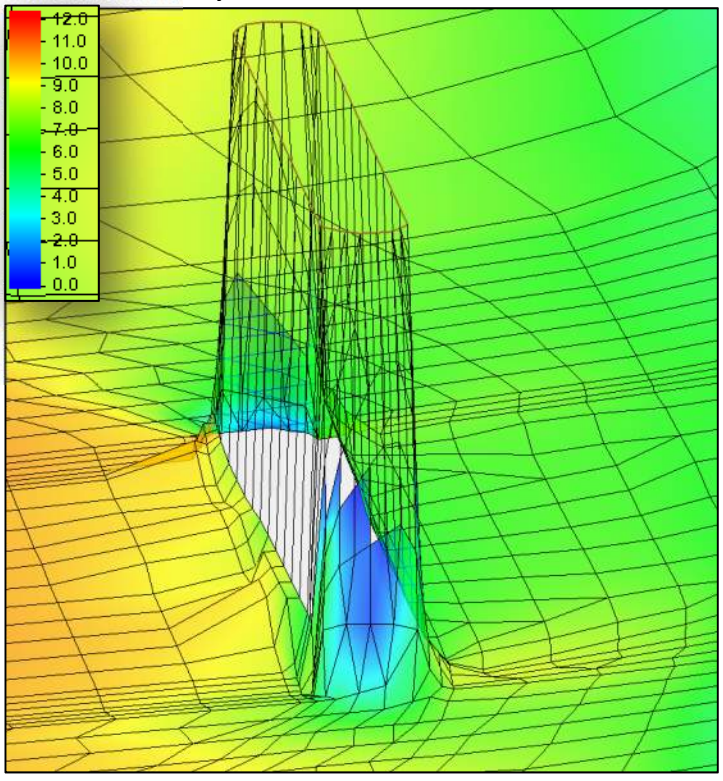
Velocities through bridge (rotated view)

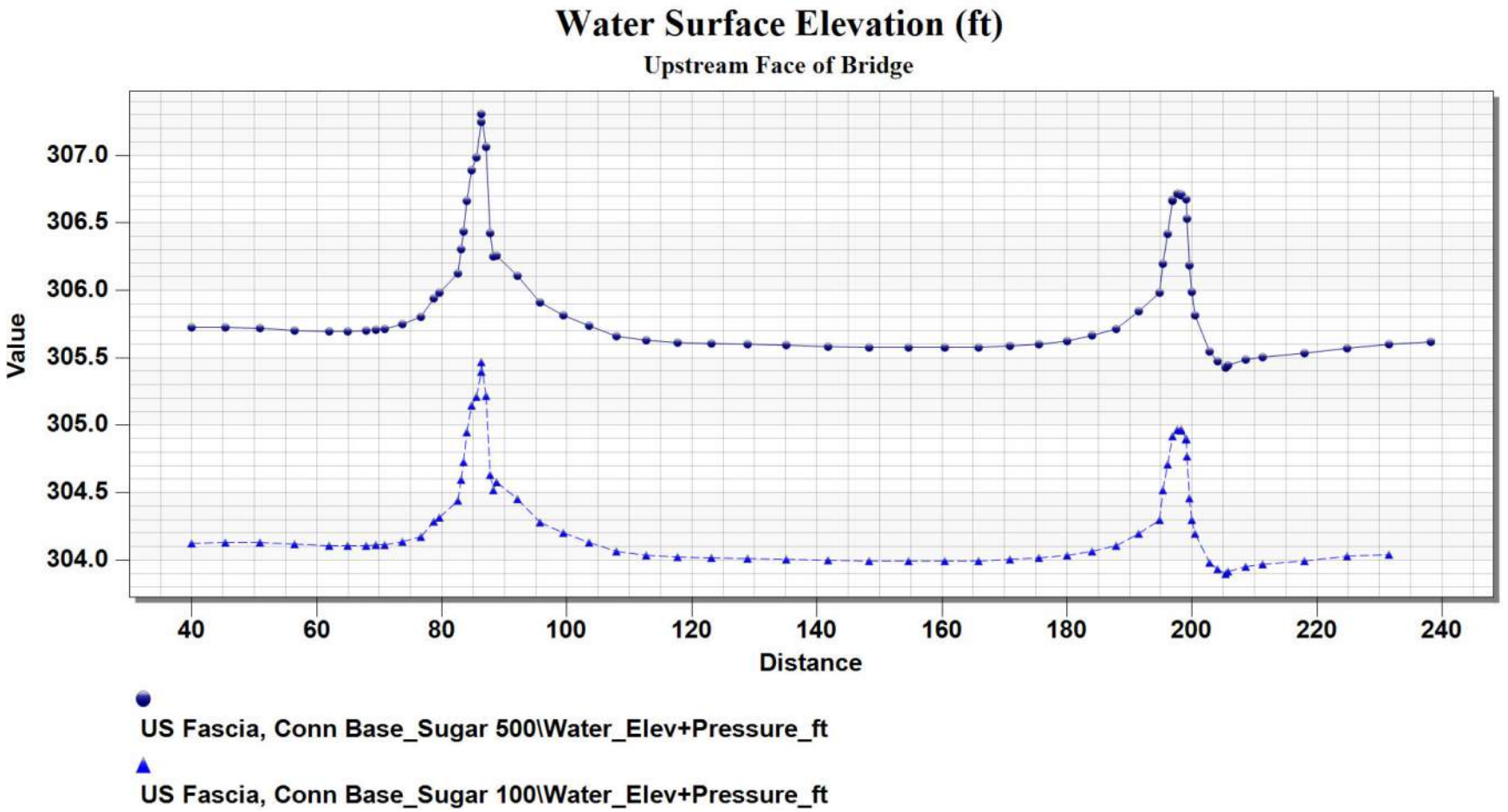


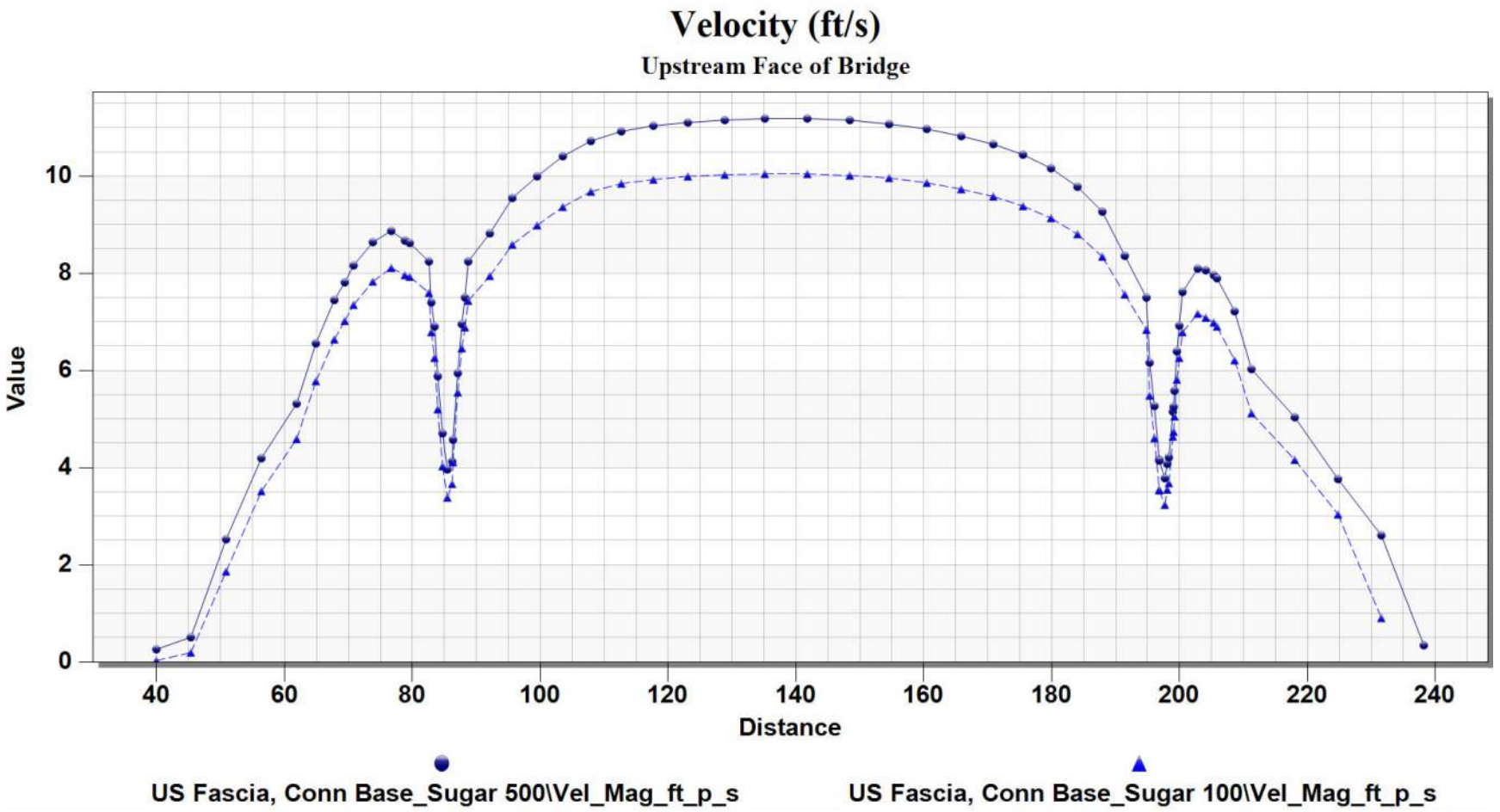
Velocities in vicinity of West Pier

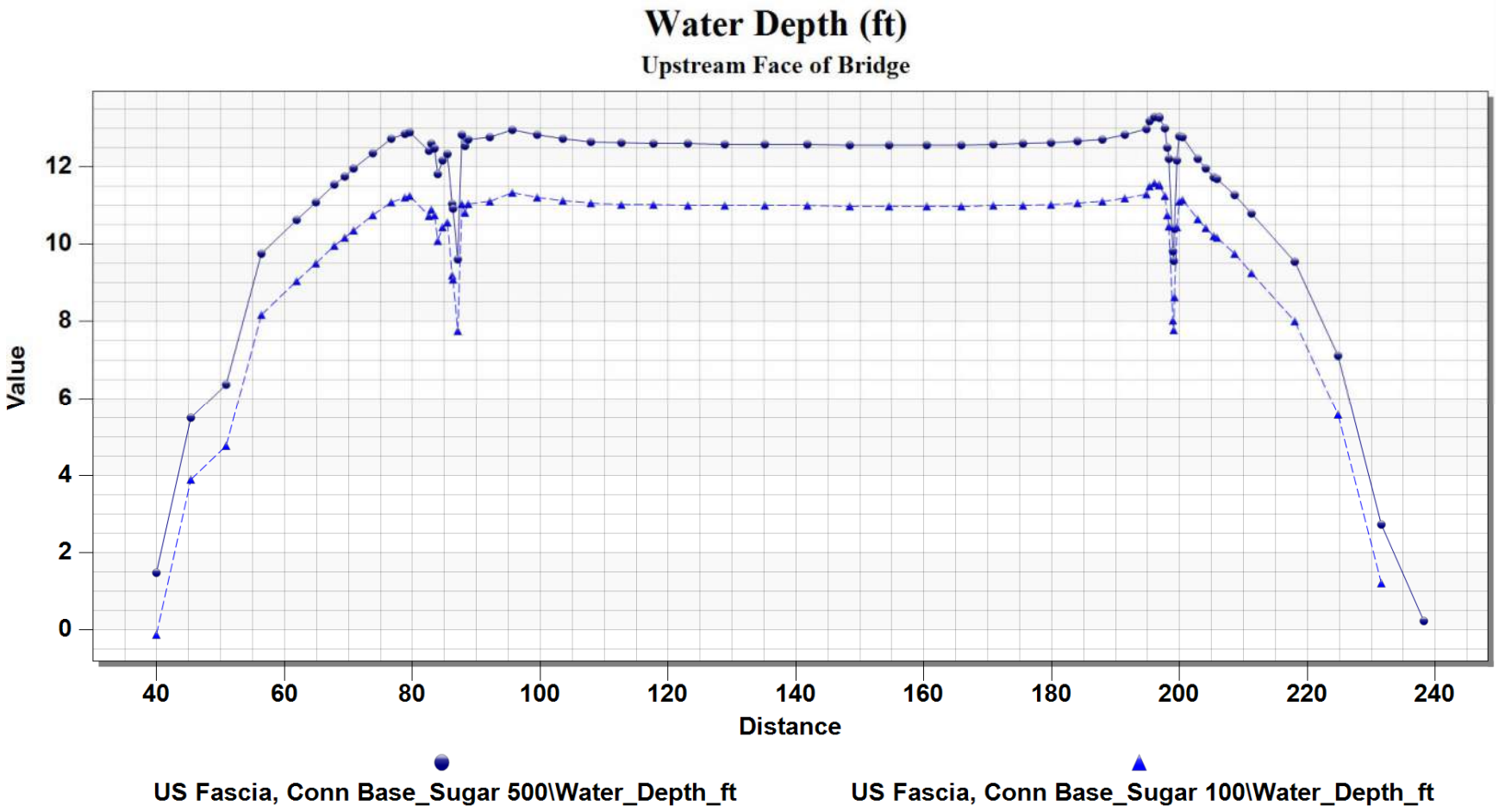


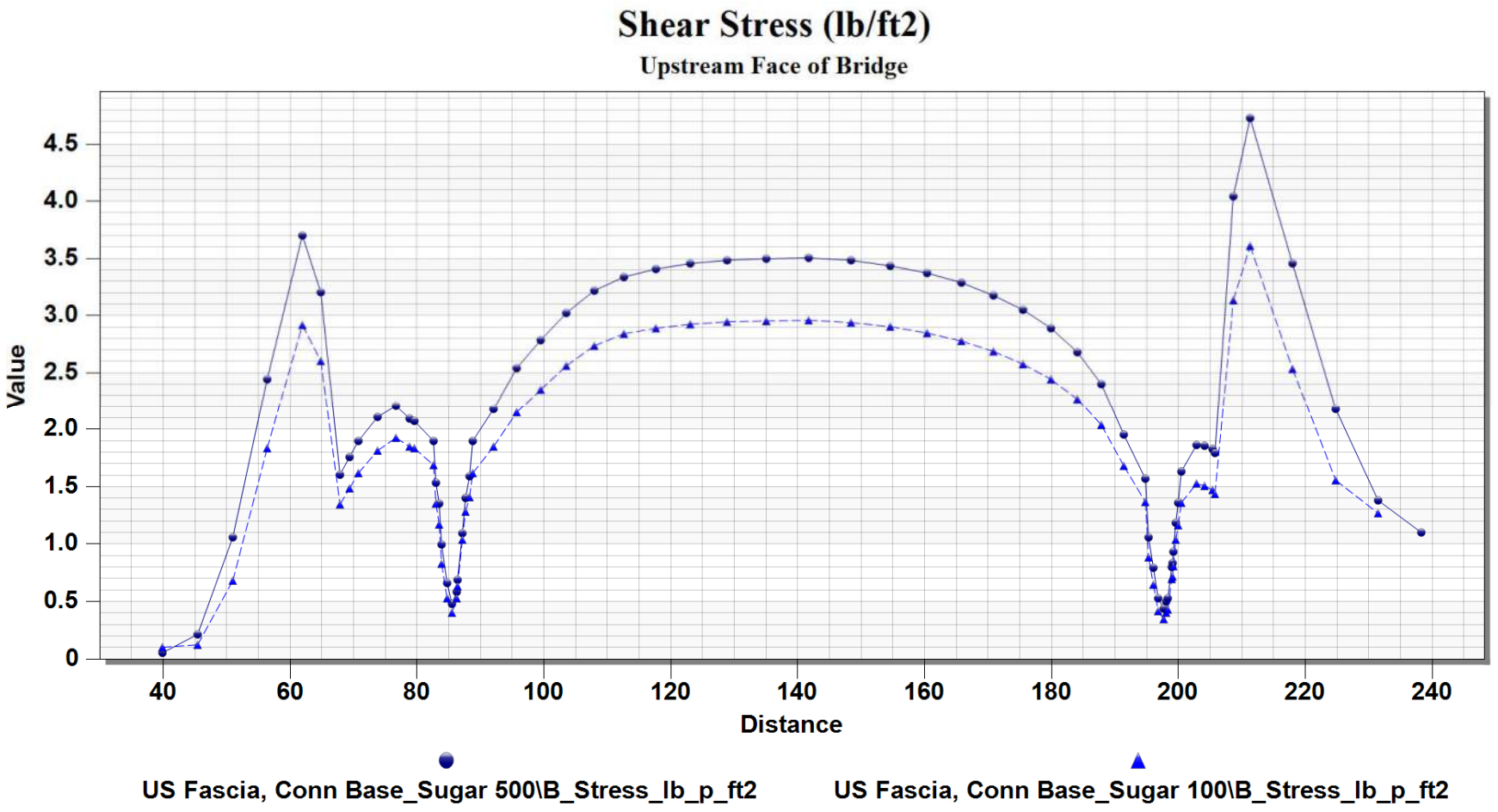
Velocities in vicinity of East Pier

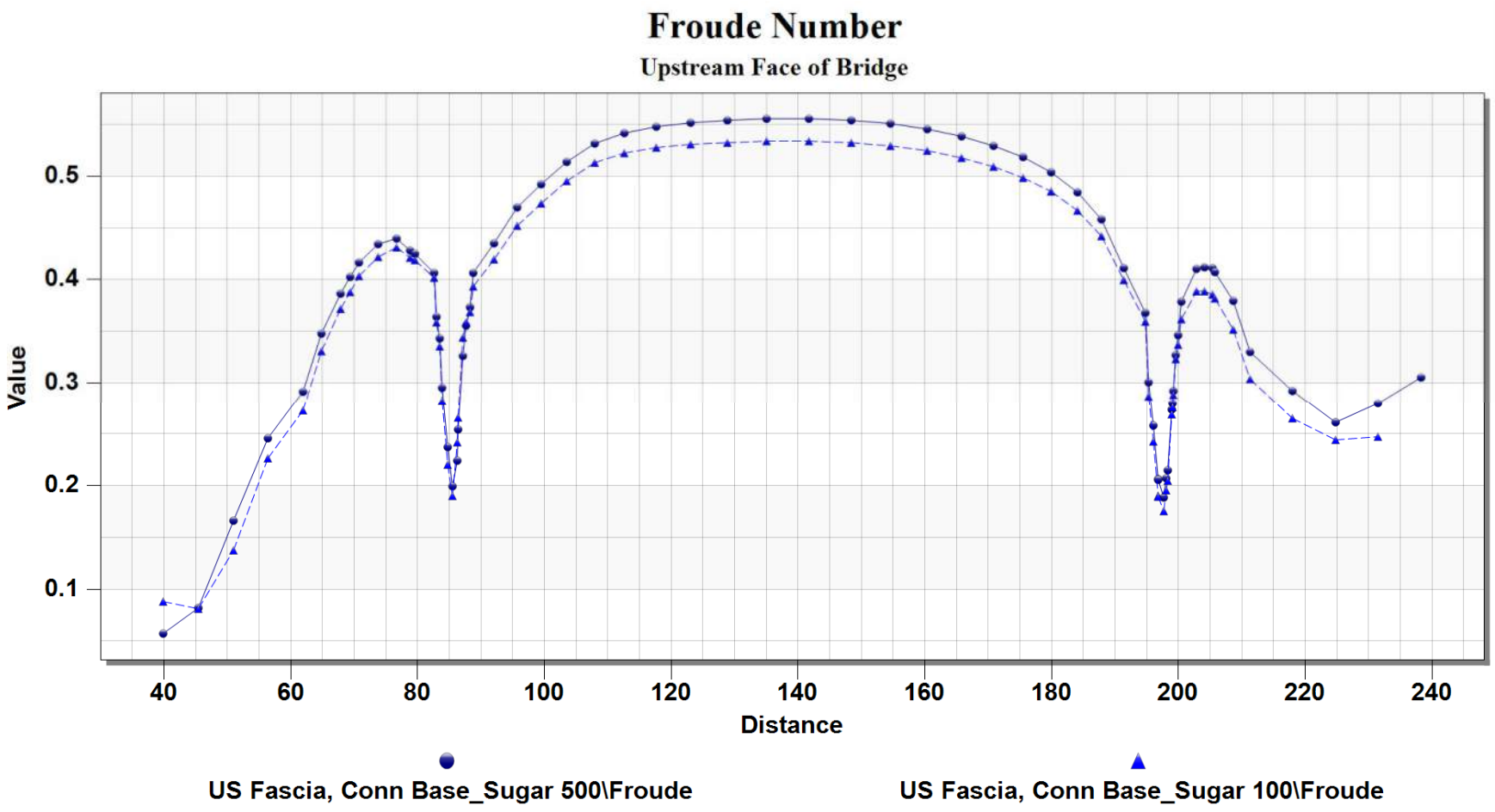


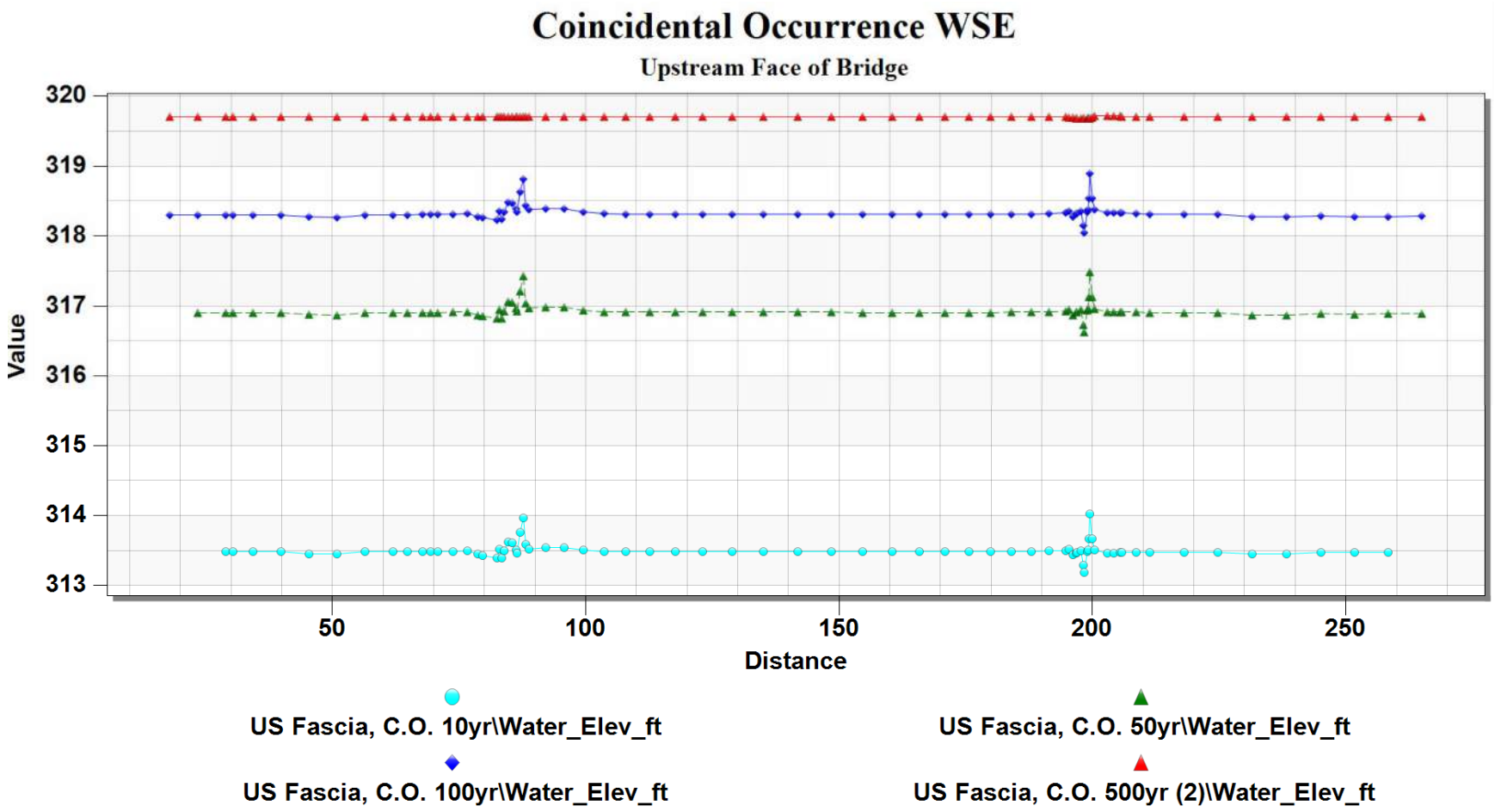

Water Surface Elevation (ft)
Upstream Face of Bridge
Value
307.0
306.5
306.0
305.5
305.0
304.5
304.0
40
60
80
100
120
140
160
180
200
220
240
Distance
US Fascia, Conn Base_Sugar 500\Water_Elev+Pressure_ft
US Fascia, Conn Base_Sugar 100\Water_Elev+Pressure_ft

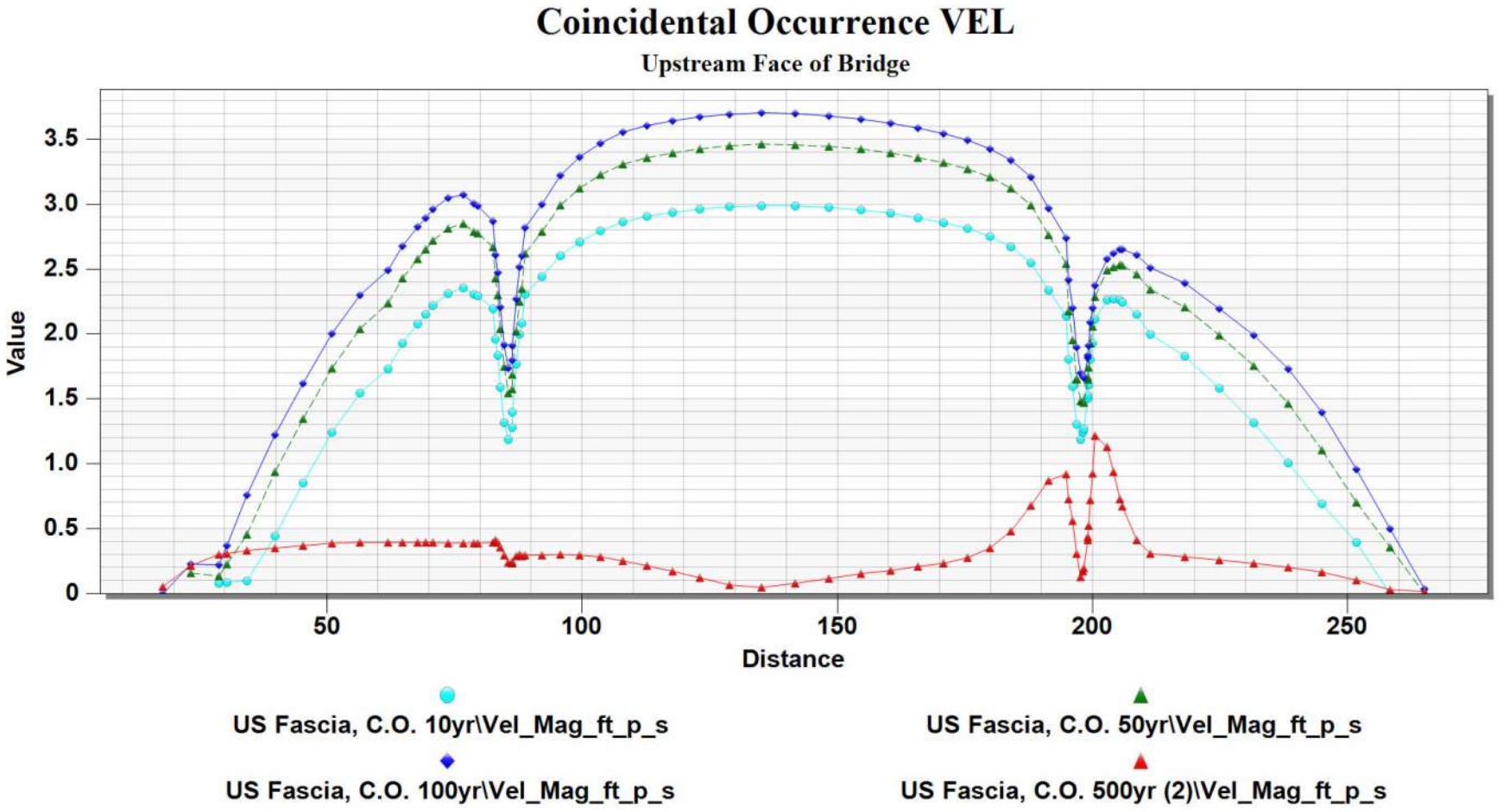

Velocity (ft/s)
Upstream Face of Bridge
Value
0
2
4
6
8
10
40
60
80
100
120
140
160
180
200
220
240
Distance
US Fascia, Conn Base_Sugar 500\Vel_Mag_ft_p_s
US Fascia, Conn Base_Sugar 100\Vel_Mag_ft_p_s


Water Depth (ft)
Upstream Face of Bridge
Value
0
2
4
6
8
10
12
40
60
80
100
120
140
160
180
200
220
240
Distance
US Fascia, Conn Base_Sugar 500\Water_Depth_ft
US Fascia, Conn Base_Sugar 100\Water_Depth_ft

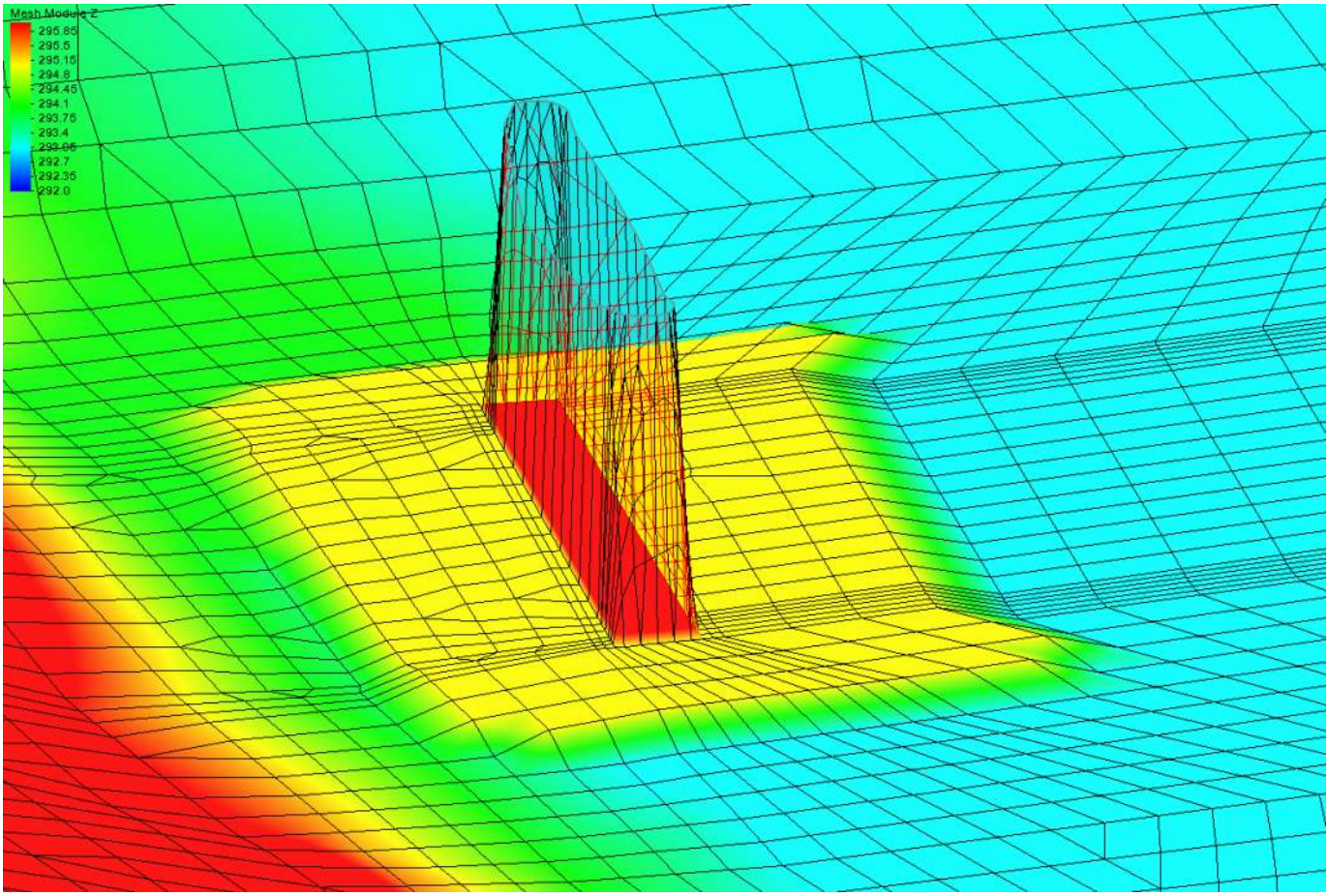

Shear Stress (lb/ft2)
Upstream Face of Bridge
Value
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
40
60
80
100
120
140
160
180
200
220
240
Distance
US Fascia, Conn Base_Sugar 500\B_Stress_lb_p_ft2
US Fascia, Conn Base_Sugar 100\B_Stress_lb_p_ft2


Froude Number
Upstream Face of Bridge
Value
0.5
0.4
0.3
0.2
0.1
40
60
80
100
120
140
160
180
200
220
240
Distance
US Fascia, Conn Base_Sugar 500\Froude
US Fascia, Conn Base_Sugar 100\Froude


Coincidental Occurrence WSE
Upstream Face of Bridge
320
319
318
317
316
315
314
313
Value
50
100
150
200
250
Distance
US Fascia, C.O. 10yr\Water_Elev_ft
US Fascia, C.O. 50yr\Water_Elev_ft
US Fascia, C.O. 100yr\Water_Elev_ft
US Fascia, C.O. 500yr (2)\Water_Elev_ft


Coincidental Occurrence VEL
Upstream Face of Bridge
Value
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
50
100
150
200
250
Distance
US Fascia, C.O. 10yr\Vel_Mag_ft_p_s
US Fascia, C.O. 50yr\Vel_Mag_ft_p_s
US Fascia, C.O. 100yr\Vel_Mag_ft_p_s
US Fascia, C.O. 500yr (2)\Vel_Mag_ft_p_s

A-Jax Raised Channel Simulation to ensure no change sin Water Surface Elevations at Bridge



Section III:
Scour Analysis Results

Summary Table

Scour Base_500yr

Parameter	Value	U...	Notes
Check boxes for scour components to be computed			
Enable Scour Plot Options	☑		
To plot scour components add specified bridge geometry and cross section ...			
Import Geometry from HEC-RAS File	Import		
Long Term Degradation	☐		
Main Channel Contraction Scour	☑		
Define Main Channel Contraction Scour Parameters	Define...		
Left Bank Station	28.27	ft	
Define Left Overbank Contraction Scour Parameters	Define...		
Right Bank Station	248.86	ft	
Define Right Overbank Contraction Scour Parameters	Define...		
Bridge Cross-Section & Geometry	☑		
Cross-Section Name	Bridge Cross-section		
Define Cross-Section under Bridge	Define...		
Bridge Name	Bridge Deck Geometry		
Define Bridge Deck Geometry	Define...		Define Profile of Upper and Lower Bridge Deck Chord
Approach Cross-Section	☑		
Approach Cross-Section Name	Approach Cross-section		
Define Approach Cross-Section	Define...		
Local Scour at Piers	☑		
Number of Piers	2		
Piers			
Pier Name	Pier 1		
Pier Geometry	Define...		Data Exists
Centerline Station of Pier	83.105	ft	
Define Pier Scour Parameters	Define...		
Pier Scour Reference Point	Thalweg		This specifies whether the scour depth measured relative...
Duplicate Pier	Duplicate		
Piers			
Pier Name	Pier 2		
Pier Geometry	Define...		Data Exists
Centerline Station of Pier	195.083	ft	
Define Pier Scour Parameters	Define...		
Pier Scour Reference Point	Thalweg		This specifies whether the scour depth measured relative...
Duplicate Pier	Duplicate		

Scour Summary Table

Bridge Scour Summary Table

Parameter	Value	Units	Notes	Plot
Main Channel Contraction Scour				
Applied Contraction Scour Depth	1.23	ft	Contraction & Long Term Scour is app...	
Live Bed Contraction Scour Depth	1.23	ft		
Local Scour at Piers				☑
Plot Pier Scour				☑
Piers				
Pier Name	Pier 1			
Pier Scour Depth	11.22	ft	Computation Method: HEC-18	
Total Scour at Pier	12.45	ft		
Total Scour Elevation at Pier	-11.22	ft		
Piers				
Pier Name	Pier 2			
Pier Scour Depth	12.59	ft	Computation Method: HEC-18	
Total Scour at Pier	13.82	ft		
Total Scour Elevation at Pier	-12.59	ft		

Main Channel Contraction Scour

Contraction Scour

Computation Method: Clear-Water and Live-Bed Scour

Parameter	Value	Units	Notes
Input Parameters			
Average Depth Upstream of Contraction	10.07	ft	
D50	0.000029	ft	0.0000 ft < D50
Average Velocity Upstream	7.61	ft/s	
Results of Scour Condition			
Critical velocity above which bed material of size D and s...	0.50	ft/s	
Contraction Scour Condition	Live Bed		
Live Bed & Clear Water Input Parameters			
Temperature of Water	60.00	°F	
Slope of Energy Grade Line at Approach Section	0.0073	ft/ft	
Flow in Contracted Section	18177.50	cfs	
Flow Upstream that is Transporting Sediment	18446.40	cfs	
Width in Contracted Section	180.40	ft	Remove widths occupied by ...
Width Upstream that is Transporting Sediment	240.66	ft	
Depth Prior to Scour in Contracted Section	10.90	ft	
Unit Weight of Water	62.40	lb/ft^3	
Unit Weight of Sediment	165.00	lb/ft^3	
Results of Clear Water Method			
Diameter of the smallest nontransportable particle in the b...	0.000036	ft	
Average Depth in Contracted Section after Scour	120.80	ft	
Scour Depth	109.89	ft	Negative values imply 'zero' ...
Results of Live Bed Method			
k1	0.690000		
Shear Velocity	1.54	ft/s	
Fall Velocity	0.00	ft/s	
Average Depth in Contracted Section after Scour	12.13	ft	
Scour Depth	1.23	ft	Negative values imply 'zero' ...
Shear Applied to Bed by Live-Bed Scour	0.0300	lb/ft^2	
Shear Required for Movement of D50 Particle	0.0001	lb/ft^2	
Recommendations			
Recommended Scour Depth	1.23	ft	Negative values imply 'zero' ...

West Pier Scour

Pier Scour

Computation Method: HEC-18

Parameter	Value	Units	Notes
Input Parameters			
Pier Shape	Round Nose		
Bed Condition	Clear-Water Scour		Dune Height is N/A
Depth Upstream of Pier	12.78	ft	
Velocity Upstream of Pier	11.04	ft/s	
Width of Pier	3.00	ft	width for the zero skew co...
Length of Pier	37.69	ft	
Angle of Attack	2.64	Degrees	
Results			
Froude Number Upstream	0.54		
Correction Factor for Pier Nose Shape (K1)	1.00		
Correction Factor of Angle of Attack (K2)	1.33		
Pier Length to Pier Width (L/a)	12.00		
Correction Factor for Bed Condition (K3)	1.10		
Scour Depth	11.22	ft	
Scour Hole			
Angle of Repose	44.00	degrees	
Use the Pier Width as the Bottom Width of Scour Hole	☑		
Scour Hole Bottom Width	3.00	ft	
Scour Hole Top Width	22.85	ft	

East Pier Scour

Pier Scour

Computation Method: HEC-18

Parameter	Value	Units	Notes
Input Parameters			
Pier Shape	Round Nose		
Bed Condition	Clear-Water Scour		Dune Height is N/A
Depth Upstream of Pier	12.78	ft	
Velocity Upstream of Pier	11.04	ft/s	
Width of Pier	3.00	ft	width for the zero skew co...
Length of Pier	36.58	ft	
Angle of Attack	4.08	Degrees	
Results			
Froude Number Upstream	0.54		
Correction Factor for Pier Nose Shape (K1)	1.00		
Correction Factor of Angle of Attack (K2)	1.49		
Pier Length to Pier Width (L/a)	12.00		
Correction Factor for Bed Condition (K3)	1.10		
Scour Depth	12.59	ft	
Scour Hole			
Angle of Repose	44.00	degrees	
Use the Pier Width as the Bottom Width of Scour Hole	☑		
Scour Hole Bottom Width	3.00	ft	
Scour Hole Top Width	25.63	ft	

Summary Table

Scour Base_100yr

Parameter	Value	U...	Notes
Check boxes for scour components to be computed			
Enable Scour Plot Options	☑		
To plot scour components add specified bridge geometry and cross section ...			
Import Geometry from HEC-RAS File	Import		
Long Term Degradation	☐		
Main Channel Contraction Scour	☑		
Define Main Channel Contraction Scour Parameters	Define...		
Left Bank Station	28.27	ft	
Define Left Overbank Contraction Scour Parameters	Define...		
Right Bank Station	248.86	ft	
Define Right Overbank Contraction Scour Parameters	Define...		
Bridge Cross-Section & Geometry	☑		
Cross-Section Name	Bridge Cross-section		
Define Cross-Section under Bridge	Define...		
Bridge Name	Bridge Deck Geometry		
Define Bridge Deck Geometry	Define...		Define Profile of Upper and Lower Bridge Deck Chord
Approach Cross-Section	☑		
Approach Cross-Section Name	Approach Cross-section		
Define Approach Cross-Section	Define...		
Local Scour at Piers	☑		
Number of Piers	2		
Piers			
Pier Name	Pier 1		
Pier Geometry	Define...		Data Exists
Centerline Station of Pier	83.105	ft	
Define Pier Scour Parameters	Define...		
Pier Scour Reference Point	Thalweg		This specifies whether the scour depth measured relative...
Duplicate Pier	Duplicate		
Piers			
Pier Name	Pier 2		
Pier Geometry	Define...		Data Exists
Centerline Station of Pier	195.083	ft	
Define Pier Scour Parameters	Define...		
Pier Scour Reference Point	Thalweg		This specifies whether the scour depth measured relative...
Duplicate Pier	Duplicate		

Scour Summary Table

Bridge Scour Summary Table

Parameter	Value	Units	Notes	Plot
Main Channel Contraction Scour				
Applied Contraction Scour Depth	0.75	ft	Contraction & Long Term Scour is app...	
Live Bed Contraction Scour Depth	0.75	ft		
Local Scour at Piers				☑
Plot Pier Scour				☑
Piers				
Pier Name	Pier 1			
Pier Scour Depth	10.61	ft	Computation Method: HEC-18	
Total Scour at Pier	11.36	ft		
Total Scour Elevation at Pier	-10.61	ft		
Piers				
Pier Name	Pier 2			
Pier Scour Depth	12.48	ft	Computation Method: HEC-18	
Total Scour at Pier	13.22	ft		
Total Scour Elevation at Pier	-12.48	ft		

Main Channel Contraction Scour

Contraction Scour

Computation Method: Clear-Water and Live-Bed Scour

Parameter	Value	Units	Notes
Input Parameters			
Average Depth Upstream of Contraction	8.43	ft	
D50	0.000029	ft	0.0000 ft < D50
Average Velocity Upstream	7.06	ft/s	
Results of Scour Condition			
Critical velocity above which bed material of size D and s...	0.49	ft/s	
Contraction Scour Condition	Live Bed		
Live Bed & Clear Water Input Parameters			
Temperature of Water	60.00	°F	
Slope of Energy Grade Line at Approach Section	0.0064	ft/ft	
Flow in Contracted Section	14093.40	cfs	
Flow Upstream that is Transporting Sediment	14318.80	cfs	
Width in Contracted Section	174.66	ft	Remove widths occupied by ...
Width Upstream that is Transporting Sediment	240.65	ft	
Depth Prior to Scour in Contracted Section	9.63	ft	
Unit Weight of Water	62.40	lb/ft^3	
Unit Weight of Sediment	165.00	lb/ft^3	
Results of Clear Water Method			
Diameter of the smallest nontransportable particle in the b...	0.000036	ft	
Average Depth in Contracted Section after Scour	99.85	ft	
Scour Depth	90.23	ft	Negative values imply 'zero' ...
Results of Live Bed Method			
k1	0.690000		
Shear Velocity	1.32	ft/s	
Fall Velocity	0.00	ft/s	
Average Depth in Contracted Section after Scour	10.37	ft	
Scour Depth	0.75	ft	Negative values imply 'zero' ...
Shear Applied to Bed by Live-Bed Scour	0.0277	lb/ft^2	
Shear Required for Movement of D50 Particle	0.0001	lb/ft^2	
Recommendations			
Recommended Scour Depth	0.75	ft	Negative values imply 'zero' ...

West Pier Scour

Pier Scour

Computation Method: HEC-18

Parameter	Value	Units	Notes
Input Parameters			
Pier Shape	Round Nose		
Bed Condition	Clear-Water Scour		Dune Height is N/A
Depth Upstream of Pier	11.16	ft	
Velocity Upstream of Pier	9.97	ft/s	
Width of Pier	3.00	ft	width for the zero skew co...
Length of Pier	37.69	ft	
Angle of Attack	2.71	Degrees	
Results			
Froude Number Upstream	0.53		
Correction Factor for Pier Nose Shape (K1)	1.00		
Correction Factor of Angle of Attack (K2)	1.34		
Pier Length to Pier Width (L/a)	12.00		
Correction Factor for Bed Condition (K3)	1.10		
Scour Depth	10.61	ft	
Scour Hole			
Angle of Repose	44.00	degrees	
Use the Pier Width as the Bottom Width of Scour Hole	☑		
Scour Hole Bottom Width	3.00	ft	
Scour Hole Top Width	21.60	ft	

East Pier Scour

Pier Scour

Computation Method: HEC-18

Parameter	Value	Units	Notes
Input Parameters			
Pier Shape	Round Nose		
Bed Condition	Clear-Water Scour		Dune Height is N/A
Depth Upstream of Pier	11.16	ft	
Velocity Upstream of Pier	9.97	ft/s	
Width of Pier	3.00	ft	width for the zero skew co...
Length of Pier	36.58	ft	
Angle of Attack	4.84	Degrees	
Results			
Froude Number Upstream	0.53		
Correction Factor for Pier Nose Shape (K1)	1.00		
Correction Factor of Angle of Attack (K2)	1.57		
Pier Length to Pier Width (L/a)	12.00		
Correction Factor for Bed Condition (K3)	1.10		
Scour Depth	12.48	ft	
Scour Hole			
Angle of Repose	44.00	degrees	
Use the Pier Width as the Bottom Width of Scour Hole	☑		
Scour Hole Bottom Width	3.00	ft	
Scour Hole Top Width	25.40	ft	

Main Bridge – 500-Year Storm

APPROACH SECTION HYDRAULIC PARAMETERS:

Entire approach cross section:

Energy grade line slope at the approach section (ft/ft) 0.00726963
Total flow in the approach section (cfs) 18446.4
Total flow area of the approach section (ft^2) 2423.47
Total wetted perimeter of the approach section (ft) 228.599

Main channel (approach):

Approach section left bank station (ft) 10.1465
Approach section right bank station (ft) 250.808
Approach section main channel width (ft) 240.661
Approach section main channel flow (cfs) 18446.4
Approach section main channel flow area (ft^2) 2423.47
Approach section main channel wetted perimeter (ft) 228.599
Approach section main channel hydraulic radius (ft) 10.6014
Approach section main channel hydraulic depth (ft) 10.0701
(used for average depth upstream of contraction)
Approach section main channel maximum depth (ft) 12.4465
Approach section main channel unit discharge (cfs/ft) 76.6486
Approach section main channel average velocity (ft/s) 7.61153

Approach section critical velocity (ft/s) 0.505959

Left overbank (approach; Used for overbank contraction scour calculations

Left overbank average flow depth (ft): -0
Left overbank average velocity (ft/s): -1.#IND
Left overbank flow width (ft): -8.53014
Left overbank flow (cfs): 0
Left overbank unit discharge (cfs/ft): -0

Right overbank (approach; Used for overbank contraction scour calculatior

Right overbank average flow depth (ft): -0
Right overbank average velocity (ft/s): -1.#IND
Right overbank flow width (ft): -9.4869
Right overbank flow (cfs): 0
Right overbank unit discharge (cfs/ft): -0

CONTRACTED SECTION HYDRAULIC PARAMETERS:

Entire cross section:

Energy grade line slope at the contracted section (ft/ft) 0.00726963
Total flow in the contracted section (cfs) 18177.5
Contracted section total flow area (ft^2) 2018.68
Contracted section total wetted perimeter (ft) 200.732

Main Bridge – 100-Year Storm

APPROACH SECTION HYDRAULIC PARAMETERS:

Entire approach cross section:

Energy grade line slope at the approach section (ft/ft) 0.00644361
Total flow in the approach section (cfs) 14318.8
Total flow area of the approach section (ft^2) 2028.41
Total wetted perimeter of the approach section (ft) 225.478

Main channel (approach):

Approach section left bank station (ft) 4.22967
Approach section right bank station (ft) 244.882
Approach section main channel width (ft) 240.653
Approach section main channel flow (cfs) 14318.8
Approach section main channel flow area (ft^2) 2028.41
Approach section main channel wetted perimeter (ft) 225.478
Approach section main channel hydraulic radius (ft) 8.99607
Approach section main channel hydraulic depth (ft) 8.42881
(used for average depth upstream of contraction)
Approach section main channel maximum depth (ft) 10.6859
Approach section main channel unit discharge (cfs/ft) 59.4999
Approach section main channel average velocity (ft/s) 7.05911

Approach section critical velocity (ft/s) 0.4923

Left overbank (approach; Used for overbank contraction scour calculations):

Left overbank average flow depth (ft): -0
Left overbank average velocity (ft/s): -1.#IND
Left overbank flow width (ft): -12.2713
Left overbank flow (cfs): 0
Left overbank unit discharge (cfs/ft): -0

Right overbank (approach; Used for overbank contraction scour calculations):

Right overbank average flow depth (ft): -0
Right overbank average velocity (ft/s): -1.#IND
Right overbank flow width (ft): -19.4072
Right overbank flow (cfs): 0
Right overbank unit discharge (cfs/ft): -0

CONTRACTED SECTION HYDRAULIC PARAMETERS:

Entire cross section:

Energy grade line slope at the contracted section (ft/ft) 0.00644361
Total flow in the contracted section (cfs) 14093.4
Contracted section total flow area (ft^2) 1724.88
Contracted section total wetted perimeter (ft) 195.876

Main channel:

Contracted section left bank station (ft) 28.2678
Contracted section right bank station (ft) 248.861
Contracted section main channel width (ft) 191.09
Contracted section main channel adjusted width (ft) 180.401
(adjusted for piers and skew)
Contracted section main channel flow (cfs) 18177.5
Contracted section main channel flow area (ft^2) 2018.68
Contracted section main channel adjusted flow area (ft^2) 1966.99
(adjusted for piers and skew)
Contracted section main channel skew angle (degrees) 12.9931
Contracted section main channel wetted perimeter (ft) 200.732
Contracted section main channel hydraulic radius (ft) 10.0566
Contracted section main channel hydraulic depth (ft) 10.9035
(used for the depth prior to scour in the contracted section)
Contracted section main channel maximum depth (ft) 12.5585
Contracted section main channel unit discharge (cfs/ft) 100.762
Contracted section main channel average velocity (ft/s) 9.00465

Left overbank (contracted; Used for overbank contraction scour calculat

Left overbank average flow depth (ft): -0
Left overbank average velocity (ft/s): -1.#IND
Left overbank flow width (ft): -13.8669
Left overbank flow (cfs): 0
Left overbank unit discharge (cfs/ft): -0

Right overbank (contracted; Used for overbank contraction scour calcul

Right overbank average flow depth (ft): -0
Right overbank average velocity (ft/s): -1.#IND
Right overbank flow width (ft): -12.7532
Right overbank flow (cfs): 0
Right overbank unit discharge (cfs/ft): -0

ABUTMENT HYDRAULIC PARAMETERS:

There was NO depth determined at the left abutment toe depth. No Abutment computations made. If this is unexpected, Check that the abutment toe arc intersects the contracted section arc and that the abutment toe arc is located within water depth

There was NO depth determined at the right abutment toe depth. No Abutment computations made. If this is unexpected, Check that the abutment toe arc intersects the contracted section arc and that the abutment toe arc is located within water depth

Main channel:

Contracted section left bank station (ft) 28.2678
Contracted section right bank station (ft) 248.861
Contracted section main channel width (ft) 185.132
Contracted section main channel adjusted width (ft) 174.661
(adjusted for piers and skew)
Contracted section main channel flow (cfs) 14093.4
Contracted section main channel flow area (ft^2) 1724.88
Contracted section main channel adjusted flow area (ft^2) 1681.34
(adjusted for piers and skew)
Contracted section main channel skew angle (degrees) 12.9014
Contracted section main channel wetted perimeter (ft) 195.876
Contracted section main channel hydraulic radius (ft) 8.80599
Contracted section main channel hydraulic depth (ft) 9.62627
(used for the depth prior to scour in the contracted section)
Contracted section main channel maximum depth (ft) 10.9807
Contracted section main channel unit discharge (cfs/ft) 80.6896
Contracted section main channel average velocity (ft/s) 8.17063

Left overbank (contracted; Used for overbank contraction scour calculations):

Left overbank average flow depth (ft): -0
Left overbank average velocity (ft/s): -1.#IND
Left overbank flow width (ft): -13.8669
Left overbank flow (cfs): 0
Left overbank unit discharge (cfs/ft): -0

Right overbank (contracted; Used for overbank contraction scour calculations):

Right overbank average flow depth (ft): -0
Right overbank average velocity (ft/s): -1.#IND
Right overbank flow width (ft): -19.3701
Right overbank flow (cfs): 0
Right overbank unit discharge (cfs/ft): -0

ABUTMENT HYDRAULIC PARAMETERS:

There was NO depth determined at the left abutment toe depth. No Abutment computations made. If this is unexpected, Check that the abutment toe arc intersects the contracted section arc and that the abutment toe arc is located within water depth

There was NO depth determined at the right abutment toe depth. No Abutment computations made. If this is unexpected, Check that the abutment toe arc intersects the contracted section arc and that the abutment toe arc is located within water depth

PIER HYDRAULIC PARAMETERS:

Piers

Pier 1

Pier centerline station (ft) 83.1049
Pier width (ft) 3
Pier length (ft) 37.692
Pier local approach depth (ft) 12.8163
Pier local approach velocity (ft/s) 10.4103
Pier flow angle of attack (degrees) 2.63932

Pier 2

Pier centerline station (ft) 195.083
Pier width (ft) 3
Pier length (ft) 36.5824
Pier local approach depth (ft) 11.6373
Pier local approach velocity (ft/s) 8.85185
Pier flow angle of attack (degrees) 4.07985

Pier summary

Highest unit discharge approaching piers (cfs/ft) 141.095
(location based on longest pier length (offset from bridge centerline))
Station of the highest unit discharge approaching piers (ft) 145.21
Pier design velocity (ft/s) 11.0359
(Velocity magnitude at the highest unit discharge approaching piers)
Depth at the highest unit discharge approaching piers (ft) 12.7781

The scour toolbox defaults to "Thalweg" option.
If you wish to evaluate "Local" option, note
pier local approach depth and velocity from above
and enter into Hydraulic Toolbox.

PIER HYDRAULIC PARAMETERS:

Piers

Pier 1

Pier centerline station (ft) 83.1049
Pier width (ft) 3
Pier length (ft) 37.692
Pier local approach depth (ft) 11.2071
Pier local approach velocity (ft/s) 9.40043
Pier flow angle of attack (degrees) 2.70697

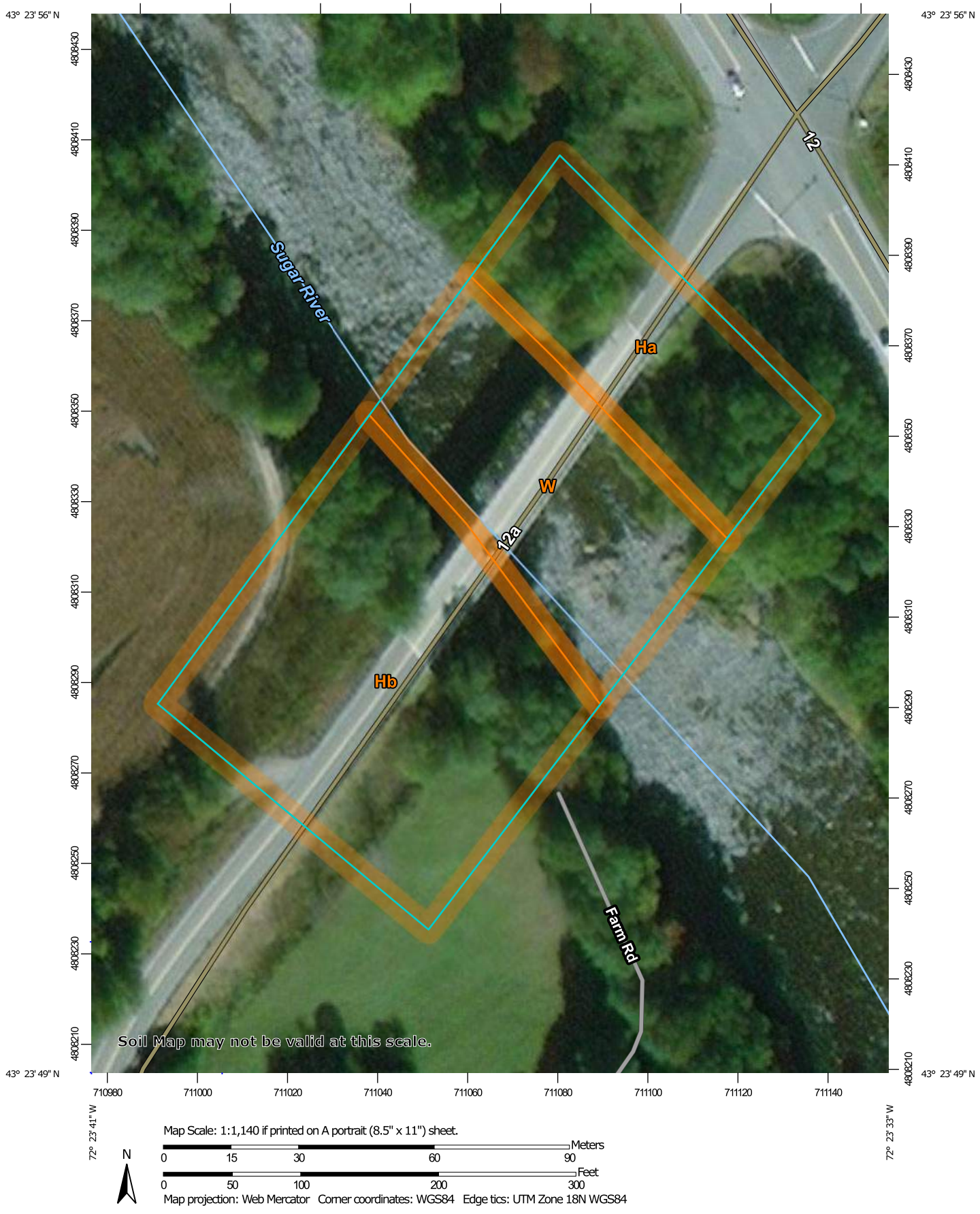
Pier 2

Pier centerline station (ft) 195.083
Pier width (ft) 3
Pier length (ft) 36.5824
Pier local approach depth (ft) 10.0811
Pier local approach velocity (ft/s) 7.76608
Pier flow angle of attack (degrees) 4.84091

Pier summary

Highest unit discharge approaching piers (cfs/ft) 111.256
(location based on longest pier length (offset from bridge centerline))
Station of the highest unit discharge approaching piers (ft) 147.851
Pier design velocity (ft/s) 9.96685
(Velocity magnitude at the highest unit discharge approaching piers)
Depth at the highest unit discharge approaching piers (ft) 11.1567

The scour toolbox defaults to "Thalweg" option.
If you wish to evaluate "Local" option, note
pier local approach depth and velocity from above
and enter into Hydraulic Toolbox.


43° 23' 56" N
43° 23' 49" N
4808430
4808410
4808390
4808370
4808350
4808330
4808310
4808290
4808270
4808250
4808230
4808210
710980
711000
711020
711040
711060
711080
711100
711120
711140
72° 23' 41" W
72° 23' 33" W
Sugar River
12
Ha
W
12a
Hb
Farm Rd
Soil Map may not be valid at this scale.
Map Scale: 1:1,140 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 15 30 60 90
Feet
0 50 100 200 300
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sullivan County, New Hampshire
Survey Area Data: Version 25, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 11, 2014—Apr 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ha	Hadley silt loam, frequently flooded	0.7	23.1%
Hb	Hadley silt loam, occasionally flooded	1.4	48.5%
W	Water	0.8	28.4%
Totals for Area of Interest		**2.9**	**100.0%**

HADLEY SERIES

The Hadley series consists of very deep well drained soils formed in silty alluvium. They are nearly level soils on flood plains. Saturated hydraulic conductivity is moderately high or high in the surface layer and upper substratum and moderately high to very high in the lower substratum. Slope ranges from 0 to 3 percent. Mean annual temperature is about 48 degrees F. and the mean annual precipitation is about 40 inches.

TAXONOMIC CLASS: Coarse-silty, mixed, superactive, nonacid, mesic Typic Udifluvents

TYPICAL PEDON: Hadley silt loam-cultivated at an elevation of about 115 feet. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 11 inches; very dark grayish brown (2.5Y 3/2) silt loam, light gray (2.5Y 7/2) dry; weak and moderate fine and very fine granular structure; friable; slightly sticky, plastic; many fine roots; strongly acid; abrupt smooth boundary. (6 to 14 inches thick)

C1--11 to 28 inches; olive brown (2.5Y 4/4) silt; massive, evidence of fine stratification; friable, slightly sticky, slightly plastic; common fine roots; few fine pores; strongly acid; gradual irregular boundary.

C2--28 to 40 inches; brown (10YR 4/3) and grayish brown (2.5Y 5/2) silt loam; massive; friable, slightly sticky, slightly plastic; few fine roots; common fine pores; moderately acid; abrupt smooth boundary.

C3--40 to 54 inches; light olive brown (2.5Y 5/4) and brown (10YR 4/3) silt loam; massive; friable, slightly sticky, slightly plastic; few very fine roots; common very fine and fine pores; strongly acid; abrupt wavy boundary.

C4--54 to 68 inches; olive brown (2.5Y 4/4) silt loam; massive; friable, nonsticky, slightly plastic; few very fine and fine pores; moderately acid; abrupt wavy boundary.

2C5--68 to 72 inches; olive brown (2.5Y 4/4) and light brownish gray (2.5Y 6/2) loamy fine sand; massive; very friable, nonsticky, nonplastic; moderately acid.

TYPE LOCATION: Hampshire County, Massachusetts; City of Northampton, about 1 mile southeast of the west end of Coolidge Memorial Bridge on Route 9 and 3/4 mile northeast of the Northampton sewage treatment plant. USGS Mt. Holyoke quadrangle; Latitude 42 degrees 19 minutes 14 seconds N., Longitude 72 degrees 37 minutes 8 seconds W..

RANGE IN CHARACTERISTICS: Thickness and number of subsurface horizons correspond closely to the thickness and variability of the alluvial deposits. Reaction, to a depth of 40 inches, ranges from very strongly acid through neutral, but some subhorizon in each pedon is moderately acid or less acid. Reaction below 40 inches ranges from strongly acid through slightly alkaline. Rock fragments are absent or few to a depth of 40 inches.

The Ap horizon has hue of 10YR through 5Y, value of 3 or 4, and chroma of 2 through 4. Dry value is 6 or 7. It

is silt loam or very fine sandy loam.

The C horizons have hue of 10YR through 5Y, value of 3 through 6, and chroma of 2 through 6. They are silt to very fine sand to a depth of 40 inches. Some pedons have thin strata of loamy fine sand, fine sand, or sand. Below 40 inches the texture ranges from silt loam to sand.

COMPETING SERIES: These are the Arenzville, Belvue, and Chaseburg series. All of these soils are from outside Region R. Arenzville soils have a buried A horizon more than 10 inches thick within 40 inches. Belvue soils have a mean annual temperature of 52 to 55 degrees F. Chaseburg soils have platy structure throughout the C horizon. Juneau soils have a buried E horizon at a depth of 24 to 36 inches.

GEOGRAPHIC SETTING: Hadley soils are nearly level soils on flood plains and high bottoms. Slope gradients are mainly less than 3 percent. The soils formed in alluvial deposits consisting primarily of very fine sand and silt. Flooding by stream overflow ranges from once a year to once in 5 to 10 or more years. Flooding generally occurs during the early spring runoff or occasionally during periods of high rainfall in the fall. Floodwater seldom covers these soils for periods of more than 2 or 3 days on the high bottoms, but the duration is up to 7 days in the lower positions. Mean annual precipitation ranges from 30 to 50 inches; mean annual temperature ranges from 45 to 50 degrees F; mean growing season ranges from 120 to 180 days.

GEOGRAPHICALLY ASSOCIATED SOILS: Hadley soils are the well drained member of a drainage sequence which includes the moderately well drained Winooski, the poorly drained Limerick, and the very poorly drained Saco soils. Adams, Agawam, Allagash, Colton, Enfield, Groveton, Hartland, Hinckley, Merrimac, Unadilla, and Windsor soils are on nearby terraces. All these soils, with the exception of Enfield, Hartland and Unadilla, have more than 15 percent fine sand or coarser in the control section. Enfield, Hartland, and Unadilla soils have cambic horizons.

DRAINAGE AND PERMEABILITY: Well drained. Saturated hydraulic conductivity is moderately high or high in the surface layer and upper substratum and moderately high to very high in the lower substratum.

USE AND VEGETATION: Most areas used for hay, pasture, and silage corn in support of dairying. Some areas in Massachusetts and Connecticut areas are also used for truck crops, potatoes, and tobacco. Some areas are in urban uses. The few areas of woodland have red maple, elm, silver maple, sycamore, willow, sugar maple, and white pine.

DISTRIBUTION AND EXTENT: MLRAs 142, 143, 144A, 144B, and 145 in Connecticut, Massachusetts, New Hampshire, Vermont, and eastern New York. The series is extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: Amherst, Massachusetts

SERIES ESTABLISHED: Hampden and Hampshire Counties, Massachusetts, 1928.
REMARKS: Although thickness is not quantified in the typical pedon this pedon dates to 1973 - the presence of fine stratification in the C1 horizon immediately below the Ap horizon is evidence of rock structure as defined by Soil Taxonomy (Ninth Edition 2003). The soil series as represented by the typical pedon - also does not possess decisive evidence of alteration in the form of the development of structure or color in more than 50 percent of the volume. Therefore, this soil does not meet Soil Taxonomy, Ninth Edition criteria for a cambic horizon. However, a review of published data was conducted and does suggest that fine stratification is not always present or was not described. Therefore, further investigation of Hadley soils throughout its extent may be requisite to determine the extent of stratification and other alteration. Soils formed in fluvial materials on similar landscapes have been determined to have cambic horizons and have been reclassified as Inceptisols (early 2000s). Interestingly though, historical data demonstrates an evolution of the Hadley series as a soil originally described on the high bottoms with some incipient development in the 1920s to one in the 1960s that has migrated off the high bottoms to lower positions on the floodplain with no genetic development below the surface layer. The soils original characteristics were not completely lost - despite some new series development based on textural and reaction properties - and so remained a part of the soils range, at least conceptually.

Historical records of past studies and conclusions are on file at the MLRA Office in Amherst.

Diagnostic horizons and features recognized in this pedon include:

1. Ochric epipedon - the zone from the surface to a depth of 11 inches (Ap horizon).
2. Coarse-silty particle size - less than 10 percent of the material in the 10 to 40 inch zone is sand or coarser, including gravel, and clay averages about 7 percent.
3. Nonacid feature - reaction is moderately acid in the 28 to 40 inch zone.

ADDITIONAL DATA: Laboratory data are available for the typical pedon: S70MA-8-1(1-8).

National Cooperative Soil Survey
U.S.A.

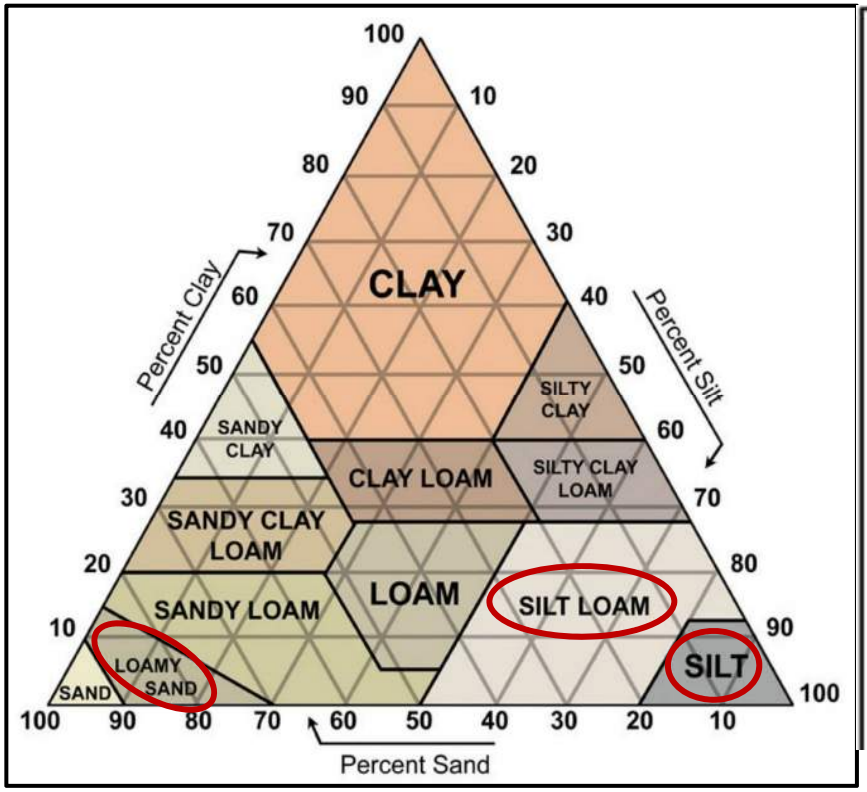
NH Route 12A over Sugar River - D_{50} Determination

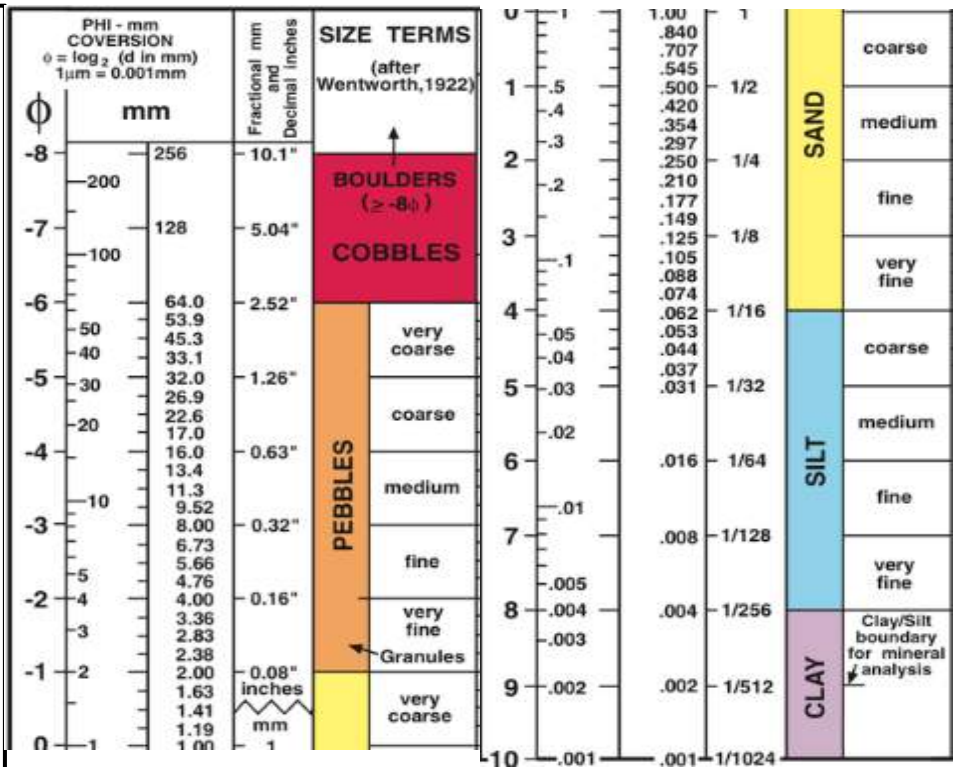
Sullivan County – Claremont, New Hampshire

TranSystems
EXPERIENCE | Transportation

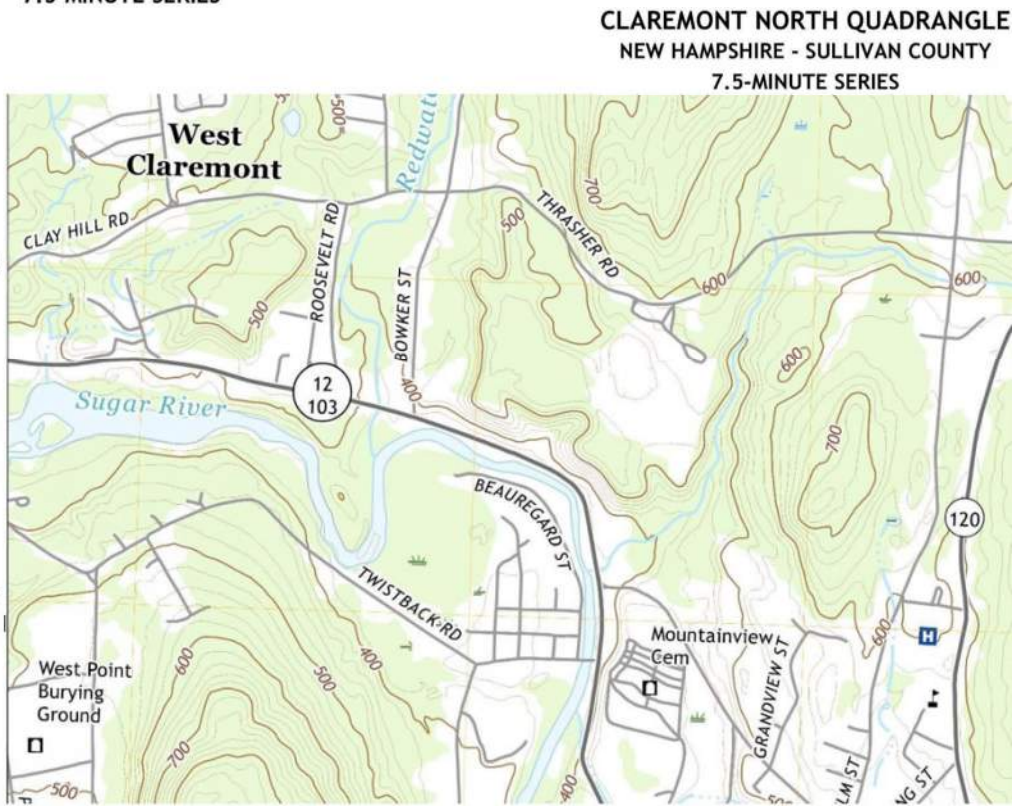
Inches			Desciption	%Total	D_{50} Clay %	D_{50} Clay D_{50} (mm)	D_{50} Silt %	D_{50} Silt D_{50} (mm)	D_{50} Sand %	D_{50} Sand D_{50} (mm)	D_{50} (mm)	%Total * D_{50} (mm)
0	to	11	Silt-loam fine granular	0.153	5	0.003	75	0.010	20	0.177	0.043	0.0066
11	to	28	Silt	0.236	0	0.000	100	0.016	0	0.000	0.016	0.0038
28	to	40	Silt-loam	0.167	5	0.003	75	0.020	20	0.250	0.065	0.0109
40	to	54	Silt-loam	0.194	5	0.003	75	0.020	20	0.250	0.065	0.0127
54	to	68	Silt-loam	0.194	5	0.003	75	0.020	20	0.250	0.065	0.0127
68	to	72	Loamy fine sand	0.056	15	0.003	0	0.000	85	0.125	0.107	0.0059
			SUM:	1.000							D_{50} (AVG)	0.0087

D50 used in Scour Analysis





Section IV: Appendix

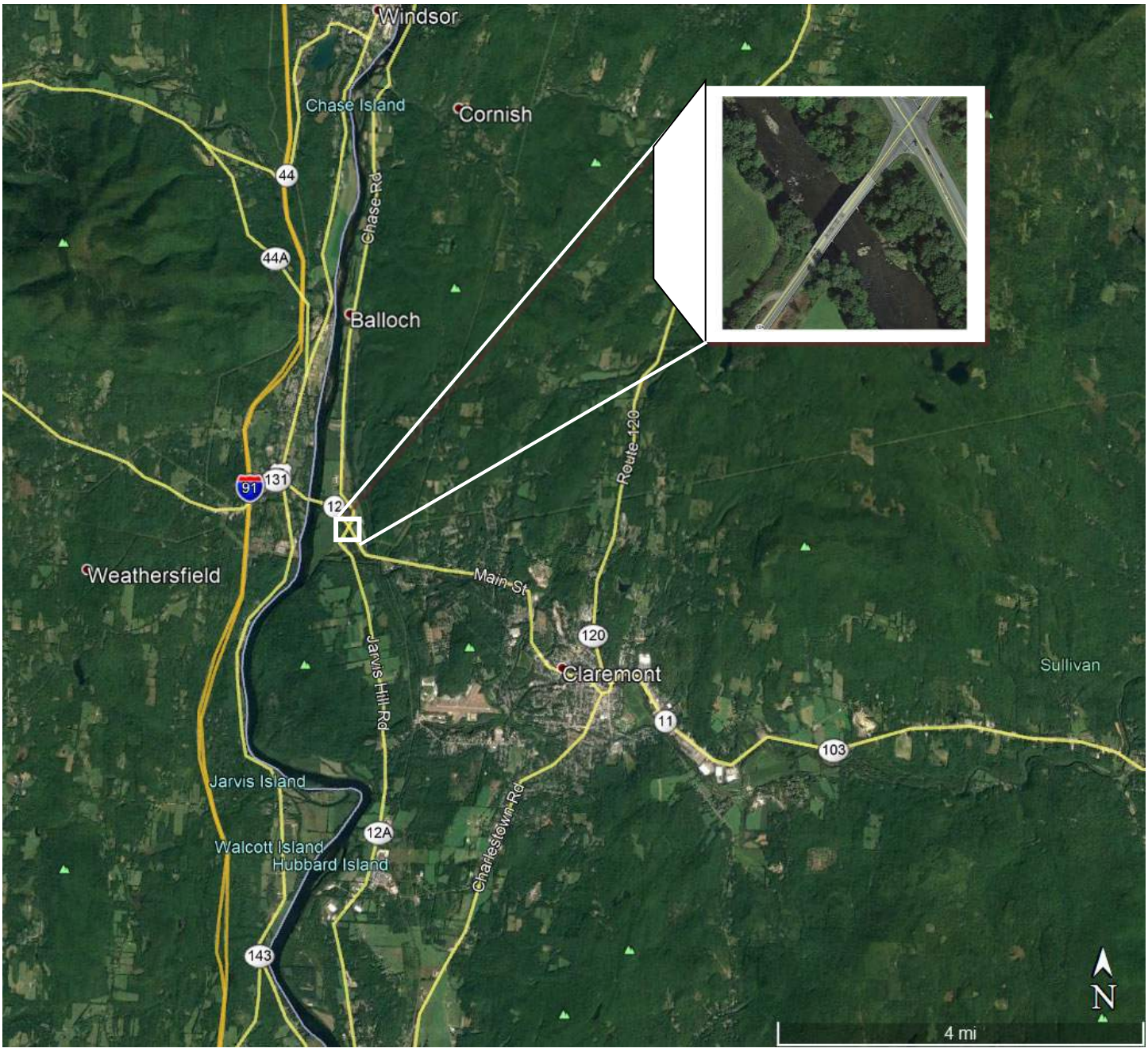


QUADRANGLE MAPS: WINDSOR & CLAREMONT NORTH

Project Title: NH Route 12A over Sugar River
Location: Sullivan County – Claremont, New Hampshire
Structure ID: 072/127
Source of Map: Store.USGS.gov

NH Route 12A over Sugar River - Location Map

Sullivan County – Claremont, New Hampshire



COORDINATES: 34°15'15.97" N , 85°09'50.54 W

Project Title: NH Route 12A over Sugar River
Location: Sullivan County – Claremont, New Hampshire
Structure ID: 072/127
Source of Map: Google Earth Pro

NH Route 12A roadway approach looking east.

NH Route 12A roadway approach looking west.

Upstream face of bridge looking east.

Upstream face of bridge looking west.

Western pier looking west.

Eastern pier looking east.

Abutment and slope conditions, typ.

Superstructure conditions, typ.

Upstream channel looking southeast.

Downstream channel looking northwest.

Downstream eastern banks looking southeast.

Upstream eastern channel banks looking northwest.

Upstream Channel (Google Earth Imagery 07/2012).

Downstream Channel (Google Earth Imagery 07/2012).

Upstream Sugar River Reservior looking east from Plains Road (Google Earth Imagery 11/2019).

Upstream Sugar River Reservior looking west from Plains Road (Google Earth Imagery 11/2019).

NHB DataCheck Results Letter

Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

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

To: Christine Perron, McFarland Johnson
53 Regional Drive
Concord, NH 03301

From: NHB Review, NH Natural Heritage Bureau
Date: 3/16/2022 (valid until 03/16/2023)
Re: Review by NH Natural Heritage Bureau
Permits: NHDES - Shoreland Standard Permit, NHDES - Wetland Standard Dredge & Fill - Major, USACE - General Permit, USEPA - Stormwater Pollution Prevention

NHB ID: **NHB22-0855** Town: Claremont Location: NH Route 12A
Description: This project will address Bridge 072/127, which carries NH Route 12A over the Sugar River in Claremont. The project is a non-federal bridge rehabilitation and scour protection project. The bridge is a 1967 three-span steel girder bridge with a concrete deck. The rehabilitation will entail replacement of the superstructure and bridge bearings. This work will not be located within the river. The only proposed in-water work is associated with the placement of scour protection at the one scour critical pier in the river. This work will be completed within a cofferdam. Construction access will require a temporary bulkhead off the bank of the river, most likely in the NE quadrant, and a temporary work trestle to reach the pier.

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

Comments **NHB: As per recent communication during the NHDOT NRACM on March 16, 2022, please conduct a survey for the two rare plant species indicated on the Datacheck Letter.**
F&G: No Comments At This Time

Plant species	State[1]	Federal	Notes
eastern waterleaf (*Hydrophyllum virginianum*)	T	--	This plant's habitat is typically in forested, moist areas. Canopy removal could threaten the plants by allowing other, shade-intolerant species to become established. Trampling could also damage the relatively fragile soils.
large-fruited sanicle (*Sanicula trifoliata*)*	T	--	Threats include direct desctuction of the plants and loss of habitat.

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

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

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

Please note: portions of this document are confidential.
Maps and NHB record pages are confidential and should be redacted from public documents.
A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

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

DNCR/NHB
172 Pembroke Rd.
Concord, NH 03301

USFWS Official Species List

United States Department of the Interior

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

In Reply Refer To: April 14, 2022
Project Code: 2022-0032174
Project Name: Claremont NH Bridge

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

To Whom It May Concern:

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

About Official Species Lists

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

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

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

Endangered Species Act Project Review

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

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

https://www.fws.gov/newengland/endangeredspecies/project-review/index.html

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

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

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

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

Candidate species that appear on the enclosed species list have no current protections under the ESA. The species' occurrence on an official species list does not convey a requirement to consider impacts to this species as you would a proposed, threatened, or endangered species. The ESA does not provide for interagency consultations on candidate species under section 7, however, the Service recommends that all project proponents incorporate measures into projects to benefit candidate species and their habitats wherever possible.

Migratory Birds

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

https://www.fws.gov/birds/policies-and-regulations.php

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

Attachment(s): Official Species List

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

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

Project Summary

Project Code: 2022-0032174
Event Code: None
Project Name: Claremont NH Bridge
Project Type: Bridge - Maintenance
Project Description: Bridge rehabilitation over the Sugar River. The rehabilitation will include replacing the bridge superstructure and bridge bearings, as well as placing scour protection in the river at the northern pier. The proposed scour protection method is now partially embedded riprap, which will extend approximately 1 foot above the existing channel. Based on the hydraulic analysis completed by TranSystems, the proposed riprap will not result in an increase in base flood elevation within the floodway. The riprap placement will be completed within a cofferdam and a portion of the channel will remain unimpeded during construction. Construction access will require a temporary bulkhead off the bank of the river in one quadrant of the bridge, most likely in the northeast quadrant, and a temporary work trestle from the bulkhead.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.398026099184946,-72.39371357646803,14z

Counties: Sullivan County, New Hampshire

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

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

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

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

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

Mammals

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

Clams

NAME	STATUS
Dwarf Wedgemussel *Alasmidonta heterodon* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/784	Endangered

Insects

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

Flowering Plants

NAME	STATUS
Jesup"s Milk-vetch *Astragalus robbinsii var. jesupii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/388	Endangered

Critical habitats

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

IPaC User Contact Information

Agency:	McFarland Johnson
Name:	Jordan Tate
Address:	5 Depot Street
Address Line 2:	Suite 25
City:	Freeport
State:	ME
Zip:	04032
Email	jtate@mjinc.com
Phone:	2078695419

USFWS 4(d) Rule Consistency Verification Letter

United States Department of the Interior

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

In Reply Refer To: April 14, 2022
Project code: 2022-0032174
Project Name: Claremont NH Bridge

Subject: Verification letter for the 'Claremont NH Bridge' project under the January 5, 2016, Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-eared Bat and Activities Excepted from Take Prohibitions.

Dear Jordan Tate:

The U.S. Fish and Wildlife Service (Service) received on April 14, 2022 your effects determination for the 'Claremont NH Bridge' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. This IPaC key assists users in determining whether a Federal action is consistent with the activities analyzed in the Service's January 5, 2016, Programmatic Biological Opinion (PBO). The PBO addresses activities excepted from "take"[1] prohibitions applicable to the northern long-eared bat under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

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

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

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

- Dwarf Wedgemussel *Alasmidonta heterodon* Endangered
- Jesup"s Milk-vetch *Astragalus robbinsii var. jesupii* Endangered
- Monarch Butterfly *Danaus plexippus* Candidate

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

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

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

1. Name

Claremont NH Bridge

2. Description

The following description was provided for the project 'Claremont NH Bridge':

> Bridge rehabilitation over the Sugar River. The rehabilitation will include replacing the bridge superstructure and bridge bearings, as well as placing scour protection in the river at the northern pier. The proposed scour protection method is now partially embedded riprap, which will extend approximately 1 foot above the existing channel. Based on the hydraulic analysis completed by TranSystems, the proposed riprap will not result in an increase in base flood elevation within the floodway. The riprap placement will be completed within a cofferdam and a portion of the channel will remain unimpeded during construction. Construction access will require a temporary bulkhead off the bank of the river in one quadrant of the bridge, most likely in the northeast quadrant, and a temporary work trestle from the bulkhead.

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.398026099184946,-72.39371357646803,14z

Determination Key Result

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

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

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

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

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

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

Determination Key Result

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

Qualification Interview

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

   Yes

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

   No

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

   No

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

   Automatically answered
   No

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

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

   Yes

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

   No

7. Will the action involve Tree Removal?

   No

Project Questionnaire

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

1. Estimated total acres of forest conversion:

0

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

0

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

0

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

4. Estimated total acres of timber harvest

0

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

0

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

0

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

7. Estimated total acres of prescribed fire

0

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

0

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

0

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

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

0

IPaC User Contact Information

Agency: McFarland Johnson
Name: Jordan Tate
Address: 5 Depot Street
Address Line 2: Suite 25
City: Freeport
State: ME
Zip: 04032
Email jtate@mjinc.com
Phone: 2078695419

Lead Agency Contact Information

Lead Agency: Army Corps of Engineers

Bridge Culvert Bat Assessment Form

APPENDIX D: Bridge/Structure Bat Assessment Form

Bridge/Structure Bat Assessment Form Instructions

- This form will be completed to document bat occupancy or bat use of bridges, culverts, and other structures. This form shall be submitted to the appropriate personnel within the DOT and USFWS for recordkeeping (or uploaded into the Information, Planning, and Consultation (IPaC) Determination Key for use of the Programmatic Biological Opinion for Transportation Projects in the Range of the Indiana Bat and Northern Long-Eared Bat) prior to conducting: any activities below the deck surface either from the underside or from above the deck surface that bore down to the underside; any activities that could impact expansion joints; any activities involving deck removal on bridges; or any activities involving structure demolition for bridges, culverts, and/or other structures.
- Assessments must be completed within two (2) years of conducting any work (see the above bullet), regardless of whether assessments have been conducted in the past. Assessments must be completed in appropriate weather conditions, suitable for the assessor to observe common signs of bat use.
- Evidence of bat use may include visual observation (live and/or dead), presence of guano, presence of staining, audible observation, and/or odor observation. Presence of one or more indicators is sufficient evidence that bats may be using the bridge, culvert, and/or other structure.
- If bat use of a bridge, culvert, and/or other structure is noted, additional studies may be undertaken during bat active season to identify the specific bat species utilizing the structure, or protected bat species presence can be assumed, in order to comply with threatened and endangered species regulations. Bat active season dates, typically between April and November, vary regionally and by species, so assessors should consult with their local USFWS Field Office for more specific active season dates.
- For use of the Programmatic Biological Opinion for Transportation Projects in the Range of the Indiana Bat and Northern Long-Eared Bat – If the bridge/structure is 1,000 feet or more from suitable bat habitat[1] (e.g., an urban or agricultural area without suitable foraging habitat or corridors linking the bridge to suitable foraging habitat), check the appropriate box and fill out the table below. **No further assessment is required.**

Date & Time of Assessment	**DOT Project #**	**Route/Facility Carried**	**County**
5/9/2019	27691	NH 12A	Sullivan
Federal Structure ID 072/127	**Structure Coordinates** (latitude and longitude) 43.398246, -72.393579	☐ This bridge/structure is 1,000 feet or more from suitable bat habitat[2] Name:_____ Signature: _____	

- Any questions pertaining to assessments or this form should be directed to the local USFWS Field Office.

[1] Refer to the USFWS's summer survey guidance for the definition of suitable habitat (http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html).

[2] This condition is only for use of the Programmatic Biological Opinion for Transportation Projects in the Range of the Indiana Bat and Northern Long-Eared Bat

Bridge/Structure Bat Assessment Form

Date & Time of Assessment	DOT Project Number	Route/Facility Carried	County
Federal Structure ID	Structure Coordinates (latitude and longitude)	Structure Height (approximate)	Structure Length

Structure Type (check one)

Bridge Construction Style

- ☐ Cast-in-place 
- ☐ Flat Slab/Box 
- ☐ Truss 

- ☐ Parallel Box Beam 
- ☐ Pre-stressed Girder 
- ☐ Steel I-beam 
- ☐ Covered 
- ☐ Other:

Culvert Type

- ☐ Box
- ☐ Pipe/Round
- ☐ Other:

Other Structure

Structure Material (check all that apply)

Deck Material	*Beam Material*	*End/Back Wall Material*
☐ Metal	☐ None	☒ Concrete
☐ Concrete	☐ Concrete	☐ Timber
☐ Timber	☐ Steel	☐ Stone/Masonry
☐ Open grid	☐ Timber	☐ Other:
☐ Other:	☐ Other:	

Creosote Evidence

☐ Yes ☐ No ☐ Unknown

Culvert Material

- ☐ Metal
- ☐ Concrete
- ☐ Plastic
- ☐ Stone/Masonry
- ☐ Other:

Notes:

Crossings Traversed (check all that apply)

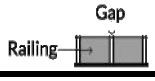
☐ Bare ground	☐ Open vegetation
☐ Rip-rap	☐ Closed vegetation
☐ Flowing water	☐ Railroad
☐ Standing water	☐ Road/trail - Type:
☐ Seasonal water	☐ Other:

Surrounding Habitat (check all that apply)

☐ Agricultural	☐ Grassland
☐ Commercial	☐ Ranching
☐ Residential-urban	☐ Riparian/wetland
☐ Residential-rural	☐ Mixed use
☐ Woodland/forested	☐ Other:

Areas Assessed (check all that apply)

Check all areas that apply. If an area is not present in the structure, check the "not present" box.
Document all bat indicators observed during the assessment. Include the species present, if known, and provide photo documentation as indicated.

Area (check if assessed)	**Assessment Notes**	**Evidence of Bats** (include photos if present)
☒ All crevices and cracks: **Bridges/culverts:** rough surfaces or imperfections in concrete **Other structures:** soffits, rafters, attic areas	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☒ Concrete surfaces (open roosting on concrete)	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☒ Spaces between concrete end walls and the bridge deck	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☒ Crack between concrete railings on top of the bridge deck 	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☐ Vertical surfaces on concrete I-beams	☐ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☒ Spaces between walls, ceiling joists	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☒ Weep holes, scupper drains, and inlets/pipes	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☒ All guiderails	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species
☒ All expansion joints	☒ Not present	☐ Visual - live # dead # ☐ Guano ☐ Staining ☐ Audible ☐ Odor ☐ Photos ☐ Species

Name: Jordan Tate

Signature: Jordan Tate

NHFG Correspondence

Christine J. Perron

From: Magee, John <john.a.magee@wildlife.nh.gov>
Sent: Monday, October 10, 2022 12:41 PM
To: Christine J. Perron
Cc: Dionne, Michael; Tuttle, Kim; Newton, Kevin
Subject: RE: NHDOT Project, Claremont 27691 - mussel survey report

Hi Christine. NH Fish and Game Department is OK with the work as proposed. No further information or assessment is needed.

John

John Magee (he/him/his)
M.S., Certified Fisheries Professional
Fisheries Habitat Research and Management Programs Coordinator
New Hampshire Fish and Game Department
11 Hazen Drive, Concord, NH 03301
Phone 603-271-2744
Fax 603-271-5829

Did you know? New Hampshire Fish and Game protects, conserves and manages more than 500 species of wildlife, including 63 mammals, 18 reptiles, 22 amphibians, 313 birds and 122 kinds of fish as well as thousands of invertebrates!

From: Christine J. Perron <CPerron@mjinc.com>
Sent: Monday, October 10, 2022 11:53 AM
To: Magee, John <john.a.magee@wildlife.nh.gov>
Subject: RE: NHDOT Project, Claremont 27691 - mussel survey report

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Hi John,

This is NHB22-0855 (attached).

McFarland Johnson
Christine J. Perron, CWS | Regional Environmental Manager
603-931-3327
Visit our website to see how MJ employee owners are innovating to improve our world.

From: Magee, John <john.a.magee@wildlife.nh.gov>
Sent: Monday, October 10, 2022 11:25 AM
To: Christine J. Perron <CPerron@mjinc.com>
Subject: RE: NHDOT Project, Claremont 27691 - mussel survey report

Hi Christine. I asked our Nongame folks about this just now…what is the NHB number for this one?

John Magee (he/him/his)
M.S., Certified Fisheries Professional
Fisheries Habitat Research and Management Programs Coordinator
New Hampshire Fish and Game Department
11 Hazen Drive, Concord, NH 03301
Phone 603-271-2744
Fax 603-271-5829

From: Christine J. Perron <CPerron@mjinc.com>
Sent: Thursday, October 6, 2022 10:20 AM
To: Magee, John <john.a.magee@wildlife.nh.gov>
Subject: FW: NHDOT Project, Claremont 27691 - mussel survey report

Hi John,

At the March 2022 resource agency meeting, there was some discussion about the mussel survey completed for the subject bridge project.

The survey was completed by Biodrawversity in 2020 and found generally poor mussel habitat within the project area with no live mussels, mussel shells, or shell fragments. I forwarded the report to NHFG back in 2020 and didn't receive any comments back.

The concern raised at the resource agency meeting was the timing of the survey so far in advance of construction, which is anticipated to start summer 2023. I dropped the ball and didn't follow up with you about this. My thought was that the habitat was found to be poor for mussels so there should not be any concern with the timing of the survey, but please let me know if you have any concerns.

Thanks,
Christine

McFarland Johnson
Christine J. Perron, CWS | Regional Environmental Manager
603-931-3327

From: Christine J. Perron
Sent: Wednesday, June 10, 2020 3:01 PM
To: Doperalski, Melissa <Melissa.Doperalski@wildlife.nh.gov>; Susi_vonoettingen@fws.gov; Kristoff, Richard C NAE (Richard.C.Kristoff@usace.army.mil) <richard.c.kristoff@usace.army.mil>
Cc: Carol Henderson <Carol.Henderson@wildlife.nh.gov>; Dube, Melilotus <Melilotus.Dube@dot.nh.gov>
Subject: NHDOT Project, Claremont 27691 - mussel survey report

Good afternoon,

The subject project is located on NH Route 12A over the Sugar River in Claremont. The project will include the installation of scour protection around one pier in the river. Due to the potential for mussels, Biodrawversity completed a mussel survey within the limits of the project. No live mussels or shell fragments were found. The survey is summarized in the attached report.

Please let us know if you have any further concerns with mussels at this location.
Thank you,
Christine

Christine Perron, CWS
Project Manager • Senior Environmental Analyst
McFarland Johnson
53 Regional Drive • Concord, NH 03301
OFFICE: 603-225-2978 ext. 1280
www.mjinc.com

Section 106 Effect Memo

New Hampshire DOT
Department of Transportation

Victoria F. Sheehan
Commissioner

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

William Cass, P.E.
Assistant Commissioner

Claremont
27691
RPR 10479

No Historic Properties Affected Memo

Pursuant to the Request for Project Review response from the NH Division of Historical Resources (NHDHR) signed February 27, 2019 and for the purpose of compliance with regulations of the National Historic Preservation Act, the Advisory Council on Historic Preservation's *Procedures for the Protection of Historic Properties* (36 CFR 800), and the US Army Corps of Engineers' *Appendix C*; the NH Division of Historical Resources and the US Army Corps of Engineers have coordinated the identification and evaluation of cultural resources with plans to rehabilitate bridge 072/127, which carries NH Route 12A over the Sugar River in Claremont, New Hampshire.

Project Description:
Constructed in 1967, Bridge 072/127 has a total length of 281 feet and a total width of 32.7 feet (28 feet curb-to-curb). The bridge consists of a three-span steel girder reinforced concrete deck and is on the NHDOT Red List of Deficient structures due to poor deck condition and a scour critical rating during floods. The bridge was rehabilitated in 1990 under NHDOT Project 11165.

The rehabilitation will include replacing the bridge superstructure and bridge bearings, as well as placing scour protection in the river at the northern pier. The proposed scour protection method is partially embedded riprap, which will extend approximately 1 foot above the existing channel. Construction access will require a temporary bulkhead off the bank of the river in one quadrant of the bridge and a temporary work trestle from the bulkhead. All work will remain within the existing right-of-way. The Area of Potential Effect encompasses the area directly surrounding the bridge, extending from the edge of pavement to the existing right of-way in each quadrant of the bridge, a distance of approximately 320 feet along the southerly approach from the edge of water and 230 feet along the northerly approach.

Identification:
The 1967 girder bridge was determined to apply to the Program Comment for Common Post-1945 Concrete and Steel Bridges, therefore Section 106 review does not apply to the bridge.

Based on the results of a Phase 1A/1B survey, it was determined that an archaeological site is located in the southwest quadrant of the bridge and untested areas beyond the existing right-of-way are archaeologically sensitive. No work is proposed in the southwest quadrant and there will be language in the contract to prohibit any construction activities in that quadrant and outside the existing right-of-way. Therefore, no additional archaeological survey is required prior to construction.

Public Consultation:
The proposed project was presented and discussed at a public informational meeting on November 16, 2021. Initial contact letters seeking input on the project were sent to various City officials, boards, and commissions in Claremont. The project has no consulting parties.

Determination of Effect:
Based on a review pursuant to 36 CFR 800.4, NHDOT has determined that no historic or archaeological resources will be affected in the project area and that no additional survey work is needed with the proposed plans. There will be an environmental commitment to avoid the southwest quadrant which is archaeologically sensitive.

The result of identification and evaluation for the proposed contract is a finding of **No Historic Properties Affected**. In accordance with the Advisory Council's regulations, we will continue to consult, as appropriate, as this project proceeds.

Jill Edelmann 7/5/2022
Jill Edelmann Date
Cultural Resources Manager
NH Department of Transportation

Concurred with by the NH State Historic Preservation Officer:

Nadine Miller 7/13/2022
Nadine Miller Date
Deputy State Historic Preservation Officer
NH Division of Historical Resources

c.c. Marika Labash, NHDHR
Mike Hicks, ACOE
Jon Evans, NHDOT
Christine Perron, MJ

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

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?	Unknown	
2.7 What is the area of the proposed fill in wetlands?	310 SF	
2.8 What is the % of previously and proposed fill in wetlands to the overall project site?	Unknown	
3. Wildlife	Yes	No
3.1 Has the NHB & USFWS determined that there are known occurrences of rare species, exemplary natural communities, Federal and State threatened and endangered species and habitat, in the vicinity of the proposed project? (All projects require an NHB ID number & a USFWS IPAC determination.) NHB DataCheck Tool: https://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?	N/A	
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.
`

New Hampshire Department of Transportation
Claremont 27691 Bridge 072/127

ACOE Appendix B Supplemental Narrative

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

Section 303(d) of the Clean Water Act requires each state to submit a list of impaired waters to the US EPA every two years to identify surface waters that are impaired by pollutants, not expected to meet water quality standards within a reasonable time, and require the development of a Total Maximum Daily Load (TMDL) study. This list is prepared by NHDES as outlined in the Draft Section 305(b) and 303(d) Consolidated Assessment and Listing Methodology. According to the NHDES 303(d) list (most recent available), the Sugar River (NHRIV801060407-16) is listed as impaired by pH and mercury.

The proposed project will result in a slight increase in pavement width, with a total increase in impervious surface area of approximately 1,500 sq ft. Runoff from the project area is not currently treated. Runoff from the approaches flows into catch basins that outlet on the roadway slopes and runoff from the bridge deck drains through scuppers. It was determined that the exiting catch basins have sufficient capacity to accept runoff from the bridge deck, and that the spread on the bridge is within the allowable limit of spread per the NHDOT Manual on Drainage Design for Highways. Therefore, the proposed project will eliminate the scuppers and direct runoff to the existing catch basins. No changes in the drainage outlets are proposed. With the minimal increase in impervious area and the elimination of the bridge scuppers, the proposed project is not expected to result in an adverse impact on water quality and will not cause or contribute to surface water impairments.

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

As mentioned above in Section 1.1, the bridge is located over Sugar River, which is a perennial stream and tributary of the Connecticut River.

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?

According to the most recent Natural Heritage Bureau (NHB) review, eastern waterleaf (Hydrophyllum virginianum) and large-fruited sanicle (Sanicula trifoliata) have historically been documented south of the project area, with large-fruited sanicle observations greater than 20 years ago. A rare plant survey was conducted on May 27, 2022 and located no rare plants within the project area; therefore, the project will not result in impacts to any rare plant species.

The US Fish & Wildlife Service (USFWS) Information, Planning, and Conservation System (IPaC) web tool was utilized to determine if federally listed species have the potential to occur in the project area. According to IPaC, the federally threatened northern long-eared bat (NLEB) and the federally endangered Dwarf Wedgemussel are potential concerns in this region of New Hampshire.

Northern long-eared bat has the potential to occur throughout New Hampshire. According to the USFWS, suitable summer habitat for northern long-eared bat consists of a variety of forested habitats. This species generally prefers closed canopy forest with an open understory. Potential roost trees include live trees or snags, at least 3” in diameter, with exfoliating bark, cracks, crevices, or cavities.

Bridges and other structures can also provide suitable roosting habitat. This species overwinters in hibernacula such as caves.

NHDOT completed an acoustic presence/absence survey for bat species of concern and a bridge assessment was completed on May 9, 2019. Based on survey results, the federally listed northern long-eared bat can be assumed absent from the site and consultation with the USFWS on this species will fall under the 4(d) rule. The acoustic survey also determined that the state-listed little brown bat was likely present at the site. However, there are no suitable roosting sites for this species in the project area and impacts to this species are not anticipated. The project adheres to the criteria and conditions as outlined in the Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat (January 2016). Using the USFWS determination key, it was determined that the project may affect northern long-eared bat. The proposed project's effects are consistent with those analyzed in the Programmatic BO. The USFWS concurs that the project is not likely to jeopardize the continued existence of the northern long-eared bat.

A freshwater mussel survey was completed in the Sugar River upstream and downstream of the project area on September 17, 2018. No live mussels, mussel shells, or old shell fragments were found within the survey area. The survey also determined that the habitat within the project area is considered poor due to coarse rocky substrates, strong flows, and shallow depth. Therefore, there are no anticipated impacts to the federally endangered dwarf wedgemussel as a result of this project. The report was provided to NH Fish & Game and USFWS. NH Fish & Game confirmed that there are no concerns with the work as proposed and no further mussel surveys are required.

The monarch butterfly is a candidate for listing under the ESA. The USFWS will review the monarch's status each year until resources are available to begin developing a proposal to list the monarch as threatened or endangered under the ESA. The candidate status of the monarch does not provide protection under the ESA, and no further coordination with the USFWS is required at this time. Monarch habitat includes non-forested, non-shrubby areas where there is potential for nectar species (flowering plants) and/or milkweed plants, including, but not limited to, regularly or semi-regularly mowed areas within the ROW and where a clear zone is maintained. The proposed project area includes some potential monarch habitat, but the project would not permanently change that habitat and no monarch conservation measures are included in the project at this time. Following construction, roadside areas would continue to provide potential habitat.

Jesup's Milk-vetch (Astragalus robbinsii var. jesupii) was listed in the IPaC review as potentially occurring within the vicinity of the project area. The plant grows in calcareous rock outcrops with flood-deposited silt. Suitable habitat exists as portions of the project area are located within the floodplain of Sugar River, with marginal rock and ledge outcropping along the shoreline. A rare species survey was conducted on May 26, 2022, this species was not identified within the project area during the survey.

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

According to the 2020 NH Wildlife Action Plan mapping, the proposed project is located within an area identified as Highest Ranked Habitat in NH. This habitat polygon is associated with the Sugar River and adjacent areas. The proposed action is located in a previously disturbed area associated with the existing bridge and NH Route 12A roadway corridor. Impacts on wildlife from the proposed action will be temporary and short-term in nature. The proposed action is not anticipated to result in any changes to terrestrial wildlife or aquatic organism passage or connectivity at the bridge location.

4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?

The Sugar River is a FEMA-mapped regulatory floodway with a 100-year floodplain (Zone AE) on both sides of the river. The project area is located within Zone AE (33019C0165E). The riprap placement will be completed within a cofferdam and a portion of the channel will remain unimpeded during construction.

The project was reviewed by the NH National Flood Insurance Program Assistant Coordinator on April 28, 2022. To comply with the National Flood Insurance Program, any placement of fill in the floodway would require hydrologic and hydraulic analyses. A hydraulic analysis was completed for the project and confirmed that there will be no increase in base flood elevation.

5. Historic/Archaeological Resources

The Request for Project Review (RPR) was sent to NH DHR and Section 106 consultation was carried out for the project. It was determined that the proposed project would have no adverse effect on known or potential historic properties. There are archaeologically sensitive areas in the vicinity of the project area, therefore, an environmental commitment will be included to avoid the southwest quadrant of the bridge to avoid impacts.

Photographs

Photo 1: View of Bridge 072/127 from the southwest quadrant on the West Bank Side

Photo 2: View of Bridge 072/127 from the southeast quadrant on the West Bank Side

Photo 3: View of Bridge 072/127 from the West Bank Side looking northeast towards the intersection between NH Route 12A and Route 103.

Photo 4: View of Bridge 072/127 from the East Bank Side looking southwest.

Photo 5: View of the underside of Bridge 072/127 and Sugar River

Photo 6: View of Bridge 072/127 from the northeast quadrant on the East Side Bank

Photo 7: View of the Intersection between NH Route 12A and Route 103 on the eastern bank of the project area

Construction Sequence

NHDES MAJOR IMPACT WETLANDS PERMIT APPLICATION

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

CLAREMONT, 27691

BRIDGE NO. 072/127 SUPERSTRUCTURE REPLACEMENT

CLAREMONT, NEW HAMPSHIRE

Anticipated Construction Sequence

Notes:

- The advertisement date is currently anticipated to be April 18, 2023
- The start of construction is anticipated to be Summer 2023, with the bridge closure and in-water work being completed in Summer 2023 (June-August).
- Construction is anticipated to be complete in Fall 2023
- Traffic will be maintained during construction using one lane with two-way alternating traffic controlled by traffic signals at each end of the bridge. Due to the constrained width available to the single lane of traffic across the bridge, a truck detour will be posted for wide load vehicles directing drivers to use the posted truck route around Claremont.
- The following sequence is a preliminary and likely order of construction but the exact means and methods will ultimately be decided by the selected contractor.

Construction Sequence:

1.) Mobilize equipment and materials to the project site.
2.) Using appropriate traffic control procedures to the satisfaction of the Engineer, close one lane on the bridge and install construction barrier.
3.) Install appropriate perimeter controls for soil erosion and sediment control.
4.) Remove and replace existing deck, superstructure, and bearings within work zone.
5.) Repeat steps 2-4 for remaining portion of existing bridge.
6.) Install temporary bulkhead and launch temporary work trestle.
7.) Install cofferdam.
8.) Excavate area around the existing bridge pier/footing for the installation of the scour countermeasures.
9.) Place riprap around existing pier.
10.) Remove cofferdam.
11.) Remove temporary trestle and bulkhead.
12.) Remove perimeter controls.
13.) Reopen bridge and roadway to traffic.

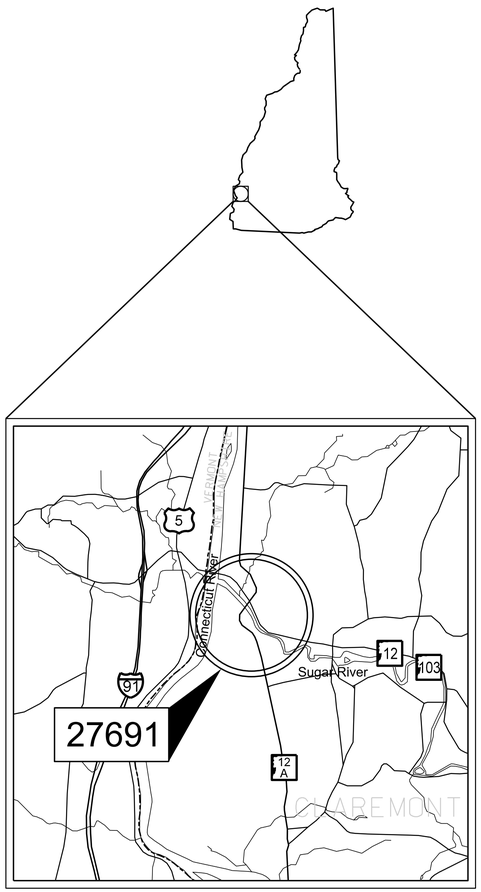
Wetland Impact Plan and Erosion Control Set

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

WETLAND PLANS

NH PROJECT NO. 27691
NH ROUTE 12A

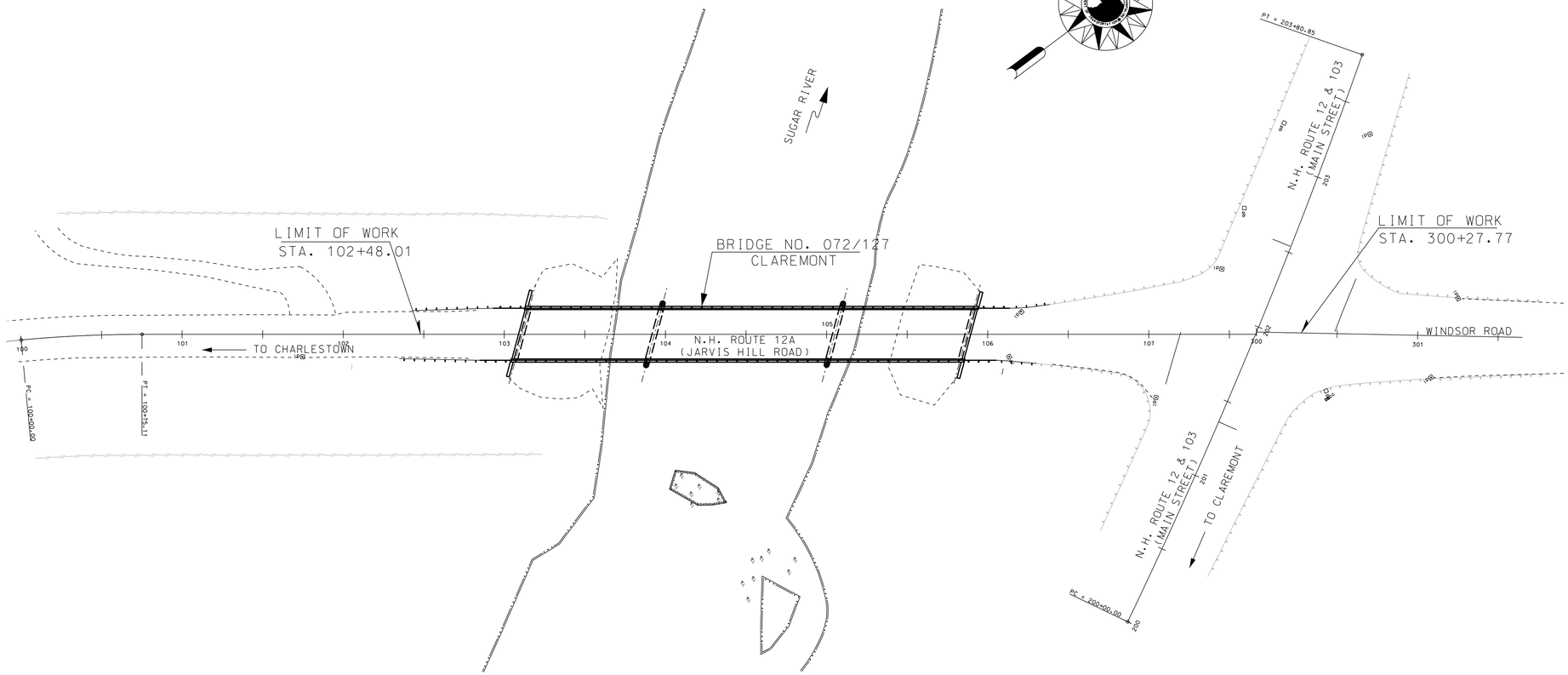
DESIGN DATA	
AVERAGE DAILY TRAFFIC 20 19	1700
AVERAGE DAILY TRAFFIC 20 42	2250
PERCENT OF TRUCKS	7%
DESIGN SPEED	35 MPH
LENGTH OF PROJECT	546 FT



LOCATION MAP

400 0 400 800

SCALE IN FEET



WETLANDS DELINEATED BY MCFARLAND-JOHNSON, INC. ON MAY 6, 2020, IN ACCORDANCE WITH THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL AND THE REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, VERSION 2.0, JANUARY 2012, US ARMY CORPS OF ENGINEERS.

STATE OF NEW HAMPSHIRE
CHRISTINE J. PERRON
No. 294
CERTIFIED WETLAND SCIENTIST

STATE OF NEW HAMPSHIRE
EVAN C. LOWELL
No. 13556
LICENSED PROFESSIONAL ENGINEER
10/6/2022

DRAWN BY VLS DATE 03/22
CHECKED BY BJG DATE 03/22

CLAREMONT
SULLIVAN COUNTY
SCALE: 1" = 40'-0"

INDEX OF SHEETS

NHDOT THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR APPROVAL:

DIRECTOR OF PROJECT DEVELOPMENT — DATE

APPROVED: 09/07/2022

ASSISTANT COMMISSIONER AND CHIEF ENGINEER — DATE

FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
X-A003(590)	27691	1	8

DRAINAGE

MANHOLE
CATCH BASIN (cb)
DROP INLET (di)
(existing) (PROPOSED)

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
PROPERTY LINE (COMMON OWNER)
TOWN LINE — BOW / CONCORD
COUNTY LINE — COOS / GRAFTON
STATE LINE — MAINE / NEW HAMPSHIRE
NATIONAL FOREST
CONSERVATION LAND
BENCH MARK / SURVEY DISK
BOUND (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

UTILITIES

	existing	PROPOSED
TELEPHONE POLE		
POWER POLE		
JOINT OCCUPANCY		
MISCELLANEOUS/UNKNOWN POLE		
GUY POLE OR PUSH BRACE		
LIGHT POLE		
LIGHT ON POWER POLE		
LIGHT ON JOINT POLE		

(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) (OW)

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	
FIBER OPTIC	FO	PFO
WATER SHUT OFF	W	W
GAS SHUT OFF	G	G
HYDRANT		

MANHOLES

SEWER	S	MHS
TELEPHONE	T	MHT
ELECTRICAL	E	MHE
GAS	G	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 C C	PC PC PC
CONTROLLER CABINET	cc	CC
METER PEDESTAL	mp	MP
PULL BOX	pb	PB
LOOP DETECTOR (QUADRUPOLE)		(label size)
LOOP DETECTOR (RECTANGULAR)		(label size)
CAMERA POLE (CCTV)		
FIBER OPTIC DELINEATOR	fod	FOD
FIBER OPTIC SPLICE VAULT		SVF
ITS EQUIPMENT CABINET	its	ITS
VARIABLE SPEED LIMIT SIGN		
DYNAMIC MESSAGE SIGN		
ROAD AND WEATHER INFO SYSTEM		

CONSTRUCTION NOTES

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

STATE OF NEW HAMPSHIRE
$TOWN$
DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
9-1-2016	stdsymb1-2	27691	2	8

GENERAL

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

DRIVEWAYS — (label surface type)

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

FOUNDATION — (label type)

LEACH FIELD — leach field

BRIDGE CROSSINGS — STREAM — OVERPASS

STEPS AND WALK — (label type)

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 W

WELL — W

FLAG POLE — fp

ORIGINAL GROUND (TYPICALS)

ROCK OUTCROP

ROCK LINE (TYPICALS & SECTIONS ONLY)

GUARDRAIL (label type) — existing — PROPOSED — bgr — cgr

JERSEY BARRIER

CURB (LABEL TYPE)

STONE WALL

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

FENCE (LABEL TYPE)

SIGNS — (single post) — (double post)

GAS PUMP — gp

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

STORAGE TANK FILLER CAP — fc

SEPTIC TANK — S

GRAVE — gr

MAILBOX — mb

VENT PIPE — vp

SATELLITE DISH ANTENNA — da

PHONE — ph

GROUND LIGHT/LAMP POST — gl — lp

BORING LOCATION — 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. I — I.S. II
INVASIVE SPECIES — INV

FLOODPLAIN / FLOODWAY

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

ENGINEERING

CONSTRUCTION BASELINE — 30 — 31 — 32

PC, PT, POT (ON CONST BASELINE)

PI (IN CONSTRUCTION BASELINES)

INTERSECTION OR EQUATION OF TWO LINES

ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)

PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)

CLEARING LINE — SLOPE 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
$TOWN$
DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	stdsymb1-2	27691	3	8

WETLAND IMPACT SUMMARY

WETLAND NUMBER	WETLAND CLASS-IFICATION	LOCATION	AREA IMPACTS						LINEAR STREAM IMPACTS FOR MITIGATION			COMMENTS
			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	R2UB1	A			310	61						STONE FILL PIER PROTECTION
2	BANK	B					4,460	120				TEMPORARY IMPACTS FOR CONSTRUCTION ACCESS
1	R2UB1	C					20,860	120				TEMPORARY IMPACTS FOR CONSTRUCTION ACCESS
3	BANK	D					1,190	25				TEMPORARY BULKHEAD (BANK IMPACT)
3	BANK	E					2,770	78				TEMPORARY IMPACTS FOR CONSTRUCTION ACCESS
3	BANK	F					2,035	40				TEMPORARY BULKHEAD (BANK IMPACT)
1	R2UB1	G					135	22				TEMPORARY BULKHEAD (CHANNEL IMPACT)
2	BANK	H					85	18				TEMPORARY IMPACTS FOR CONSTRUCTION ACCESS
		TOTAL										

PERMANENT IMPACTS: 310 SF
TEMPORARY IMPACTS: 31,535 SF

TOTAL IMPACTS: 31,845 SF

SUGAR RIVER CLASSIFICATION:
RIVERINE, LOWER PERENNIAL, UNCONSOLIDATED BOTTOM, COBBLE-GRAVEL

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE

McFarland Johnson

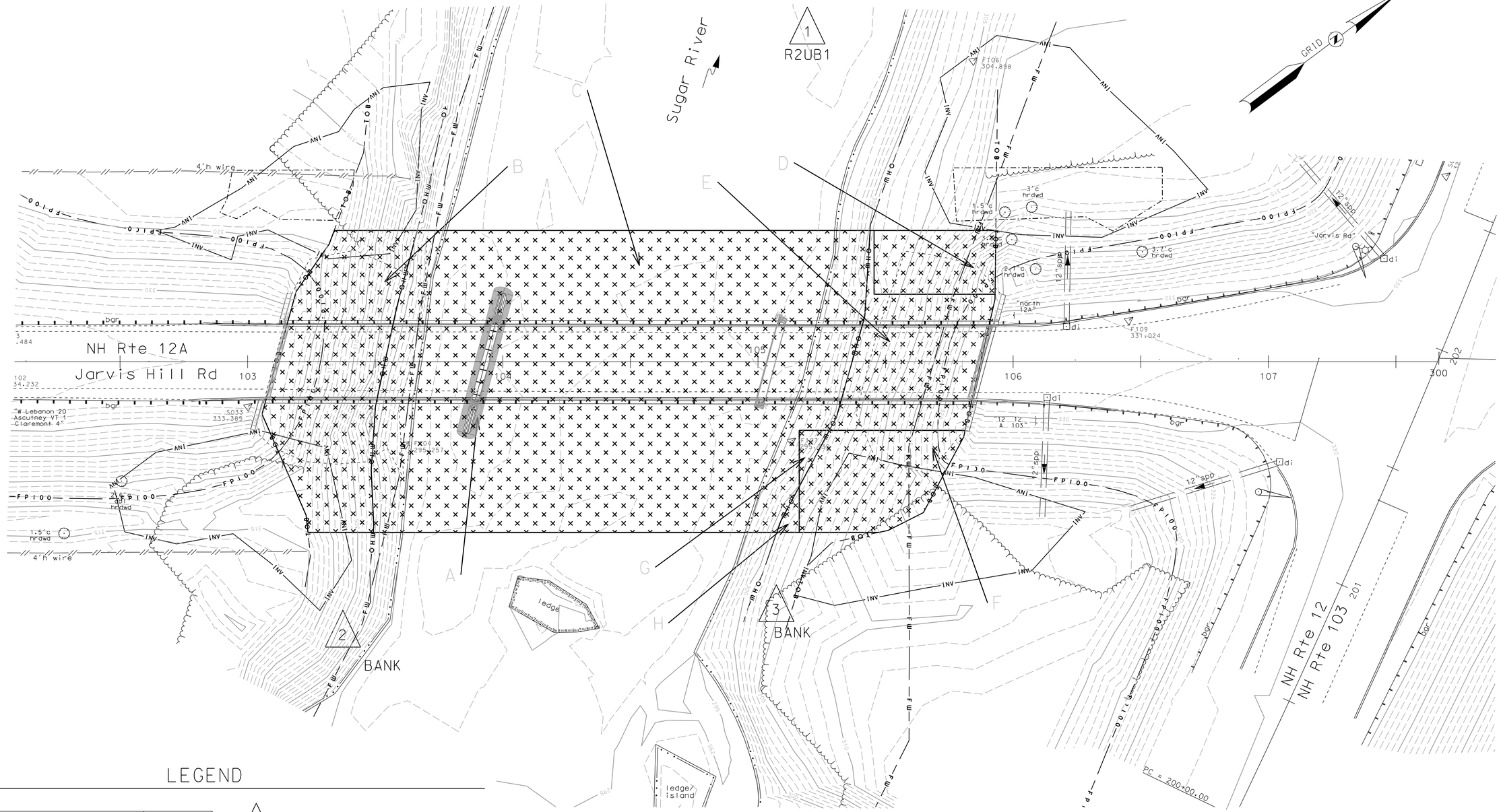
STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF BRIDGE DESIGN
WETLAND IMPACT SUMMARY SHEET

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
27691-WET_IMPACT	27691	4	8

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	DATE

	DATE
SDR PROCCESSED	
NEW DESIGN	
SHEET CHECKED	
AS BUILT DETAILS	



LEGEND

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

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

WETLAND PLAN

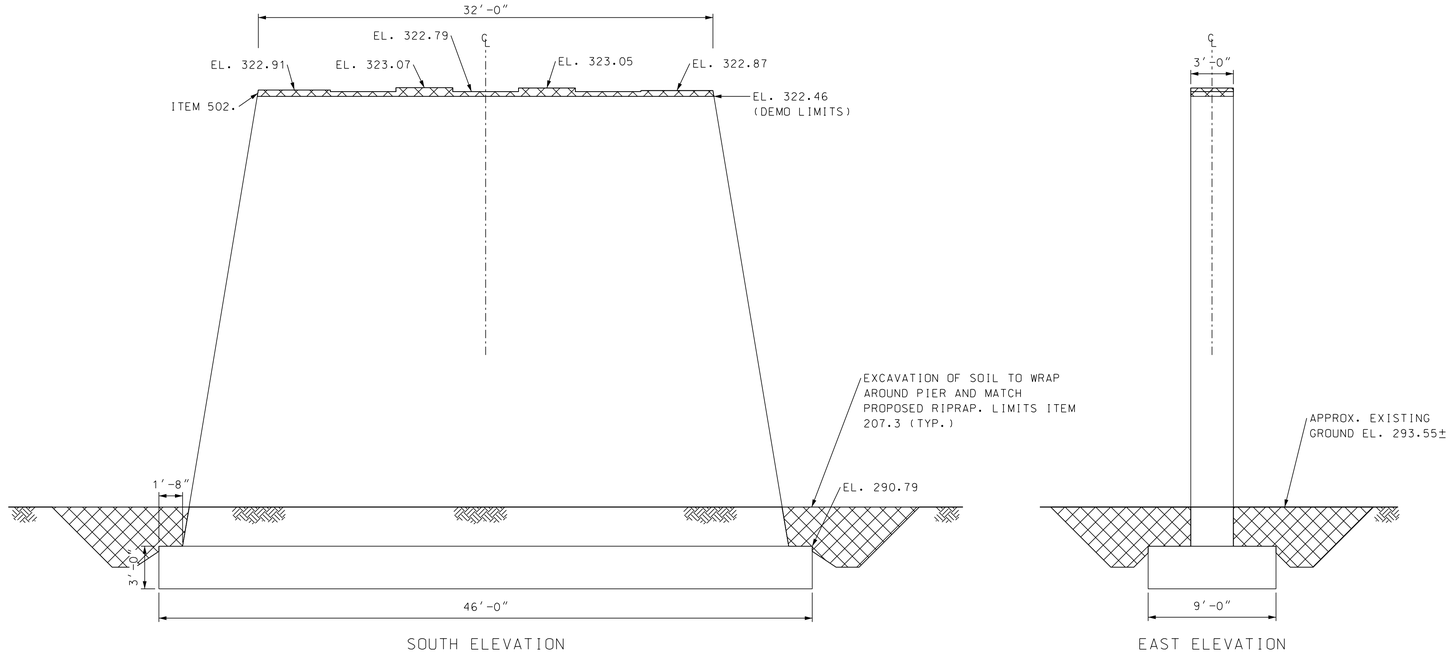
10 0 10 20
SCALE IN FEET

* BRIDGE SUPERSTRUCTURE NOT SHOWN FOR CLARITY *

McFarland Johnson

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION ◦ BUREAU OF BRIDGE DESIGN
WETLAND PLAN

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
27691-p-wet	27691	5	8

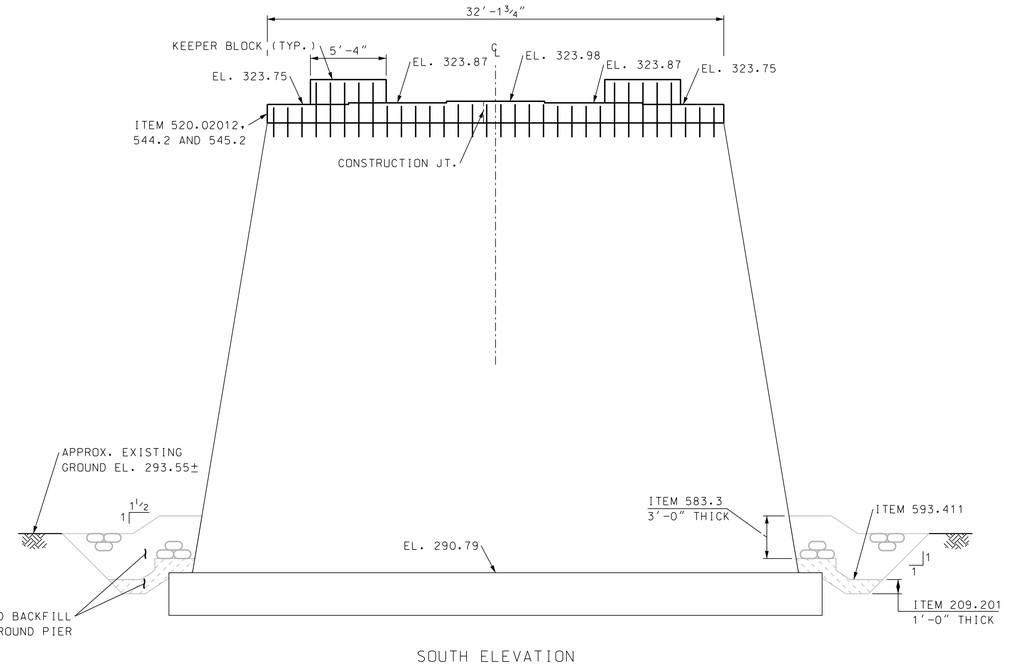


SOUTH ELEVATION

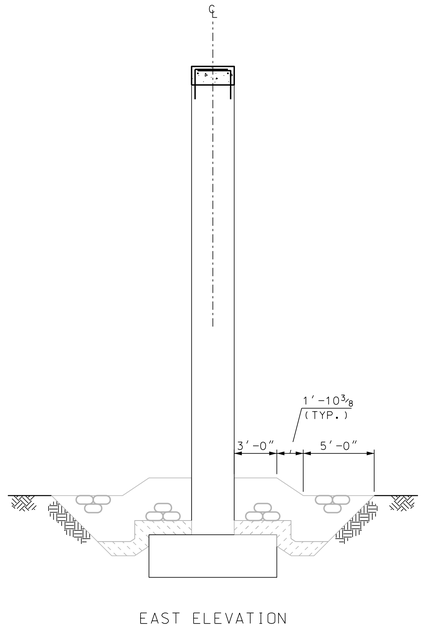
EAST ELEVATION

SOUTH PIER REMOVAL

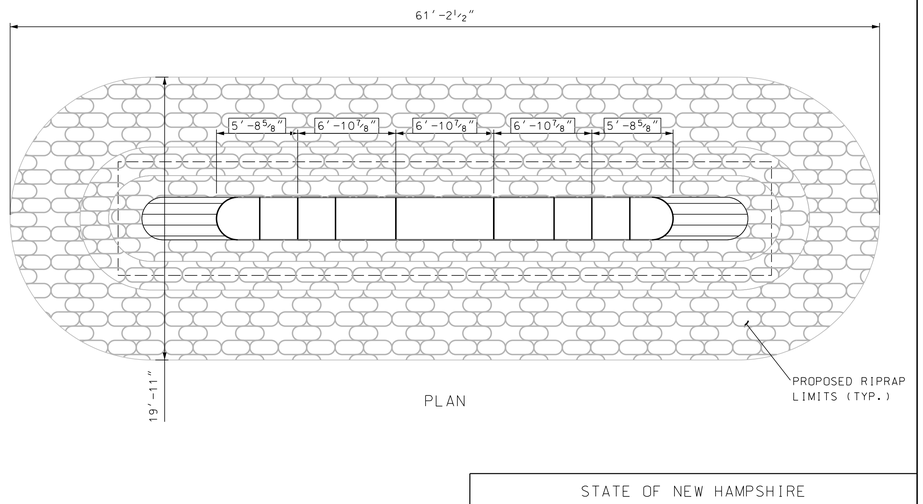
SCALE 3/16″ = 1′-0″



SOUTH ELEVATION



EAST ELEVATION



PLAN

SOUTH PIER MODIFICATIONS

SCALE 3/16″ = 1′-0″

McFarland Johnson

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF BRIDGE DESIGN

PIER STONE FILL DETAILS

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
27691South Pier	27691	6	8

EROSION CONTROL STRATEGIES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

TABLE 1

GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES[2]				ROLLED EROSION CONTROL BLANKETS[3]			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES[1]												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES'	YES'	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
$TOWN$
DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

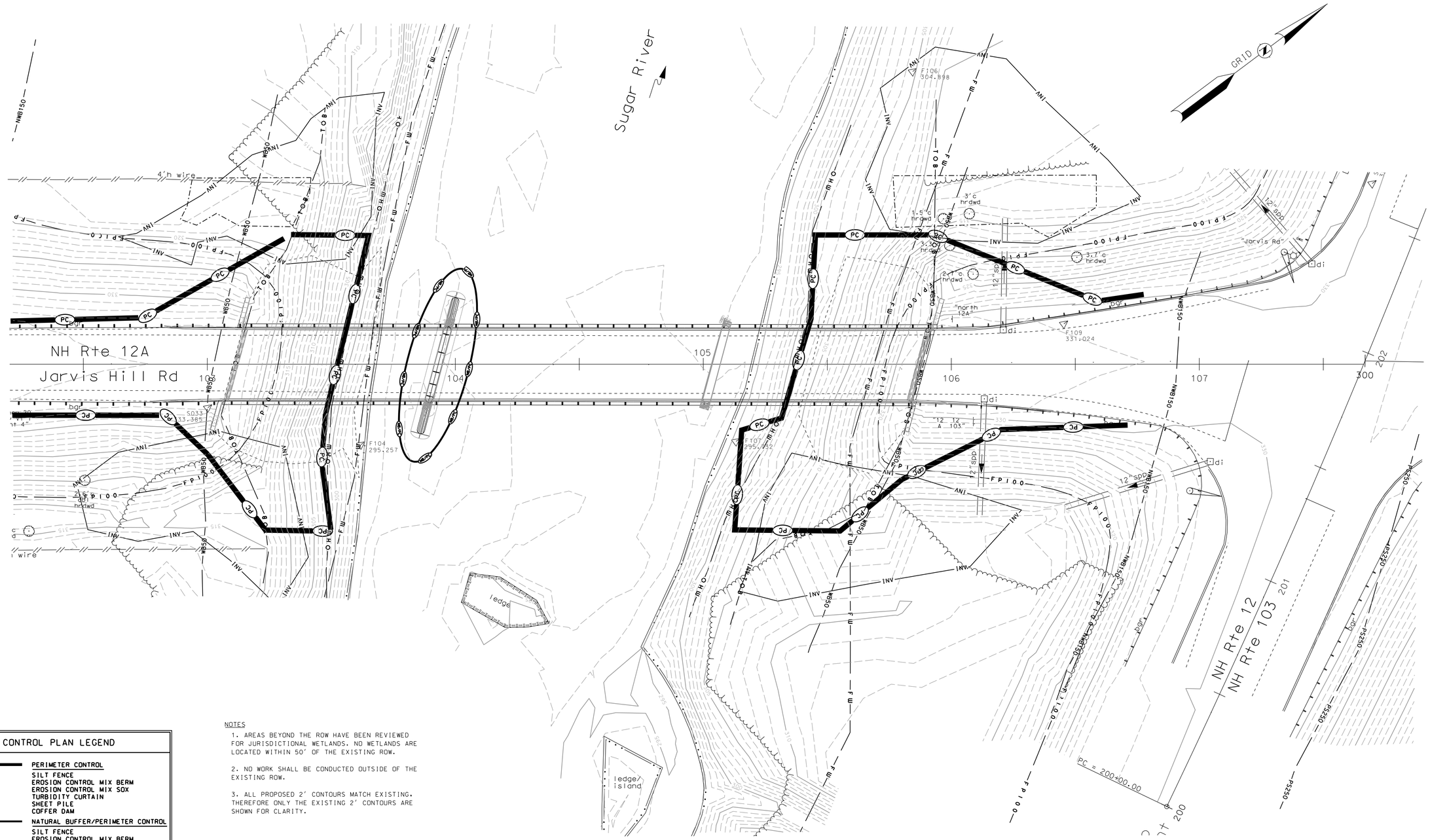
EROSION CONTROL STRATEGIES

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12-21-2015	erosstrat	27691	7	8

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	DATE

	DATE
SDR PROCCESSED	
NEW DESIGN	
SHEET CHECKED	
AS BUILT DETAILS	



EROSION CONTROL PLAN LEGEND

PC PC	**PERIMETER CONTROL** SILT FENCE EROSION CONTROL MIX BERM EROSION CONTROL MIX SOX TURBIDITY CURTAIN SHEET PILE COFFER DAM
NBM NBM	**NATURAL BUFFER/PERIMETER CONTROL** SILT FENCE EROSION CONTROL MIX BERM EROSION CONTROL MIX SOX TURBIDITY CURTAIN SHEET PILE COFFER DAM
CP CP CP CP CP CP CP	**CHANNEL PROTECTION** STONE CHECK DAMS STRAW WATTLES CHANNEL MATTING CLASS D EROSION STONE CLASS C STONE
CW CW CW CW CW CW CW	**CLEAN WATER BYPASS** PUMP THROUGH PIPE DRAIN THROUGH PIPE OR CHANNEL

NOTES

1. AREAS BEYOND THE ROW HAVE BEEN REVIEWED FOR JURISDICTIONAL WETLANDS. NO WETLANDS ARE LOCATED WITHIN 50' OF THE EXISTING ROW.

2. NO WORK SHALL BE CONDUCTED OUTSIDE OF THE EXISTING ROW.

3. ALL PROPOSED 2' CONTOURS MATCH EXISTING, THEREFORE ONLY THE EXISTING 2' CONTOURS ARE SHOWN FOR CLARITY.

EROSION CONTROL PLAN

SCALE IN FEET: 10 0 10 20

* BRIDGE SUPERSTRUCTURE NOT SHOWN FOR CLARITY *

McFarland Johnson

STATE OF NEW HAMPSHIRE

DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF BRIDGE DESIGN

EROSION CONTROL PLAN

DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
27691-p-ero	27691	8	8