

# STATE OF NEW HAMPSHIRE INTER-DEPARTMENT COMMUNICATION

**DATE:** May 27, 2016

**FROM:** Matt Urban  
Wetlands Program Manager

**AT (OFFICE):** Department of  
Transportation

**SUBJECT** Dredge & Fill Application  
Northfield-Tilton, 16147 &14744A

Bureau of  
Environment

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

Forwarded herewith is the application package prepared by NH DOT Bureau of Highway Design for the subject Major impact project. This project is classified as major per Env-Wt 303.02(p). The project is located on I-93 North Bound (NB) and South Bound (SB) over the Winnepesaukee River. This project consists of bridge deck rehabilitation and scour protection at the two bridges carrying I-93 NB and SB lanes over Winnepesaukee River. The project also involves approach work and temporary wetland fill in the median for traffic control lane crossovers.

This project was reviewed at the October 16<sup>th</sup> Natural Resource Agency Coordination Meeting. The minutes from that meeting can be found within this application.

This project does not require mitigation.

A payment voucher has been processed for this application (Voucher #443642) in the amount of \$9,382.

The lead people to contact for this project are Robert Landry, Bridge Design (271-2731 or blandry@dot.state.nh.us) or Matt Urban, Wetlands Program Manager, Bureau of Environment (271-3226 or murban@dot.state.nh.us).

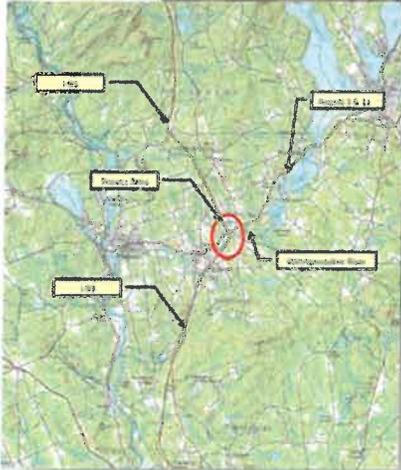
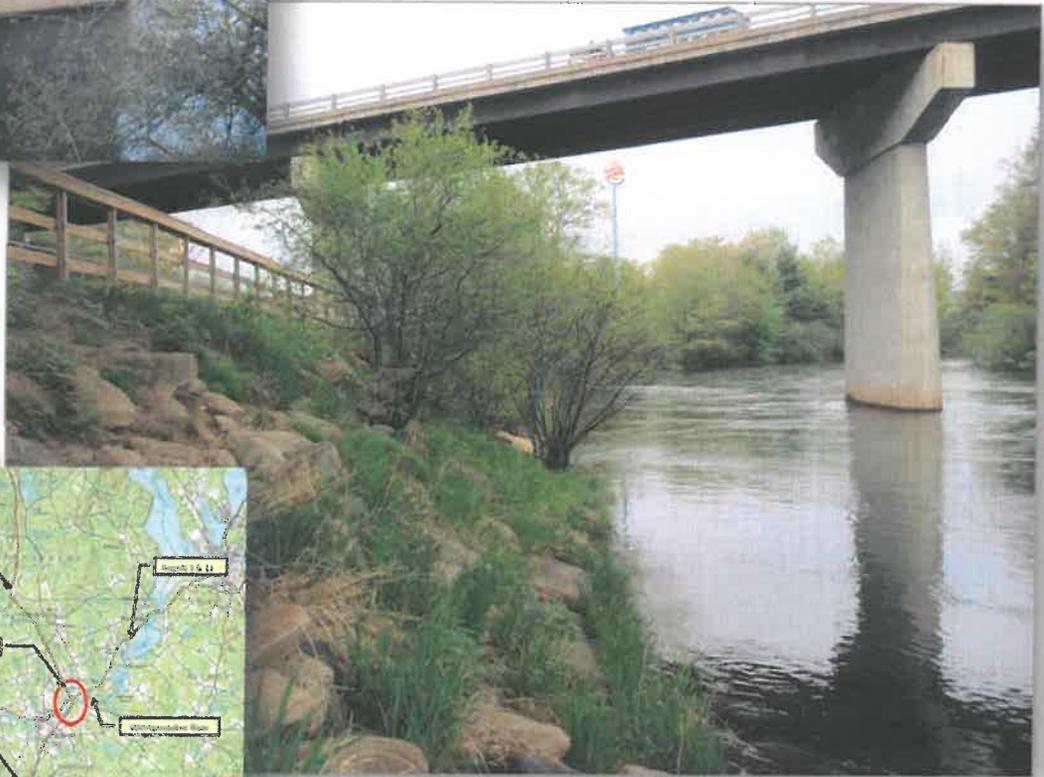
If and when this application meets with the approval of the Bureau, please send the permit directly to Matt Urban, Wetlands Program Manager, Bureau of Environment.

MRU:mru  
Enclosures

cc:  
BOE Original  
Town of Northfield (4 copies via certified mail)  
Town of Tilton (4 copies via certified mail)  
District Construction Engineer, NH DOT Bureau of Construction  
Darrel Elliott, Environmental Coordinator  
Carol Henderson, NH Fish and Game  
Maria Tur, USF&WS  
Edna Feighner, NHDHR (Cultural Review Within)  
Mark Kern, EPA  
Mike Hicks, US Army Corp of Engineers (via electronic copy)

# Interstate 93 Winnepesaukee River Bridges Deck Rehabilitation and Scour Protection Projects NHDES Wetland Application

State of New Hampshire  
Department of Transportation  
Northfield and Tilton, NH  
X-A001(153), 16147  
A001(042), 14744A





## Table of Contents

	Page
STANDARD DREDGE AND FILL APPLICATION FORM .....	1
EXHIBIT A - LOCATION MAP .....	5
ATTACHMENT A.....	7
MITIGATION.....	13
EXHIBIT B - NHDOT BUREAU OF ENVIRONMENT CONFERENCE REPORTS .....	15
EXHIBIT C - WATERSHED BOUNDARIES.....	23
ENV-WT 900 STREAM CROSSING REQUIREMENTS .....	25
ENV-Wt 904.05 DESIGN CRITERIA FOR TIER 2 AND TIER 3 STREAM CROSSINGS. ....	25
ENV-Wt 904.01 GENERAL DESIGN CONSIDERATIONS. ....	27
EXHIBIT D - NEW HAMPSHIRE NATURAL HERITAGE BUREAU DATACHECK RESULTS.....	29
EXHIBIT E - NHNHBB AND NHF&G CORRESPONDENCE .....	37
EXHIBIT F - USF&W IPAC RESULTS .....	43
EXHIBIT G - NORTHERN LONG-EARED BAT COORDINATION .....	49
EXHIBIT H - NHDHR MEMORANDUM OF NO EFFECT .....	55
ARMY CORPS OF ENGINEERS SECONDARY IMPACTS CHECKLIST .....	57
ARMY CORPS OF ENGINEERS SECONDARY IMPACTS CHECKLIST SUPPLEMENTAL NARRATIVE.....	59
EXHIBIT I - PHOTOS.....	63
CONSTRUCTION SEQUENCE NARRATIVE.....	67
ENV-WT 404.04 RIP-RAP.....	70
EXHIBIT J – WILDLIFE ACTION PLAN .....	73
EXHIBIT K – FLOODPLAIN INFORMATION .....	75
WETLAND IMPACT PLANS	





# WETLANDS PERMIT APPLICATION

Water Division/ Wetlands Bureau  
Land Resources Management

Check the status of your application: [www.des.nh.gov/onestop](http://www.des.nh.gov/onestop)



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

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

**1. REVIEW TIME:**  
Indicate your Review Time below. Refer to Guidance Document A for instructions.

- Standard Review (Minimum, Minor or Major Impact)       Expedited Review (Minimum Impact only)

**2. PROJECT LOCATION:**  
Separate applications must be filed with each municipality that jurisdictional impacts will occur in.

ADDRESS: **I-93 over the Winnepesaukee River**      TOWN/CITY: **Northfield & Tilton**

TAX MAP: **NA**      BLOCK:      LOT:      UNIT:

USGS TOPO MAP WATERBODY NAME: **Winnepesaukee River**       NA      STREAM WATERSHED SIZE: **467 sq miles**       NA

LOCATION COORDINATES (If known): **71°34'12.62"W 43°27'6.57"N**       Latitude/Longitude  
 UTM     State Plane

**3. PROJECT DESCRIPTION:**  
Provide a brief description of the project outlining the scope of work. Attach additional sheets as needed to provide a detailed explanation of your project. DO NOT reply "See Attached" in the space provided below.

**The New Hampshire Department of Transportation (NHDT) proposes deck rehabilitation and scour protection installation at the two bridges carrying Interstate 93 (I-93) northbound (State Bridge No. 118/158) and southbound (State Bridge No. 117/157) over the Winnepesaukee River, in the Towns of Northfield and Tilton, New Hampshire. The project involves approach work and temporary wetland fill in the median for traffic control lane crossovers.**

**4. SHORELINE FRONTAGE**

NA This lot has no shoreline frontage.      SHORELINE FRONTAGE:  
Shoreline frontage is calculated by determining the average of the distances of the actual natural navigable shoreline frontage and a straight line drawn between the property lines, both of which are measured at the normal high water line.

**5. RELATED PERMITS, ENFORCEMENT, EMERGENCY AUTHORIZATION, SHORELAND, ALTERATION OF TERRAIN, ETC...**

**Shoreland notification**

**6. NATURAL HERITAGE BUREAU & DESIGNATED RIVERS:**  
See the Instructions & Required Attachments document for instructions to complete a & b below.

- a. Natural Heritage Bureau File ID:    NHB **16**    -    **1377**
- b.  Designated River the project is in ¼ miles of: \_\_\_\_\_; and  
date a copy of the application was sent to the Local River Management Advisory Committee: Month: \_\_\_\_ Day: \_\_\_\_ Year: \_\_\_\_
- NA

<b>7. APPLICANT INFORMATION (Desired permit holder)</b>			
LAST NAME, FIRST NAME, M.I.: <b>Landry, L. Robert</b>			
TRUST / COMPANY NAME: <b>NHDOT</b>		MAILING ADDRESS: <b>7 Hazen Drive</b>	
TOWN/CITY: <b>Concord</b>		STATE: <b>NH</b>	ZIP CODE: <b>03302</b>
EMAIL or FAX: <b>RLandry@dot.state.nh.us</b>		PHONE: <b>603 271-2731</b>	
ELECTRONIC COMMUNICATION: By initialing here: <u>LR</u> I hereby authorize NHDES to communicate all matters relative to this application electronically			
<b>8. PROPERTY OWNER INFORMATION (If different than applicant)</b>			
LAST NAME, FIRST NAME, M.I.:			
TRUST / COMPANY NAME:		MAILING ADDRESS:	
TOWN/CITY:		STATE:	ZIP CODE:
EMAIL or FAX:		PHONE:	
ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically			
<b>9. AUTHORIZED AGENT INFORMATION</b>			
LAST NAME, FIRST NAME, M.I.: <b>Chase, Vicki</b>		COMPANY NAME: <b>Normandeau Associates</b>	
MAILING ADDRESS: <b>25 Nashua Road</b>			
TOWN/CITY: <b>Bedford</b>		STATE: <b>NH</b>	ZIP CODE: <b>03110</b>
EMAIL or FAX: <b>vchase@normandeau.com</b>		PHONE: <b>603 637-1111</b>	
ELECTRONIC COMMUNICATION: By initialing here <u>VPC</u> , I hereby authorize NHDES to communicate all matters relative to this application electronically			
<b>10. PROPERTY OWNER SIGNATURE:</b>			
See the Instructions & Required Attachments document for clarification of the below statements			
By signing the application, I am certifying that:			
<ol style="list-style-type: none"> <li>I authorize the applicant and/or agent indicated on this form to act in my behalf in the processing of this application, and to furnish upon request, supplemental information in support of this permit application.</li> <li>I have reviewed and submitted information &amp; attachments outlined in the Instructions and Required Attachment document.</li> <li>All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900.</li> <li>I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type.</li> <li>I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative.</li> <li>Any structure that I am proposing to repair/replace was either previously permitted by the Wetlands Bureau or would be considered grandfathered per Env-Wt 101.47.</li> <li>I have submitted a Request for Project Review (RPR) Form (<a href="http://www.nh.gov/nhdhr/review">www.nh.gov/nhdhr/review</a>) to the NH State Historic Preservation Officer (SHPO) at the NH Division of Historical Resources to identify the presence of historical/ archeological resources while coordinating with the lead federal agency for NHPA 106 compliance.</li> <li>I authorize NHDES and the municipal conservation commission to inspect the site of the proposed project.</li> <li>I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate.</li> <li>I understand that the willful submission of falsified or misrepresented information to the New Hampshire Department of Environmental Services is a criminal act, which may result in legal action.</li> <li>I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining.</li> <li>The mailing addresses I have provided are up to date and appropriate for receipt of NHDES correspondence. NHDES will not</li> </ol>			
 Property Owner Signature		L. Robert Landry Print name legibly	5/26/2016 Date

[shoreland@des.nh.gov](mailto:shoreland@des.nh.gov) or (603) 271-2147  
NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095  
[www.des.nh.gov](http://www.des.nh.gov)

## MUNICIPAL SIGNATURES

### 11. CONSERVATION COMMISSION SIGNATURE

The signature below certifies that the municipal conservation commission has reviewed this application, and:

1. Waives its right to intervene per RSA 482-A:11;
2. Believes that the application and submitted plans accurately represent the proposed project; and
3. Has no objection to permitting the proposed work.

	Print name legibly	Date
--	--------------------	------

#### **DIRECTIONS FOR CONSERVATION COMMISSION**

1. Expedited review **ONLY** requires that the conservation commission's signature is obtained in the space above.
2. Expedited review requires the Conservation Commission signature be obtained **prior** to the submittal of the original application to the Town/City Clerk for signature.
3. The Conservation Commission may refuse to sign. If the Conservation Commission does not sign this statement for any reason, the application is not eligible for expedited review and the application will reviewed in the standard review time frame.

### 12. TOWN / CITY CLERK SIGNATURE

As required by Chapter 482-A:3 (amended 2014), 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	Town/City	Date

#### **DIRECTIONS FOR TOWN/CITY CLERK:**

Per RSA 482-A:3,I

1. For applications where "Expedited Review" is checked on page 1, if the Conservation Commission signature is not present, NHDES will accept the permit application, but it will **NOT** receive the expedited review time.
2. **IMMEDIATELY** sign the original application form and four copies in the signature space provided above;
3. 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.
4. **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; and
5. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

#### **DIRECTIONS FOR APPLICANT:**

1. Submit the single, 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.

**13. IMPACT AREA:**

For each jurisdictional area that will be/has been impacted, provide square feet and, if applicable, linear feet of impact

*Permanent: impacts that will remain after the project is complete.*

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

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.	TEMPORARY Sq. Ft. / Lin. Ft.
Forested wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Scrub-shrub wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Emergent wetland	<input type="checkbox"/> ATF	26,685 <input type="checkbox"/> ATF
Wet meadow	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Intermittent stream	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Perennial Stream / River	3,692 / 225 <input type="checkbox"/> ATF	15,067 / 298 <input type="checkbox"/> ATF
Lake / Pond	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Bank - Intermittent stream	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Bank - Perennial stream / River	/ <input type="checkbox"/> ATF	1,466 / 80 <input type="checkbox"/> ATF
Bank - Lake / Pond	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Tidal water	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Salt marsh	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Sand dune	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Prime wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Prime wetland buffer	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Undeveloped Tidal Buffer Zone (TBZ)	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Previously-developed upland in TBZ	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - Lake / Pond	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - River	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - Tidal Water	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
<b>TOTAL</b>	<b>3,692 / 225</b>	<b>43,218 / 376</b>

**14. APPLICATION FEE:** See the Instructions & Required Attachments document for further instruction

Minimum Impact Fee: Flat fee of \$ 200

Minor or Major Impact Fee: Calculate using the below table below

Permanent and Temporary (non-docking) 46,910 sq. ft. X \$0.20 = \$ 9,382

Temporary (seasonal) docking structure: \_\_\_\_\_ sq. ft. X \$1.00 = \$ \_\_\_\_\_

Permanent docking structure: \_\_\_\_\_ sq. ft. X \$2.00 = \$ \_\_\_\_\_

**Projects proposing shoreline structures (including docks) add \$200 = \$ \_\_\_\_\_**

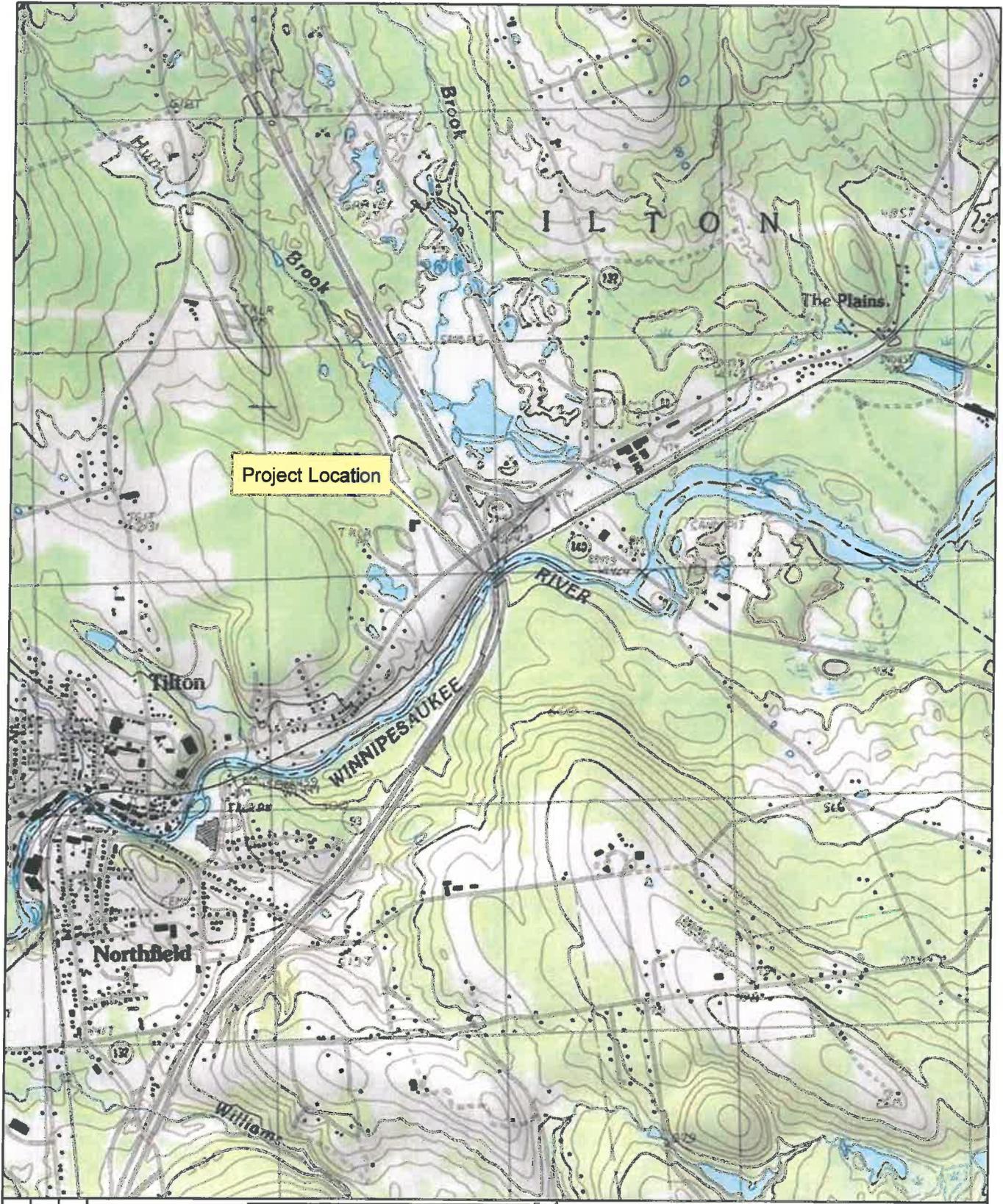
Total = \$ \_\_\_\_\_

The Application Fee is the above calculated Total or \$200, whichever is greater = \$ 9,382

[shoreland@des.nh.gov](mailto:shoreland@des.nh.gov) or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

[www.des.nh.gov](http://www.des.nh.gov)



Date: 5/12/2016 Drawn By: V.Chase Project No: 22287.010	0 1,000 2,000 4,000 Feet	NHDOT TILTON AND NORTHFIELD, NEW HAMPSHIRE 16147 & 14744A	
		<b>EXHIBIT A - LOCATION MAP</b>	
		SCALE: 1:24,000	 25 Nashua Road Bedford, NH 03110 (603) 472-5191 www.normandeau.com



## Attachment A

**Env-Wt 302.04 Requirements for Application Evaluation - For any major or minor project, the applicant shall demonstrate by plan and example that the following factors have been considered in the project's design in assessing the impact of the proposed project to areas and environments under the department's jurisdiction. Respond with statements demonstrating:**

1. The need for the proposed impact.

### **Description of Project:**

The New Hampshire Department of Transportation (NHDOT) proposes two projects at the two bridges carrying Interstate 93 (I-93) northbound (State Bridge No. 118/158) and southbound (State Bridge No. 117/157) corridors over the Winnepesaukee River, in the Towns of Northfield and Tilton, New Hampshire (see Exhibit A - Location Map). The first project involves deck rehabilitation on each bridge [X-A001(153), 16147]. This project involves approach work and temporary wetland fill to construct lane crossovers in the median. The second project provides scour protection adjacent to the bridge piers [A001(042), 14744A].

### EXISTING BRIDGES

The subject bridges are located a few hundred feet south of the I-93 Exit 20 ramps, with merging traffic occurring on the southbound bridge. The bridges were originally constructed in 1959, and then rehabilitated in 1979 and 1998. The existing bridges have four-span continuous curved steel girders each, with total length of approximately 330 feet each. The southbound bridge carries three 12-foot lanes, with 46.5 feet of roadway width, and an overall width of 50.5 feet. The northbound bridge carries two 12-foot lanes, with 38.5 feet of roadway width, and an overall width of 42.5 feet. The median is 75.5 feet wide.

### PURPOSE AND NEED

The purpose of these projects is to address the red-listed bridges and provide a safe, cost-effective, multimodal crossing of the Winnepesaukee River that maximizes longevity, minimizes maintenance, and does not increase the risk of flooding. The need for the project is evidenced by the poor condition of the bridges and existing safety concerns, including a decreased load posting to the Operating Capacity for Certified Loads and ultimately the inclusion on the Red List.

### SCOUR PROTECTION

The scour protection project involves the installation of scour protection measures in the Winnepesaukee River at the piers of the I-93 bridges that will be rehabilitated as noted above. A scour analysis was prepared that investigated potential contraction and pier

scour components of total scour. The recommendation of the analysis is to install precast modular concrete armor units (aka "A-Jacks®"). The mitigation project will move forward with the design of that recommended scour mitigation method on the northern piers, and to install Class V riprap on the southern piers.

The impacts to the bed and bank of the Winnepesaukee River are required in order to install the scour protection for the affected piers. In order to minimize impacts to the extent possible, access is proposed to be from the north side only. Scour protection on both the northern and southern piers will be installed from temporary stone platforms to be constructed on the northern side of the riverbed.

**2. That the alternative proposed by the applicant is the one with the least impact to wetlands or surface waters on site.**

Impacts to wetlands have been minimized to the extent possible. The No-Build alternative would affect no wetlands but would not meet the need to improve safety of the bridge.

**3. The type and classification of the wetlands involved.**

Wetlands proposed to be impacted include the riverbed of the Winnepesaukee River (R2UBH), jurisdictional riverbank, and palustrine wetlands within the median between the northbound and southbound lanes (PEM1E).

**4. The relationship of the proposed wetlands to be impacted relative to nearby wetlands and surface waters.**

The Winnepesaukee River is downstream of Silver Lake, Lake Winnisquam, Lake Winnepesaukee, and other tributary lakes and streams. The Winnepesaukee River feeds into the Merrimack River at a point several miles downstream of the proposed project.

**5. The rarity of the wetland, surface water, sand dunes, or tidal buffer zone area.**

The palustrine median wetlands are typical of this type of environment. The Winnepesaukee River is a 5th order stream and is one of the larger rivers in New Hampshire and as such is unusual.

**6. The surface area of the wetlands that will be impacted.**

The project as proposed will involve 43,218 square feet of temporary impact and 3,692 square feet of permanent impact to wetland resources. Wetland impacts are detailed on the "Wetland Impact Plans".

**7. The impact on plants, fish and wildlife including, but not limited to:**

- a. Rare, special concern species;**
- b. State and federally listed threatened and endangered species;**

- c. Species at the extremities of their ranges;
- d. Migratory fish and wildlife;
- e. Exemplary natural communities identified by the DRED-NHB; and
- f. Vernal pools.

A database check with the New Hampshire Natural Heritage Bureau (NHNHB) indicated that there were records of two species in the project area: the state-endangered Narrow-leaved Arrowhead (*Sagittaria filiformis*) and state-threatened Bald Eagle (*Haliaeetus leucocephalus*) (Exhibit D – NHNHB Responses.) A plant survey was undertaken on July 7, 2015 and no evidence of *S. filiformis* was found in the vicinity of the project area. NHNHB concluded that they had no concerns with impacts to the plant (Exhibit E - NHNHB and NHF&G Correspondence.)

The New Hampshire Fish and Game (NHF&G) non-game department was contacted about the potential to affect bald eagles in the project area. NHF&G determined that given the scope of proposed work and limited tree cutting proposed there would be no impacts to roosting bald eagles in the project area (Exhibit E – NHNHB and NHF&G Correspondence).

A second request was submitted to NHNHB on May 3, 2016, as the original request was over a year old that confirmed that there were no new occurrences of state-listed species recorded near the project area.

An environmental review was conducted through the US Fish and Wildlife Service’s (USFWS) online Information for Planning and Conservation website (IPaC). The response indicated that the federally threatened northern long-eared bat (*Myotis septentrionalis*) has the potential to occur within the project area. (Exhibit F – IpaC Results)

Informal consultation performed for the northern long-eared bat under the “Federal Highway Administration (FHWA) and Federal Railroad Administration (FRA) Range-wide Programmatic Informal Consultation for Indiana Bat and Northern Long-eared Bat” indicated that there will be no effect to this species from the proposed project. (Exhibit G – USFWS NLEB Consultation.)

**8. The impact of the proposed project on public commerce, navigation and recreation.**

The project will have positive effects to public commerce, navigation and recreation by improving the safety of the I-93 bridges. Public access for recreational kayakers and canoeists will be maintained throughout construction except when public safety is a concern (when riprap is being placed around the south piers, for example). There will be temporary impacts to the recreational trail that parallels the Winnepesaukee River on the north side of the bridge, as it will be closed to public access. The trail will be re-opened at the end of each workday and will be open on the weekends throughout construction.

**9. The extent to which a project interferes with the aesthetic interests of the general public. For example, where an applicant proposes the construction of a retaining wall on the bank**

<p><b>of a lake, the applicant shall be required to indicate the type of material to be used and the effect of the construction of the wall on the view of other users of the lake.</b></p>
<p>The project will not interfere with the aesthetic interests of the general public. The scour protection is needed to protect the existing infrastructure of the bridge and will generally not be visible during high water conditions. Bridge repairs needed for safety on the bridge will not have any effect on the aesthetics of the existing bridge.</p>
<p><b>10. The extent to which a project interferes with or obstructs public rights of passage or access. For example, where the applicant proposes to construct a dock in a narrow channel, the applicant shall be required to document the extent to which the dock would block or interfere with the passage through this area.</b></p>
<p>The project will not interfere with public rights of passage or access. Traffic will be maintained over the bridge throughout construction by diverting traffic onto each of the bridges while the other bridge is undergoing repairs.</p> <p>As noted above the recreational trail will be temporarily closed during construction in order to accommodate construction.</p>
<p><b>11. The impact upon abutting owners pursuant to RSA 482-A:11, II. For example, if an applicant is proposing to rip-rap a stream, the applicant shall be required to document the effect of such work on upstream and downstream abutting properties.</b></p>
<p>The impact to abutting property owners will be positive, as it will improve safety of the bridge.</p>
<p><b>12. The benefit of a project to the health, safety, and well being of the general public.</b></p>
<p>The project will improve health, safety, and well-being of the general public by providing safe structures for vehicular traffic.</p>
<p><b>13. The impact of a proposed project on quantity or quality of surface and ground water. For example, where an applicant proposes to fill wetlands the applicant shall be required to document the impact of the proposed fill on the amount of drainage entering the site versus the amount of drainage exiting the site and the difference in the quality of water entering and exiting the site.</b></p>
<p>There will be no impact to the quantity or quality of surface and ground water. Turbidity barriers will be in place around the northern and southern piers throughout construction. Clean stone will be placed around the southern piers and disturbance of the substrate will be kept to a minimum.</p>
<p><b>14. The potential of a proposed project to cause or increase flooding, erosion, or sedimentation.</b></p>

The project will not cause flooding, erosion, or sedimentation. All appropriate erosion and sedimentation controls will be used during construction to prevent sedimentation or turbidity in the Winnepesaukee River.

FEMA's Flood Insurance Rate Maps (FIRM) for the project area covered two maps (Map numbers: 330009 0005C [Tilton - Belknap County] and 330118 0179E [Northfield - Merrimack County]). The project also crosses the floodway area associated with the Winnepesaukee River.

The project proposes 67 cubic yards of permanent net fill within the jurisdictional floodplain and floodway of the Winnepesaukee River. A hydraulic study was undertaken that demonstrated that there will no effect to the base flood elevation that will occur from the fill proposed to be placed in the floodway of the Winnepesaukee River. (Exhibit K - Floodplain Information)

**15. The extent to which a project that is located in surface waters reflects or redirects current or wave energy which might cause damage or hazards.**

The purpose of the scour mitigation project is to address existing currents causing scour at the piers.

**16. The cumulative impact that would result if all parties owning or abutting a portion of the affected wetland or wetland complex were also permitted alterations to the wetland proportional to the extent of their property rights. For example, an applicant who owns only a portion of a wetland shall document the applicant's percentage of ownership of that wetland and the percentage of that ownership that would be impacted.**

If all abutters to the project also built bridges over the Winnepesaukee River there would be additional cumulative impacts to the river, however, this is unlikely to occur.

**17. The impact of the proposed project on the values and functions of the total wetland or wetland complex.**

The Winnepesaukee River provides wildlife habitat, recreation, and aesthetic value. These functions will not be affected by the proposed project.

**18. The impact upon the value of the sites included in the latest published edition of the National Register of Natural Landmarks, or sites eligible for such publication.**

NA

**19. The impact upon the value of areas named in acts of congress or presidential proclamations as national rivers, national wilderness areas, national lakeshores, and such**

<b>areas as may be established under federal, state, or municipal laws for similar and related purposes such as estuarine and marine sanctuaries.</b>
NA
<b>20. The degree to which a project redirects water from one watershed to another.</b>
NA
<b>Additional Comments</b>
None.

## **Mitigation**

As the project involves only temporary impacts to palustrine wetlands and the Winnepesaukee River and impacts to protect existing infrastructure it is exempt from the requirement to mitigate under Administrative Rules Env-Wt 302.03(b) and Env-Wt 302.03(c)(2). As such, no mitigation is proposed.



# BUREAU OF ENVIRONMENT CONFERENCE REPORT

Exhibit B

**SUBJECT:** NHDOT Monthly Natural Resource Agency Coordination Meeting

**DATE OF CONFERENCE:** October 16, 2013

**LOCATION OF CONFERENCE:** John O. Morton Building

**ATTENDED BY:**

**NHDOT**

Christine Perron  
Ron Crickard  
Matt Urban  
Mark Hemmerlein  
Jon Evans  
Mike Dugas  
Ron Grandmaison  
Jon Hebert  
Jason Tremblay  
Michael Hazlett  
Victoria Chase  
Margarete Baldwin

Joe Patusky

**NH Natural Heritage**

**Bureau**  
Melissa Coppola

**NH Fish & Game**

Carol Henderson

**NHDES Wetlands Bureau**

Gino Infascelli  
Lori Sommer

**Hoyle, Tanner & Associates**

Sean James

**Normandeau Associates**

Jameson Paine

**Faye, Spofford &**

**Thorndike**  
David McNamara  
John Stockton

*(When viewing these minutes online, click on an attendee to send an e-mail)*

**PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH:**

*(minutes on subsequent pages)*

Finalization of September Meeting Minutes .....	2
Dummer-Cambridge-Errol, X-A001(231), 16304.....	2
Lebanon, X-A000(141), 13951 .....	2
Lancaster, NH-Guildhall, VT, A001(159), 16155.....	4
Northfield-Tilton, X-A001(153), 16147 / Northfield-Tilton, X-A001(042), 14744A .....	5

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

Lori Sommer asked how the existing truss bridge would be removed. S. James indicated that removal methods still need to be discussed. As a historic structure, the bridge will be offered for sale. If an interested party comes forward to acquire the bridge, they will help direct the safe means for removal. J. Paine also noted that removal would need to take the potential presence of mussels into consideration.

*This project was previously reviewed on the following date: 10/17/2012.*

### **Northfield-Tilton, X-A001(153), 16147 / Northfield-Tilton, X-A001(042), 14744A**

The purpose of this meeting was to provide an initial review for the rehabilitation of both Interstate 93 (I-93) bridge decks that carry the interstate over the Winnepesaukee River in Northfield and Tilton, NH. Dave McNamara, of Fay, Spofford and Thorndike (FST) provided an overview of the project's purpose and proposed improvements under the 16147 project. The NHDOT proposes to rehabilitate the two bridges carrying Interstate 93 (I-93) north (State Bridge No. 118/158) and southbound (State Bridge No. 117/157) over the Winnepesaukee River, in the Towns of Northfield and Tilton, NH.

The subject bridges are located a few hundred feet south of the Exit 20 ramps, with merging traffic occurring on the southbound bridge. The bridges were originally constructed in 1960, and then rehabilitated in 1980 and 1998. The existing bridges have four-span continuous curved steel girders, each with total length of approximately 330 feet. The southbound bridge carries three 12 foot lanes, with 46.5 feet roadway width, and 50' - 6" overall width. The northbound bridge carries two 12 foot lanes, with 38 ft - 6 in roadway width, and 42' - 6" overall width. The median is 75' - 6" wide. This project is on the NHDOT's Priority List and the bridges were placed on the State's Red List in 2009 for "Deck Poor" and "Scour Critical".

The existing horizontal alignments and vertical profiles will be maintained for the rehabilitated bridges. The southbound bridge is wide enough for three 12-foot travel lanes, but the current roadway configuration of two striped lanes will be retained, with the widened right lane serving as a continuation of the merge for the I-93 southbound on-ramp at Exit 20. This results in a 50' - 6" overall width that provides a roadway section equivalent to three 12 ft travel lanes, two 5'-9" shoulders, and two 1'-6" brush curbs. The 42'-6" overall width of the northbound bridge will continue to carry two 12 ft travel lanes, a 5'-9" inside shoulder, a 9'-9" outside shoulder, and two 1'-6" brush curbs in the current configuration.

As the poor condition of the concrete decks of both of the I-93 bridges result in a decreased load posting to the Operating Capacity for Certified Loads and inclusion on the Red List, bridge deck replacement is warranted for both bridges. The existing bridge decks, brush curbs, and expansion joints will be replaced. The existing steel bridge bearings will be evaluated during the final design phase of the project, but it is anticipated they will be replaced with elastomeric bearings. An investigation into the need for concrete shear keys or steel keeper angles will be conducted with the bearing evaluation. The existing steel beams and substructures will remain in place. All design will be in accordance with the AASHTO Load and Resistance Factor Design (LRFD) methodology and the NHDOT *Bridge Design Manual*.

The bridge deck will consist of a cast-in-place reinforced concrete slab that will be composite with the existing weathering steel beams throughout the entire length of the bridge. The 8-in bridge deck thickness of the 1980 reconstruction will be retained to avoid an increase over the current dead load. A cast-in-place deck will be used, and precast concrete deck panels will not be allowed due to the 7.7% superelevation. The existing bridge deck scuppers will remain in place or be replaced in-kind at their current locations, depending on their condition. The need to replace the light pole deck supports will be determined during the final design phase. Should the light poles be included in the rehabilitated structures, galvanized conduit will be placed in the brush curb, similar to the current condition.

The proposed bridge will have NHDOT standard T3 steel bridge rail mounted to each brush curb. Repairs to the deteriorated areas of the reinforced concrete substructures will be included as part of the bridge rehabilitation. It is anticipated that the re-installation of the scour monitoring devices will be addressed in NHDOT Project 14744A.

Jameson Paine, of Normandeau Associates, Inc. (Normandeau), provided a brief overview of resource reviews that have been completed to date, as well as ongoing efforts, to assist in alternatives evaluations and to minimize impacts to resources in the area.

Normandeau staff has been on site to delineate wetlands, top of bank, ordinary high water, and invasive species locations. Pocketed wetlands exist along the exterior edge of the interstate corridor and within southern extent of the interstate median. The project, as proposed, is not expected to have impacts within the river.

The NH Natural Heritage Bureau review determined that no sensitive resources are located within the project area. However, the Winnepesaukee River is considered potential essential fish habitat (EFH) for Atlantic salmon. Per the direction of the National Marine Fisheries Service (NMFS), an EFH report is currently being prepared for the project site. Coordination with NMFS staff will continue through the EFH report process.

Carol Henderson commented that Lake Winnisquam (the Winnepesaukee River is the outlet) has recently been stocked with alewives, which migrate in the fall and typically move during the daytime. The project could minimize the disturbance to outmigrating alewives by constructing the cofferdam (if necessary) in advance of the out migration and limiting it to only a portion of the river. If the activity of construction disturbs them in the daytime, fish could still bypass the cofferdam at night. Also, constructing the cofferdam in advance of the Fall spawning period should minimize impacts to Brook trout.

Joe Patusky provided an overview of the 14744A project. The project involves the installation of scour protection measures in the Winnepesaukee River at the piers of the Interstate 93 bridges that will be rehabilitated under the Northfield-Tilton 16147 project. The proposed scour countermeasure consists of precast modular "A-Jacks" concrete armor units, which the Department installed recently as part of the Littleton-Waterford 15926/16195 project in the Connecticut River. Stone riprap would be used where protection is necessary along the portion of one pier that is not located in the river. Access to the piers is challenging due to the steep slopes. Access options under consideration involve either installing the A-Jacks from the bridges when their decks are removed during rehabilitation or utilizing the railroad line that runs parallel to the river.

Gino Infascelli asked how the bedding material would be installed. J. Patusky commented that this was done from a barge in Littleton without cofferdams but construction methods have not yet been determined for this site.

G. Infascelli asked if the velocity at this site is higher than at the Connecticut River site in Littleton. J. Patusky replied that the velocity in Littleton is higher due to the dam releases just upstream from that project.

Carol Henderson asked if there was a benefit to using A-Jacks instead of stone riprap. J. Patusky said that A-Jacks hold in place better.

C. Henderson noted that Fish & Game owns a boat ramp near the project area but the water is shallow, if a barge were being considered for the installation of the A-Jacks.. The Department would need to get permission from Fish & Game to use the boat ramp during construction.

G. Infascelli asked that a shelf for wildlife passage be considered along one bank. Christine Perron replied that the Department would look into providing a shelf.

Matt Urban asked G. Infascelli if the work as proposed would be considered protection of existing infrastructure. G. Infascelli agreed that it would be considered as such.

C. Perron said that the scour project would be discussed at a future meeting to address outstanding issues and concerns.

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

# BUREAU OF ENVIRONMENT CONFERENCE REPORT

**SUBJECT:** NHDOT Monthly Natural Resource Agency Coordination Meeting

**DATE OF CONFERENCE:** February 17, 2016

**LOCATION OF CONFERENCE:** John O. Morton Building

**ATTENDED BY:**

<p><b>NHDOT</b>                  Matt Urban                  Ron Crickard                  Anthony Weatherbee                  Kerry Ryan                  Marc Laurin                  Sam Fifield                  Joe Adams                  Carol Niewola                  Jon Evans                  Bob Juliano                  Mike Dugas                  Keith Cota</p>	<p><b>Army Corps of Engineers</b>                  Michael Hicks</p> <p><b>NHDES</b>                  Gino Infascelli                  Lori Sommer                  Katie Zink                  Greg Cummings                  Deb Loiselle</p> <p><b>NH Fish &amp; Game</b>                  Carol Henderson</p> <p><b>NHB/DRED</b>                  Amy Lamb</p>	<p><b>Consultants/Public Participants</b>                  Jed Merrow                  David Nelson                  Christine Perron                  Rick Dymment                  Brian Colburn                  Josh Lund                  Rob Faulkner                  Bill Ashford                  David McNamara                  Vicki Chase                  Jennifer Riordan                  John Trottier                  Chris Bean                  Ian Broadwater                  Mark Hutchins                  Leo Tidd</p>
---	--	--

**PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH:**

*(minutes on subsequent pages)*

Finalization of January 20, 2016 Meeting Minutes.....	3
Acworth, 40750 (104/063) .....	5
Gorham, 40826 (098/071) .....	14
Meredith, 40492 (131/105).....	20
Harts Location, 40828 (063/090) .....	26
Harts Location, 40827 (060/091) .....	31
Lebanon Taxiway B.....	36
Lebanon-Hartford, 16148, A001(154).....	46
Northfield-Tilton, 16147&14744A, X-A001(153) & A001(042).....	72
Barnstead, 14121, X-A000(208) .....	92
Derry-Londonderry, 13065, IM-0931(201) .....	103

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

M. Hicks suggested that a site visit with agencies from both states would be beneficial. This could be scheduled in the spring. Based on the current project schedule, permit applications will be submitted in mid-summer of this year. It is anticipated that the project will be discussed at least once more at a Natural Resource Agency Meeting prior to application submittal.

### **Northfield-Tilton, 16147&14744A, X-A001(153) & A001(042)**

This project involves rehabilitation and pier scour protection for two bridges carrying I-93 over the Winnepesaukee River in Tilton and Northfield. The two projects will be advertised as one contract. Vicki Chase introduced the project, which is located just south of Exit 20 on I-93. The subject bridges cross over the Winnepesaukee River and the New Hampshire Railroad. The existing bridges which were built in 1960 and reconstructed in 1980.

V. Chase provided an overview of existing natural resources at the site.

- The Winnepesaukee River is a 5<sup>th</sup> order Tier 3 Stream that drains all of the lakes region – the drainage area = 467 square miles. Silver Lake lies directly upstream which is not controlled by damming.
- The NHB check for the project indicated that there were Bald Eagles and Narrow-leaved Arrowhead at the site. NHFG has confirmed that they have no concerns with bald eagles. A survey was undertaken for narrow-leaved arrowhead and the plant was not found.
- The river is impaired by non-native aquatic species (milfoil).
- Northern Long-Eared Bat coordination will take place under the agreement between USFW and FHWA.
- An Essential Fish Habitat assessment was undertaken by Normandeau because of the potential for Atlantic Salmon in the river. It was determined that there would be no effect to salmon habitat and NHFS has concurred.
- Coordination for floodplain and floodways is ongoing. There will be fill within the mapped floodway, and NEPA requires that the project must demonstrate that there will be no impact to the base flood elevation.
- The Winnepesaukee River Trail parallels the river and will be used for construction. DOT will be coordinating with the town to acquire clearance under Section 4(f).
- The project will require a major impact wetland permit.

Dave McNamara described the deck rehabilitation. The decks are in poor condition and other elements are deteriorating, necessitating a full deck replacement. Alternatives were studied for traffic control, and the preferred alternative uses full crossovers with traffic moving to each bridge as the other bridge is rehabilitated, with one lane of traffic being maintained on the bridge being rehabbed. There is a median wetland that will be temporarily impacted by the crossovers, which will be restored to its existing condition.

Bill Ashford introduced the scour mitigation project. The purpose of the project is to protect the center and southern piers which are scour critical. Permanent impacts will involve adding riprap to the existing riprap around the southern piers and installing precast concrete “A-Jacks” around the center piers. For the center piers existing material will be excavated, bedding material installed, A-Jacks installed, and re-use of the existing stream bed to be material placed over the A-Jacks (no net

change to the riverbed). A coffer dam (sandbags) will be placed around the work area to divert flow and inside of the coffer dam a turbidity barrier will be placed, but the work will occur in the wet. For the southern piers riprap will be placed from the northern work pads around the piers by a crane, eliminating the need to disturb the southern bank. There will be temporary impacts to the riverbank and riverbed for the scour protection operation with three workpads proposed to be installed within the river (clean stone). A-Jacks are manufactured ahead of time and banded together on land, and placed in a group on the riverbed.

Matt Urban noted that the project would not require mitigation because the permanent impacts were all for the protection of existing infrastructure and so is exempt from the need to mitigate. Matt also asked if the sandbag footprint had been included as impact, and noted that it should be. The entire area within the sandbags need not be counted as impact, only the areas to be directly impacted.

Carol Henderson asked if access within the river would be maintained. B. Ashford indicated that the south side of the river would remain open to boaters.

Rob Faulkner asked if the A-Jacks would be considered permanent impact since they would be covered with natural material. Lori Sommer and Matt Urban concurred that it would be permanent impact.

Outstanding issues for this project – NEPA and Section 4(f) have not yet been completed. Wetland and shoreland permit applications will be submitted in the near future.

Mike Hicks noted that if floodplain mitigation is required that it should be adequately sized. Jon Evans noted that although DOT's checklist required existing and proposed conditions for erosion control plans, this project has very little in the way of contour changes and confirmed that proposed contours would not be needed.

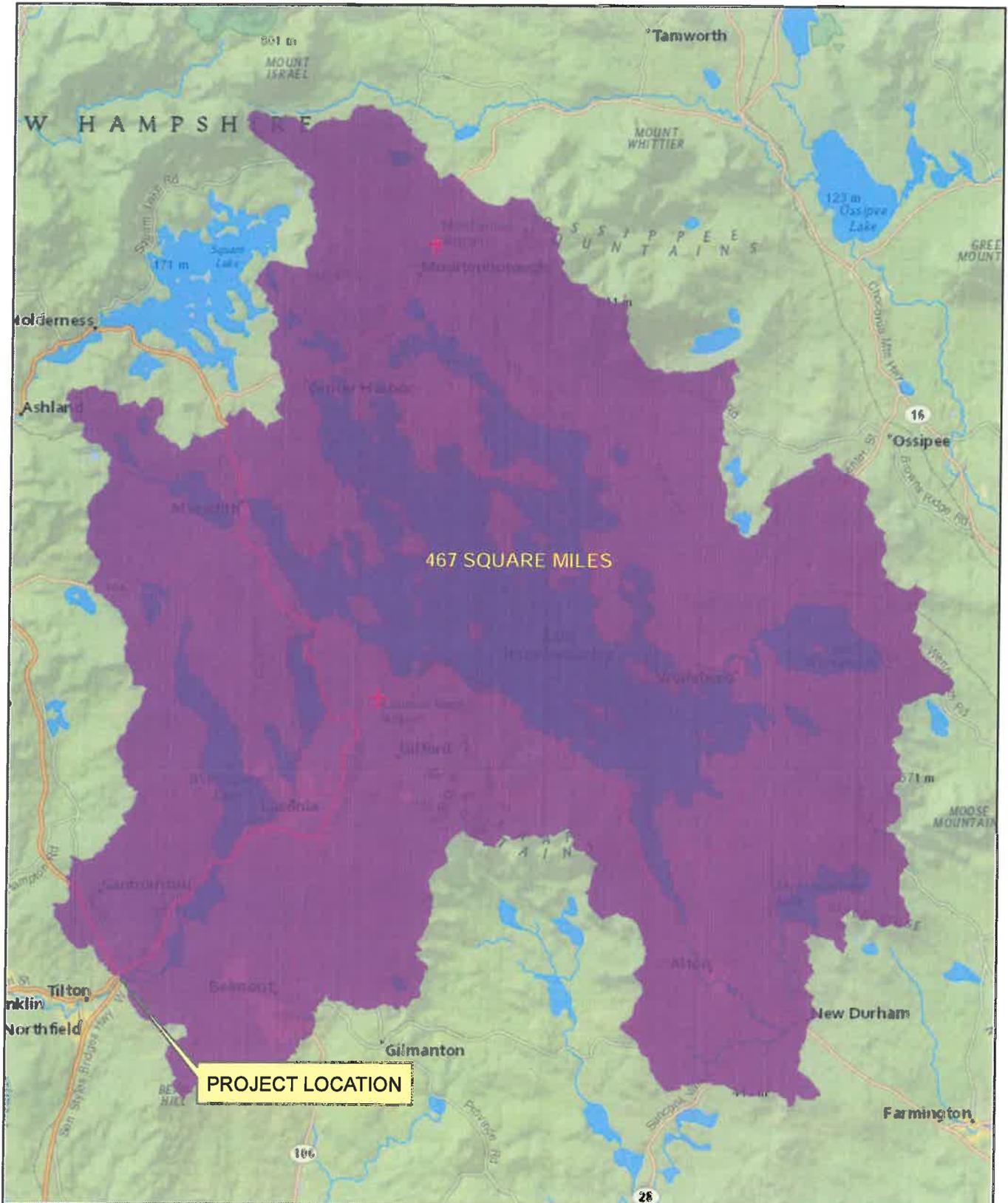
### **Barnstead, 14121, X-A000(208)**

The project involves improvements to NH Route 28 in Barnstead and is the next in a series of projects along Route 28 in Barnstead and Alton. Within the project corridor, Route 28 is narrow and has no shoulders. There is also poor sight distance at the Route 28/North Barnstead Road/North Road intersection. The purpose of the project is to widen the road, add 4-foot shoulders, and improve sight lines at the intersection. Both the horizontal and vertical road alignments will be adjusted. Route 28 will be shifted to the west in order to avoid residential impacts to the east of the road. Vertical alignment adjustments will include lowering the crest and raising the sag near the Route 28/North Barnstead Road/North Road intersection. Work along North Road and North Barnstead Road is proposed to match the lower Route 28 vertical alignment.

The project is approximately 1 mile in length. The southern end matches into the Peacham Road project (Project No. 14121E). Construction is scheduled for 2019.

Wetlands are located along the project corridor. Permanent wetland impacts are estimated at approximately 0.5 acres. Approximately 1 acre of new impervious surface is proposed from the addition of 4-foot shoulders.





Date: 5/12/2016 Drawn By: vchase Project No: 22287.010	0 1 2 4 Miles	N 	<b>NHDOT</b> <b>TILTON AND NORTHFIELD, NEW HAMPSHIRE</b> 16147 & 14744A	
	Data Source: U.S. Department of the Interior U.S. Geological Survey URL: <a href="http://streamstats.usgs.gov/">http://streamstats.usgs.gov/</a> Accessed 2/18/2016		<b>EXHIBIT C - WATERSHED BOUNDARIES</b>	
	SCALE: 1:266,169	 <b>NORMANDEAU</b> <small>Engineering, Planning, Construction</small> 25 Nashua Road Bedford, NH 03110 (603) 472-5191 www.normandeau.com	MAY 2016	



## Env-Wt 900 Stream Crossing Requirements

Because the project proposes to rehabilitate a Tier 3 stream crossing, conformance with rules under DES Administrative Rules Env-Wt 900 is required.

The project as currently proposed involves the replacement of the bridge deck and brush curbs, expansion joints, and steel bearings will be replaced. Work in the water will be restricted to the placement of supplemental stone for scour protection. NHDES Rules Env-Wt 904 et seq. do not specifically address requirements for the rehabilitation of Tier 3 Stream Crossings. Env. Wt 904.08 addresses the replacement of Tier 3 crossings, which the project does not propose.

As the NHDES Wetland Rules (Env-Wt 900 et seq.) do not specifically address the requirements for the repair or rehabilitation of an existing Tier 3 crossing, it is the Department of Transportation's practice to address the Alternative Design requirements for the replacement of a Tier 3 crossing that does not meet the specific design criteria in 904.09. In this case, the existing bridge meets all of the design criteria, as demonstrated below. Construction of replacement bridges is neither warranted to comply with NHDES Stream Rules nor practicable given the assumed high cost. Bridge replacement was not considered and no cost estimates are available.

***Env-Wt 904.09(c) (2) The proposed alternative meets the specific design criteria for Tier 2 and tier 3 stream crossings to the maximum extent practicable, as specified below.***

### Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings.

Env-Wt 904.05 requires that new Tier 2 stream crossings, replacement Tier 2 stream crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 stream crossings shall be designed and constructed:

**(a) In accordance with the NH Stream Crossing Guidelines, University of New Hampshire, May 2009.**

The New Hampshire Stream Crossing Guidelines recommend that the crossing should be an open bottom structure with (at a minimum) a width of 1.2 x bankfull width plus 2 feet. The estimated bankfull width based on the White Paper "River Restoration and Fluvial Geomorphology" is 252', so the structure should be at a minimum (252x1.2)+2 feet wide, or 304' wide. The bank on the northern side has been historically altered and filled by the construction of the railroad. The existing bridges are each 330' long four span steel girder bridges, so they meet the minimum required width. The bridges also provide a vegetated bank on each side of the river.

The NH Stream Crossing Guidelines direct the replacement stream crossings should be designed to avoid or mitigate the following problems:

- Inlet drops
- Outlet drops
- Flow contraction that produces significant turbulence and increased velocities
- Tailwater armoring
- Tailwater scour pools
- Headwater pools
- Headwater flooding
- Physical barriers to aquatic organism passage
- Embankment failures/instabilities
- Channel entrenchment
- Channel sedimentation

None of the above are existing issues that need to be mitigated.

**(b) With the bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing;**

The bedforms and streambed characteristics will remain as they are currently and are comparable to those found upstream and downstream of the stream crossing. The small amount of scour protection stone to be added around the southern piers is not anticipated to have any effect on water depths or velocities.

**(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage;**

The existing vegetated banks will remain following the bridge rehabilitation.

**(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain;**

No alteration to the existing condition is proposed, and the natural alignment and gradient of the stream channel will be maintained.

**(e) To accommodate the 100-year frequency flood, to ensure that:**

**(1) There is no increase in flood stages on abutting properties; and**

**(2) Flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability;**

The existing bridge accommodates the 100-year flood. The project proposes 389 cubic yards of temporary fill within the floodplain for construction platforms and 67 cubic yards of permanent fill for scour protection around the piers. A hydraulic analysis was undertaken

that demonstrated that the additional stone will have no effect on the base flood elevation. Flood and sediment transport characteristics will likewise remain unaffected.

**(f) To simulate a natural stream channel; and**

The stream channel under the bridge will remain as existing, and is a natural stream channel.

**(g) So as not to alter sediment transport competence.**

Sediment transport competence will not be altered.

**Env-Wt 904.01 General Design Considerations.**

**(a) Not be a barrier to sediment transport;**

Sediment transport is and will continue to be accommodated at this crossing.

**(b) Prevent the restriction of high flows and maintain existing low flows;**

High and low flows are and will continue to be accommodated.

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

Movement of indigenous aquatic life will not be disrupted.

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

No alteration to flood accommodation will occur.

**(e) Preserve watercourse connectivity where it currently exists;**

Watercourse connectivity exists today and will continue to exist.

**(f) Restore watercourse connectivity where:**

**(1) Connectivity previously was disrupted as a result of human activity(ies); and**

**(2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both;**

Not applicable to this project.

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

The bridge as existing does not cause erosion, aggradation, or scouring upstream or downstream of the crossing, nor will it following construction. Existing scour around the bridge piers will be mitigated by the scour protection.

**(h) Not cause water quality degradation.**

The proposed project will not cause water quality degradation. All appropriate erosion and sedimentation controls will be employed during construction to protect water quality in the stream.

**Memo**



NH NATURAL HERITAGE BUREAU  
NHB DATACHECK RESULTS LETTER

**To:** Vicki Chase, Normandeau Associates  
25 Nashua Road  
Bedford, NH 03301-5022

**From:** Melissa Coppola, NH Natural Heritage Bureau

**Date:** 4/24/2015 (valid for one year from this date)

**Re:** Review by NH Natural Heritage Bureau  
NHB File ID: NHB15-1437

**Town:** Northfield, Tilton

**Location:** I-93 bridges over the Winnepesaukee River

**Description:** NHDOT proposes to rehabilitate the bridges that carry both barrels of I-93 over the Winnepesaukee River in Northfield and Tilton.

**cc:** Kim Tuttle

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

**Comments:** NHB recommends surveys for narrow-leaved arrowhead in the area around the bridge that could be impacted by this project.

**Plant species**

	State <sup>1</sup>	Federal	Notes
Narrow-leaved Arrowhead ( <i>Sagittaria filiformis</i> )	E	--	Primarily vulnerable to changes to the hydrology of its habitat, especially alterations that change water levels. It may also be susceptible to increased pollutants and nutrients carried in stormwater runoff.

**Vertebrate species**

	State <sup>1</sup>	Federal	Notes
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	T	--	Contact the NH Fish & Game Dept (see below).

<sup>1</sup>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.

Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

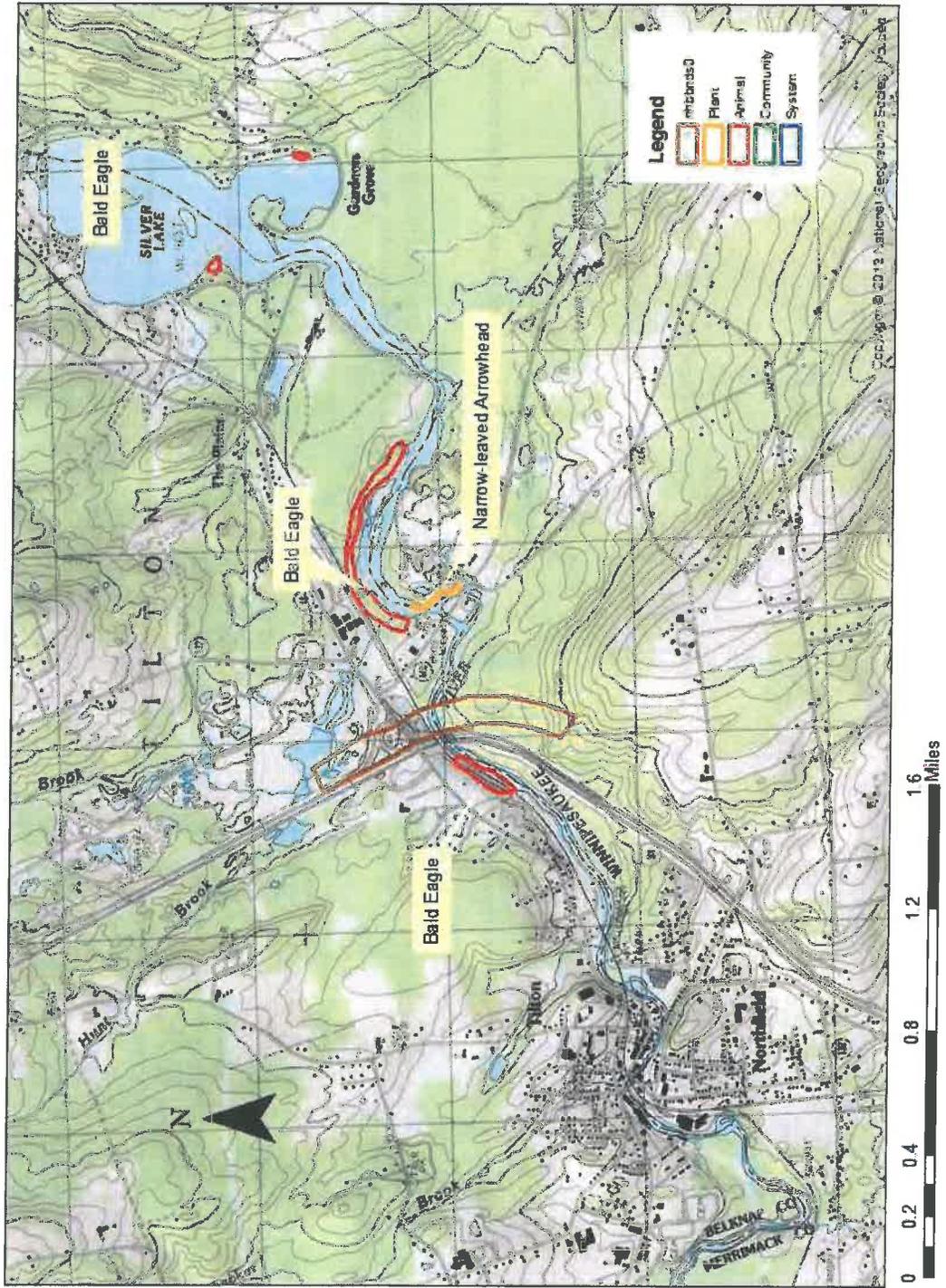
A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed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

---

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

DRED/NHB  
PO Box 1856  
Concord NH 03302-1856

NHB15-1437



## New Hampshire Natural Heritage Bureau - Plant Record

### Narrow-leaved Arrowhead (*Sagittaria filiformis*)

**Legal Status**

Federal: Not listed  
 State: Listed Endangered

**Conservation Status**

Global: Apparently secure but with cause for concern  
 State: Critically imperiled due to rarity or vulnerability

**Description at this Location**

Conservation Rank: Good quality, condition and landscape context ('B' on a scale of A-D).

Comments on Rank:

Detailed Description: 2013: A large population.

General Area: 2013: River, in about 2 ft. of water, in a current.

General Comments:

Management

Comments:

**Location**

Survey Site Name: Winnepesaukee River, east of Rte 140

Managed By:

County: Merrimack

Town(s): Northfield

Size: 1.1 acres

Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2013: Winnepesaukee River east of boat launch site off Rt. 140, Shaker Road (43 degrees 27.168N, 71 degrees 33.716W). The south side of the river in about 2 ft. of water in a current.

**Dates documented**

First reported: 2013-08-29

Last reported: 2013-08-29



# Memo



## NH NATURAL HERITAGE BUREAU NHB DATACHECK RESULTS LETTER

To: Vicki Chase, Normandeau Associates  
25 Nashua Road  
Bedford, NH 03301-5022

From: Amy Lamb, NH Natural Heritage Bureau  
Date: 5/9/2016 (valid for one year from this date)  
Re: Review by NH Natural Heritage Bureau  
NHB File ID: NHB16-1377

Town: Northfield, Tilton

Location: I-93 bridge over the Winnepesaukee  
River

Description: NHDCT proposes to rehabilitate the bridges that carry both barrels of I-93 over the Winnepesaukee River in Northfield and Tilton and install scour protection around the bridge piers.

cc: Kim Tuttle

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

### Comments:

33

### Vertebrate species

Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	State <sup>1</sup>	Federal	Notes
	T	--	Contact the NH Fish & Game Dept (see below).

<sup>1</sup>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.

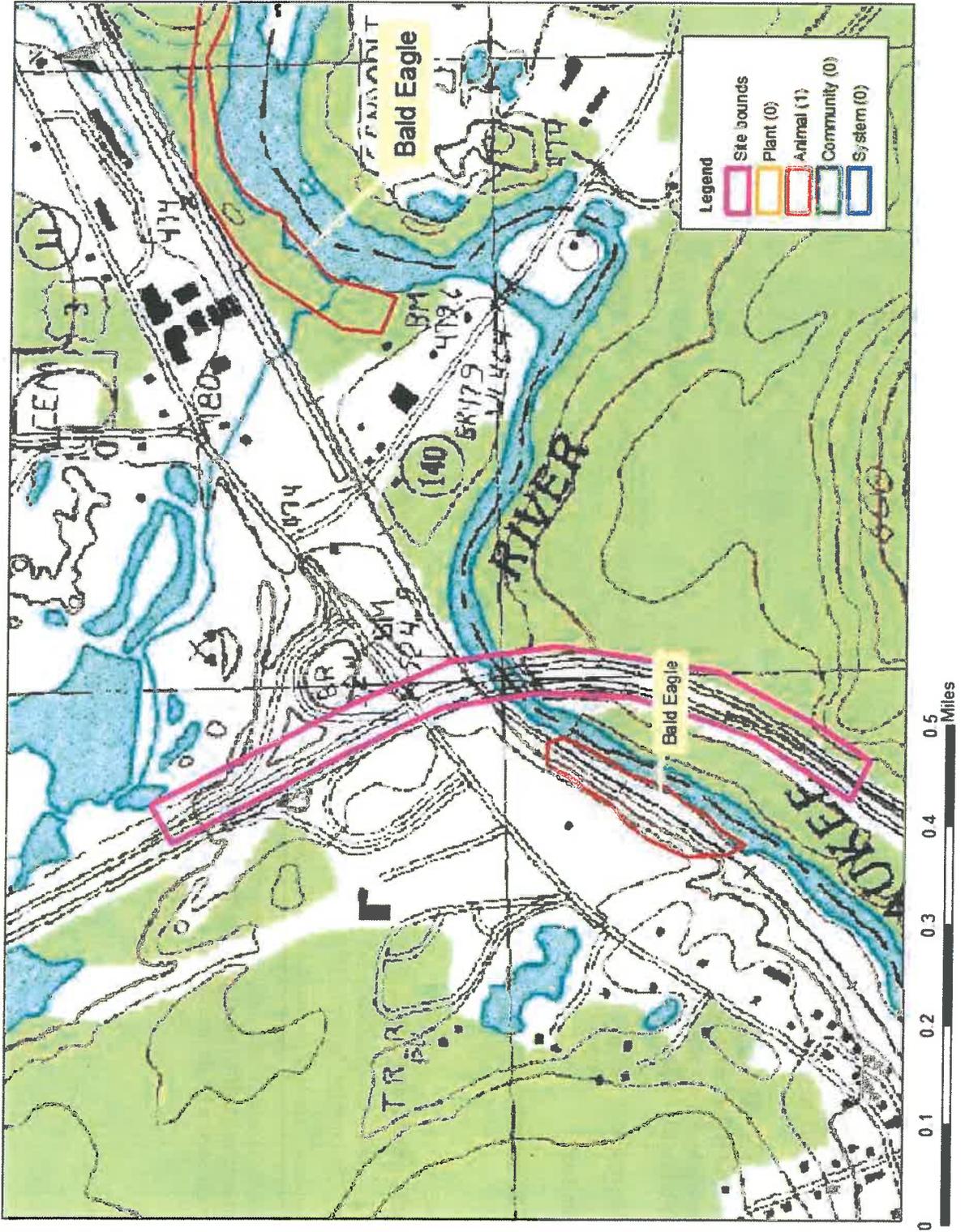
Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

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

DRED/NHB  
172 Pembroke Rd.  
Concord, NH 03301

NHB16-1377







**From:** Lamb, Amy <Amy.Lamb@dred.nh.gov>  
**Sent:** Friday, July 10, 2015 12:53 PM  
**To:** Vicki Chase  
**Subject:** RE: NHB15-1437

Hi Vicki,

Thank you for your reply. Based on your description of the survey site, that no vegetation was observed in the areas of proposed impact, and that habitat was markedly different between the project site and the site with known *Sagittaria filiformis*, NHB does not have concerns about impacts to this plant. I trust your assessment and thank you very much for conducting the survey and providing additional information. Please print this email chain and include with our original memo (NHB15-1437) in the NHDOT's permit application. Thank you,

Amy

Amy Lamb  
Ecological Information Specialist  
(603) 271-2215 ext. 323

NH Natural Heritage Bureau  
DRED - Forests & Lands  
172 Pembroke Rd  
Concord, NH 03301

---

**From:** Vicki Chase [<mailto:VChase@normandeau.com>]  
**Sent:** Friday, July 10, 2015 10:14 AM  
**To:** Lamb, Amy  
**Subject:** RE: NHB15-1457

Hi Amy,

Thanks for the catch on the NHB file number, it is corrected in the attached version.

Yes, in fact I did the survey of the known plant site by kayak – if you know that area, there is a boat put-in on Shaker Road (in Northfield) right by x 20. I had hoped to paddle down to the bridge site but the river was way too fast – I never would have been able to slow down enough to see what was there, let alone getting back. I did have a decent view from the shore, and there is no submerged vegetation near the piers. The habitat is very different from the area where the occurrence was recorded, and while I was not able to inspect as closely as I had hoped I can say with 99% certainty that there is no *S. filiformis* in the project area.

Vicki

---

**From:** Lamb, Amy [<mailto:Amy.Lamb@dred.nh.gov>]  
**Sent:** Friday, July 10, 2015 10:03 AM  
**To:** Vicki Chase  
**Subject:** RE: NHB15-1457

Vicki,

Thank you very much for completing the plant survey and report for Narrow-leaved Arrowhead (*Sagittaria filiformis*), for NHB review number NHB15-1437. (I noticed that NHB15-1457 is referenced in the report and this email so you may want to change that.) I just wanted to clarify about the extent of the survey. From the report, it sounds like someone walked along the riverbank throughout the project area (anywhere that vegetation could be potentially impacted), which could make it potentially difficult to see submerged vegetation. Was there a clear view of the water where *Sagittaria filiformis* would occur? Was any submerged vegetation observed? Since it can be difficult to identify vegetative specimens of this species I just wanted to double-check about what vegetation was observed in the vicinity of the bridge where work would occur.

Thank you,  
Amy

Amy Lamb  
Ecological Information Specialist  
(603) 271-2215 ext. 323

NH Natural Heritage Bureau  
DRED - Forests & Lands  
172 Pembroke Rd  
Concord, NH 03301

---

**From:** Vicki Chase [<mailto:VChase@normandeau.com>]  
**Sent:** Thursday, July 09, 2015 12:27 PM  
**To:** Lamb, Amy  
**Subject:** NHB15-1457

Amy,

Attached please find a report prepared by Normandeau for a rare plant survey in Tilton and Northfield. As documented in the report, NHB responded to a datacheck that there is a population of *Sagittaria filiformis*, narrow-leaved arrowhead, near the location of a proposed bridge rehabilitation (I-93 over the Winnepesaukee River). No narrow-leaved arrowhead was found in the proposed project area.

Let me know if you have any questions.

VICKI CHASE *Environmental Analyst*  
Normandeau Associates, Inc.  
25 Nashua Road, Bedford, NH 03110  
603-637-1111(direct) 603-731-7653 (cell)  
[vchase@normandeau.com](mailto:vchase@normandeau.com) [www.normandeau.com](http://www.normandeau.com)

The information contained in this electronic mail transmission and its attachments may be confidential and protected from disclosure. If the reader of this message is not the intended recipient (or an individual responsible for delivery of the message to such person), you are strictly prohibited from copying, disseminating or distributing this communication. If you have received this communication in error, please notify the sender immediately and destroy all electronic, paper or other versions. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. No representation is made by the sender that this communication is virus-free. The recipient alone is responsible for taking appropriate measures to ensure that the e-mail is virus-free.

---

Please consider the environment before printing this e-mail.

**Vicki Chase**

**From:** Tuttle, Kim <Kim.Tuttle@wildlife.nh.gov>  
**Sent:** Monday, June 01, 2015 12:52 PM  
**To:** Vicki Chase  
**Subject:** NHB15-1437 I-93 bridges Winnepesaukee River Tilton/ Northfield

Note corrected NHB file number- Kim

Vicki,

The NHFG Nongame and Endangered Species Program has reviewed NHB15-1437 for the proposed bridge rehabilitation and scour protection project for the bridges carrying I-93 over the Winnepesaukee River in Tilton and Northfield. The NHB database check identified wintering bald eagle in the vicinity of the project. Based on the scope and location of the work, we do not expect impacts to the wintering roost area for bald eagle in this vicinity. Please feel free to call me if you have any questions about this review.

Sincerely,

Kim Tuttle  
Certified Wildlife Biologist  
NH Fish and Game  
11 Hazen Drive  
Concord, NH 03301  
603-271-6544

---

**From:** Tuttle, Kim  
**Sent:** Monday, June 01, 2015 12:39 PM  
**To:** 'Vicki Chase'  
**Subject:** RE: NHB15-1457 I-93 bridges Winnepesaukee River Tilton/ Northfield

Vicki,

The NHFG Nongame and Endangered Species Program has reviewed NHB15-1457 for the proposed bridge rehabilitation and scour protection project for the bridges carrying I-93 over the Winnepesaukee River in Tilton and Northfield. The NHB database check identified wintering bald eagle in the vicinity of the project. Based on the scope and location of the work, we do not expect impacts to the wintering roost area for bald eagle in this vicinity. Please feel free to call me if you have any questions about this review.

Sincerely,

Kim Tuttle  
Certified Wildlife Biologist  
NH Fish and Game  
11 Hazen Drive  
Concord, NH 03301  
603-271-6544

---

**From:** Vicki Chase  
**Sent:** Thursday, May 07, 2015 4:44 PM  
**To:** Tuttle, Kim  
**Subject:** RE: NHB15-1457 I-93 bridges Winnepesaukee River Tilton/ Northfield

Thanks Kim. The engineers and DOT haven't finalized their access plan - they have narrowed it down to the two options shown on the attached. "Option 1 (or 2)" would access the scour protection project from the either the rail line (Option 1) or the trail next to the rail (Option 2) that parallels the river. I included an aerial plan for the rail option (Option 1) but these are essentially the same. These options would require removal of some or most of the vegetation of the north bank. See attached photos 1, 2, and 3. I think there is a red maple (or box elder) and some other small deciduous trees.

The other option, "Option 3", would be to access the river from the highway median on the south side. Most of the median is grassed, but there are trees on the south river bank that would be taken out. See photos 4,5, and 6. These are also smaller deciduous trees - gray birch and red maple (I think). I can stop by and verify these species if need be. (Note that the figure makes it look like they would be cutting the trees on the north bank for Option 3 as well but they wouldn't be.)

As far as timing goes, the intent of the work is to start in fall, build the first crossover in the median, then begin the bridge work the following spring. Construction would extend through two full seasons prior to completion. So if work starts in the September of 2016, work would extend through the construction seasons of 2017 and 2018. The start date might be later than 2016, but that would be the seasonal schedule.

Let me know if you need more information.

Thanks

Vicki Chase  
NORMANDEAU ASSOCIATES, Inc.  
(603) 637-1111

---

**From:** Tuttle, Kim [<mailto:Kim.Tuttle@wildlife.nh.gov>]  
**Sent:** Thursday, May 07, 2015 8:49 AM  
**To:** Vicki Chase  
**Subject:** RE: NHB15-1457 I-93 bridges Winnepesaukee River Tilton/ Northfield

Hi Vicki,

Will there be any tree clearing near the river? If so, send aerial and narrative describing limits of clearing and species of trees to be removed. When is the work proposed to begin and end?

Kim

---

**From:** Vicki Chase [<mailto:VChase@normandeau.com>]  
**Sent:** Wednesday, May 06, 2015 2:05 PM  
**To:** Tuttle, Kim  
**Subject:** RE: NHB15-1457 I-93 bridges Winnepesaukee River Tilton/ Northfield

Hi Kim, any progress on what might be required for Tilton-Northfield eagles? Engineer is wondering if we will need additional scope for surveys.

Thanks

VICKI CHASE *Senior Environmental Analyst*  
25 Nashua Road, Bedford, NH 03110  
603-637-1111 (direct) 603 731-7653 (cell)  
[vchase@normandeau.com](mailto:vchase@normandeau.com) [www.normandeau.com](http://www.normandeau.com)



The information contained in this electronic mail transmission and its attachments may be confidential and protected from disclosure. If the reader of this message is not the intended recipient (or an individual responsible for delivery of the message to such person), you are strictly prohibited from copying, disseminating or distributing this communication. If you have received this communication in error, please notify the sender immediately and destroy all electronic, paper or other versions. The sender does not waive confidentiality in the event of any inadvertent transmission to an unauthorized recipient. No representation is made by the sender that this communication is virus-free. The recipient alone is responsible for taking appropriate measures to ensure that the e-mail is virus-free.

---

**From:** Tuttle, Kim [<mailto:Kim.Tuttle@wildlife.nh.gov>]  
**Sent:** Tuesday, April 28, 2015 8:26 AM  
**To:** Vicki Chase  
**Subject:** RE: NHB15-1457 I-93 bridges Winnepesaukee River Tilton/ Northfield

Hi Vicki,

Carol is still here but does not need to be cc'd on most DOT e-reviews. She directly reviews FERC, lake herbicide permits, and major projects like Northern Pass and wind projects. We'll get back to you soon on this one.

Kim

---

**From:** Vicki Chase [<mailto:VChase@normandeau.com>]  
**Sent:** Monday, April 27, 2015 5:24 PM  
**To:** Tuttle, Kim  
**Subject:** NHB15-1457

Hi Kim,

I have recently change employers, now at Normandeau. I picked up a DOT project, a bridge rehabilitation and scour protection project for the bridges carrying I-93 over the Winnepesaukee River in Tilton and Northfield. The project had previously been cleared for rare species, but in updating the NHB review there is a recent record of bald eagles near the site. (Not surprising, I have seen eagles around there.)

What do you recommend in terms of survey or minimization of impacts to the eagles?

I tried to cc Carol Henderson but she does not come up in the state employees directory. Is she no longer at F&G?

VICKI CHASE *Senior Environmental Analyst*  
25 Nashua Road, Bedford, NH 03110  
603-637-1111 (direct) 603 731-7653 (cell)





# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
New England Ecological Services Field Office  
70 COMMERCIAL STREET, SUITE 300  
CONCORD, NH 3301  
PHONE: (603)223-2541 FAX: (603)223-0104  
URL: [www.fws.gov/newengland](http://www.fws.gov/newengland)

Consultation Code: 05E1NE00-2015-SLI-0514  
Event Code: 05E1NE00-2015-E-00860  
Project Name: Tilton-Northfield 16147 & 14744A

June 05, 2015

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

### To Whom It May Concern:

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

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

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

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

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

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

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

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

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

Attachment



United States Department of Interior  
Fish and Wildlife Service

Project name: Tilton-Northfield 16147 & 14744A

## Official Species List

### Provided by:

New England Ecological Services Field Office

70 COMMERCIAL STREET, SUITE 300

CONCORD, NH 3301

(603) 223-2541

<http://www.fws.gov/newengland>

**Consultation Code:** 05E1NE00-2015-SLI-0514

**Event Code:** 05E1NE00-2015-E-00860

**Project Type:** BRIDGE CONSTRUCTION / MAINTENANCE

**Project Name:** Tilton-Northfield 16147 & 14744A

**Project Description:** The New Hampshire Department of Transportation (NHDOT) proposes to rehabilitate the two bridges carrying Interstate 93 (I-93) north (State Bridge No. 118/158) and southbound (State Bridge No. 117/157) corridors over the Winnepesaukee River, in the Towns of Northfield and Tilton, NH. Repairs to the deteriorated areas of the reinforced concrete substructures would be included as part of the bridge rehabilitation.

**Please Note:** The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.



United States Department of Interior  
Fish and Wildlife Service

Project name: Tilton-Northfield 16147 & 14744A

**Project Location Map:**



**Project Coordinates:** MULTIPOLYGON (((-71.57058477401732 43.45142348523911, -71.57053112983704 43.45134559837627, -71.57047748565674 43.45140790787459, -71.57044529914856 43.45097952877737, -71.57031655311584 43.45100289498818, -71.5703809261322 43.45151694934212, -71.57019853591919 43.451711665759476, -71.57006978988647 43.45178955215088, -71.56999468803406 43.45102626118998, -71.56986594200134 43.451034049921894, -71.56997323036194 43.45199205629913, -71.57016634941101 43.4524905251599, -71.57026290893553 43.45245937097646, -71.57008051872253 43.45192195878608, -71.57041311264038 43.45164156792147, -71.57056331634521 43.4522880226807, -71.57068133354187 43.45225686839296, -71.57050967216492 43.45154810401104, -71.57058477401732 43.45142348523911)))

**Project Counties:** Belknap, NH | Merrimack, NH



United States Department of Interior  
Fish and Wildlife Service

Project name: Tilton-Northfield 16147 & 14744A

## Endangered Species Act Species List

There are a total of 1 threatened or endangered species on your 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. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Mammals	Status	Has Critical Habitat	Condition(s)
Northern long-eared Bat ( <i>Myotis septentrionalis</i> )	Threatened		



United States Department of Interior  
Fish and Wildlife Service

Project name: Tilton-Northfield 16147 & 14744A

## **Critical habitats that lie within your project area**

There are no critical habitats within your project area.

**Federal Highway Administration (FHWA) and Federal Railroad Administration (FRA)  
Range-wide Programmatic Informal Consultation for  
Indiana Bat and Northern Long-eared Bat**

Project Submittal Form for FHWA, FRA, and Transportation Agencies

*Updated May 29, 2015*

In order to use the programmatic informal consultation to fulfill Endangered Species Act consultation requirements, transportation agencies must use this form to submit project-level information for all may affect, not likely to adversely affect (NLAA) determinations to the appropriate U.S. Fish and Wildlife Service (Service) field office prior to project commencement. For more information, see the Standard Operating Procedure for Site Specific Project(s) Submission in the User’s Guide.

In submitting this form, the transportation agency ensures that the proposed project(s) adhere to the criteria of the range-wide programmatic informal BA. Upon submittal of this form, the appropriate Service field office may review the site-specific information provided and request additional information. If the applying transportation agency is not notified within 14 calendar days of emailing the Project Submittal Form to the Service field office, it may proceed under the range-wide programmatic informal consultation.

Further instructions on completing the form can be found by hovering your cursor over each text box.

1. Date: June 5, 2015

2. Lead Agency: FHWA

*This refers to the Federal governmental lead action agency initiating consultation; select FHWA or FRA as appropriate*

3. Requesting Agency: NHDOT

a. Name:

b. Title:

c. Phone:

d. Email:

4. Consultation Code<sup>1</sup>: 05E1NE00-2015-SLI-0514

5. Project Name(s): Tilton-Northfield 16147 & 14744A

6. Project Description:

Bridge rehabilitation and scour protection installation.

<sup>1</sup> Available through IPaC System Official Species List: <https://ecos.fws.gov/ipac/>

7. Other species from Official Species List:

No effect – project(s) are inside the range, but no suitable habitat – see additional information attached

May Affect – see additional information provided for those species (either attached or forthcoming)

8. For Ibat/NLEB, if Applicable, Explain Your No Effect Determination

No effect – project(s) are outside the species' range (*form complete*)

No effect – project(s) are inside the range, but no suitable summer habitat (*form complete*)

- ✓ No effect from maintenance, alteration, or demolition of bridge(s)/structure(s) – results of inspection surveys indicate no signs of bats. (*form complete*)

*Otherwise, please continue below.*

9. Affected Resource/Habitat Type

Trees

Bridge

Other Non-Tree Roosting Structure (e.g., building)

Other (please explain):

10. For Tree Removal Projects:

- a. Please verify that no documented roosts or foraging habitat will be impacted and that project is within 100 feet of existing road surface:
- b. Please verify that all tree removal will occur during the inactive season<sup>2</sup>:
- c. Timing of clearing:
- d. Amount of clearing:

---

<sup>2</sup> Coordinate with local Service field office for appropriate dates.

11. For Bridge/Structure Work Projects:

- a. Proposed work:
- b. Timing of work:
- c. Evidence of bat activity on bridge/structure:
- d. If applicable, verify that superstructure work will not bother roosting bats in any way:
- e. If applicable, verify that bridge/structure work will occur only in the winter months:

12. Please confirm that:

- Proposed project(s) adhere to the criteria of the range-wide programmatic informal BA (see Section 2.0).
- All applicable AMMs will be implemented, including<sup>3</sup>:
  - Tree Removal AMM 1:
  - Tree Removal AMM 2:
  - Tree Removal AMM 3:
  - Tree Removal AMM 4:
  - Bridge AMM 1:
  - Bridge AMM 2:
  - Bridge AMM 3:
  - Bridge AMM 4:
  - Structure AMM 1:
  - Structure AMM 2:
  - Structure AMM 3:

---

<sup>3</sup> See AMMs Fact Sheet (Appendix B) for more information on the following AMMs.

- Structure AMM 4:
- Lighting AMM 1:
- Lighting AMM 2:
- Dust Control AMM 1:
- Water Control AMM 1 (erosion control):
- Water Control AMM 2 (sediment control):
- Water Control AMM 3 (roadside drainage):
- Water Control AMM 4 (revegetation):
- Water Control AMM 5 (equipment service/maintenance):
- Water Control AMM 6 (spill plan):
- Wetland/Stream Protection AMM 1:
- Wetland/Stream Protection AMM 2:
- Wetland/Stream Protection AMM 3:
- Wetland/Stream Protection AMM 4:
- Wetland/Stream Protection AMM 5:
- Wetland/Stream Protection AMM 6:

## APPENDIX C: Bridge/Structure Inspection Form

### Bridge Inspection Form

This form will be completed and submitted to the District Environmental Manager by the Contractor prior to conducting any work below the deck surface either from the underside, from activities above that bore down to the underside, or that could impact expansion joints, from deck removal on bridges, or from structure demolition. Each bridge/structure to be worked on must have a current bridge inspection. Any bridge/structure suspected of providing habitat for any species of bat will be removed from work schedules until such time that the DOT has obtained clearance from the US Fish and Wildlife Service, if required. Additional studies may be undertaken by the DOT to determine what species may be utilizing structures prior to allowing any work to proceed.

<b>DOT Project #</b> 16147 & 14744A	<b>Water Body</b> Winnepesaukee River	<b>Date/Time of Inspection</b> June 4, 2015
--	--	--

Route:	County:	Federal Structure ID:	Bat Indicators			
			Visual	Sound	Droppings	Staining
I-93	Belknap & Merrimack					

**Notes: (e.g., number & species of bats, if known)**

#### Areas Inspected (Check all that apply)

Bridges	Culverts/Other Structures			
Summary Info (circle all that apply)	Human disturbance or traffic under bridge/in culvert or at the structure	High	Low	None
All vertical crevices sealed at the top and 0.5-1.25" wide & ≥4" deep		x		
All crevices >12" deep & not sealed			x	
All guardrails				
All expansion joints				

April 17, 2015

Spaces between concrete end walls and the bridge deck									
Vertical surfaces on concrete I-beams									

Inspection Conducted By: Vicki Chase

Signature(s):

District Environmental Use Only:

Date Received by District Environmental Manager: \_\_\_\_\_

**DOT Bat Inspection Form Instructions**

1. Inventories must be completed prior to conducting any work below the deck surface on all bridges that meet the physical characteristics described in the Programmatic Informal Consultation, regardless of whether inventories have been conducted in the past. **Due to the transitory nature of bat use, a negative result in one year does not guarantee that bats will not use that structure in subsequent years.**
2. Contractors must complete this form no more than seven (7) business days prior to initiating work at each bridge/structure location. Legible copies of this document must be provided to the District Environmental Manager within two (2) business days of completing the inspection. Failure to submit this information will result in that structure being removed from the planned work schedule.
3. Any bridge/structure suspected of providing habitat for any species of bat will be removed from work schedules until such time that the DOT has obtained clearance from the USFWS, if required. Additional studies may be undertaken by the DOT to determine what species may be utilizing each structure identified as supporting bats prior to allowing any work to proceed.
4. Estimates of numbers of bats observed should be placed in the Notes column.
5. Any questions should be directed to the District Environmental Manager.

APR 14 2015



THE STATE OF NEW HAMPSHIRE  
DEPARTMENT OF TRANSPORTATION



JEFF BRILLHART, P.E.  
ACTING COMMISSIONER

RECEIVED

APR 17 2015

Exhibit H

NORTHFIELD-TILTON

X-A001(153) 16147

A001(042) 14744A

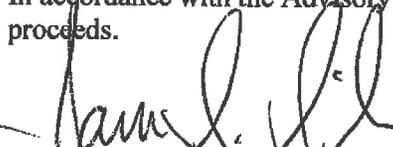
RPR 6537

No Historic Properties Affected Memo

Pursuant to the Request for Project Review signed on March 20, 2015, and for the purpose of compliance with regulations of the National Historic Preservation Act and the Advisory Council on Historic Preservation's *Procedures for the Protection of Historic Properties* (36 CFR 800), the NH Division of Historical Resources (NHDHR) and the NH Division of the Federal Highway Administration (FHWA) have coordinated the identification and evaluation of historical and archaeological resources with plans to rehabilitate the two bridges carrying Interstate 93 (I-93) northbound (State Bridge No. 118/158) and southbound (State Bridge No. 117/157) over the Winnepesaukee River, in the Towns of Northfield and Tilton, New Hampshire. The first project involves deck rehabilitation on each bridge (X-A001(153), 16147). The second project provides scour protection adjacent to the bridge piers (A001(042), 14744A).

Based on a review pursuant to 36 CFR 800.4, we agree that no historic or archaeological resources are affected in the project area and that no further survey work is needed. A Phase 1A archaeological survey undertaken for the project found moderate sensitivity for archaeological resources in a low terrace in the northwest quadrant of the project. No impacts are proposed in this area. The inter-state system is exempt from Section 106 review.

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

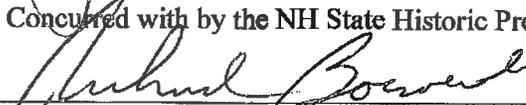
  
Patrick Bauer, Administrator  
Federal Highway Administration

4/14/15  
Date

  
Jill Edelmann  
Cultural Resources Manager

4/10/2015  
Date

Concurred with by the NH State Historic Preservation Officer:

  
Elizabeth H. Muzzey  
State Historic Preservation Officer  
NH Division of Historical Resources

4-20-15  
Date

- c.c. Chris St. Louis, NHDHR
- Jamie Sikora, FHWA
- Bob Landry, DOT
- Jon Evans, DOT
- Pete Stamnas, DOT
- Vicki Chase, Normandeau

S:\Environment\PROJECTS\DESIGN\16147\Cultural\16147 14744 NoHistoricPropAffectedFHWA draft 4.10.2015.docx





**US Army Corps  
of Engineers**  
New England District

New Hampshire Programmatic General Permit (PGP)  
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 PGP, 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 <a href="http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm">http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm</a> 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, shellfish beds, special wetlands and vernal pools (see PGP, GC 26 and Appendix A)? Applicants may obtain information from the NH Department of Resources and Economic Development Natural Heritage Bureau (NHB) website, <a href="http://www.nhnaturalheritage.org">www.nhnaturalheritage.org</a> , specifically the book <a href="#">Natural Community Systems of New Hampshire</a> .		X
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	NA	
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 size of the existing impervious surface area?	407,200 ft <sup>2</sup>	
2.7 What is the size of the proposed impervious surface area?	409,200 ft <sup>2</sup>	
2.8 What is the % of the impervious area (new and existing) to the overall project site?	28% / 28%	
3. Wildlife	Yes	No
3.1 Has the NHB 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 a NHB determination.)	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: <ul style="list-style-type: none"> <li>• PDF: <a href="http://www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/highest_ranking_habitat.htm">www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/highest_ranking_habitat.htm</a>.</li> <li>• Data Mapper: <a href="http://www.granit.unh.edu">www.granit.unh.edu</a>.</li> <li>• GIS: <a href="http://www.granit.unh.edu/data/downloadfreedata/category/databycategory.html">www.granit.unh.edu/data/downloadfreedata/category/databycategory.html</a>.</li> </ul>	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 PGP, GC 21?	NA	
<b>4. Flooding/Floodplain Values</b>	<b>Yes</b>	<b>No</b>
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? The Project will not result in a significant loss of flood storage.	NA	
<b>5. Historic/Archaeological Resources</b>		
For a minor or major impact project - a copy of the Request for Project Review (RPR) Form ( <a href="http://www.nh.gov/nhdhr/review">www.nh.gov/nhdhr/review</a> ) shall be sent to the NH Division of Historical Resources as required on Page 5 of the PGP**	X	

\*Although this checklist utilizes state information, its submittal to the Corps is a Federal requirement.

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

## **Army Corps of Engineers Secondary Impacts Checklist Supplemental Narrative**

### **1. Impaired Waters**

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

The proposed project lies within Assessment Unit NHRIV700020203-11 "Winnepesaukee River". The 2012 List of all Impaired Waters published by NHDES identifies this segment as being impaired for aquatic life by non-native aquatic plants. This Assessment Unit extends downstream approximately 1.5 miles.

### **2. Wetlands**

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

Yes. The project area is located over and within the Winnepesaukee River in the towns of Northfield and Tilton, NH.

#### **2.6 What is the size of the existing impervious surface area?**

#### **2.7 What is the size of the proposed impervious surface area?**

The numbers reflected in the Secondary Impacts Checklist refer to additional impervious surface created by widening of the bridges, and do not reflect a decrease in pervious surface. There will be no increase of pavement on the bridge approaches.

### **3. Wildlife**

#### **3.1 Has the NHB 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 a NHB determination.)**

A database check with the New Hampshire Natural Heritage Bureau (NHNHB) indicated that there were records of two species in the project area: the state-endangered Narrow-leaved Arrowhead (*Sagittaria filiformis*) and state-threatened Bald Eagle (*Haliaeetus leucocephalus*) (Exhibit D – NHNHB Responses.) A plant survey was undertaken on July 7, 2015 and no evidence of *S. filiformis* was found in the vicinity of the project area. NHNHB concluded that they had no concerns with impacts to the plant (Exhibit E - NHNHB and NHF&G Correspondence.)

The New Hampshire Fish and Game (NHF&G) non-game department was contacted about the potential to affect bald eagles in the project area. NHF&G determined that given the scope of proposed work and limited tree cutting proposed there would be no impacts to roosting bald eagles in the project area (Exhibit E – NHNHB and NHF&G Correspondence).

A second request was submitted to NHNHB on May 3, 2016, as the original request was over a year old that confirmed that there were no new occurrences of state-listed species recorded near the project area.

An environmental review was conducted through the US Fish and Wildlife Service's (USFWS) online Information for Planning and Conservation website (IPaC). The response indicated that the federally threatened northern long-eared bat (*Myotis septentrionalis*) has the potential to occur within the project area. (Exhibit F – IpaC Results)

Informal consultation performed for the northern long-eared bat under the “Federal Highway Administration (FHWA) and Federal Railroad Administration (FRA) Range-wide Programmatic Informal Consultation for Indiana Bat and Northern Long-eared Bat” indicated that there will be no effect to this species from the proposed project. (Exhibit G – USFWS NLEB Consultation.)

**3.2 Would work occur in any area identified as either “Highest Ranked Habitat in N.H.” or “Highest Ranked Habitat in Ecological Region”?**

The Project area is located within area identified in the 2015 Wildlife Action Plan as “Highest Ranked Habitat in N.H.” associated with the Winnepesaukee River. (Exhibit J – 2015 Wildlife Action Plan)

**4. Flooding/Floodplain Values**

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

The project will not cause flooding, erosion, or sedimentation. All appropriate erosion and sedimentation controls will be used during construction to prevent sedimentation or turbidity in the Winnepesaukee River.

FEMA's Flood Insurance Rate Maps (FIRM) for the project area covered two maps (Map numbers: 330009 0005C [Tilton – Belknap County] and 330118 0179E [Northfield – Merrimack County]). The project also crosses the floodway area associated with the Winnepesaukee River.

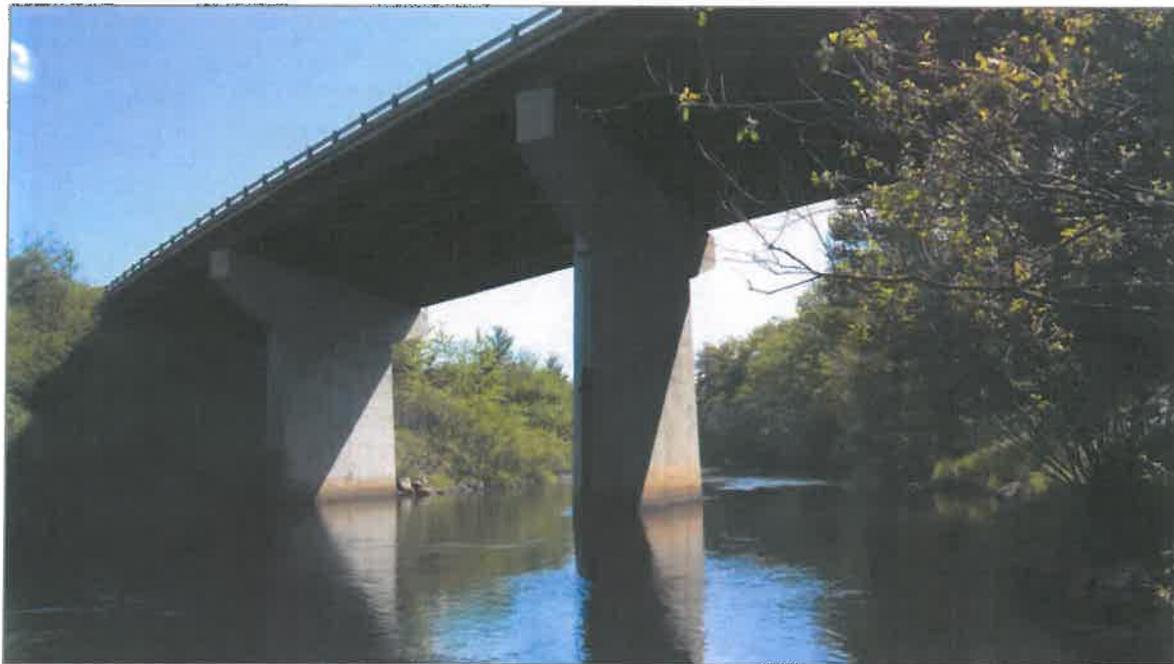
The project proposes 67 cubic yards of permanent net fill within the jurisdictional floodplain and floodway of the Winnepesaukee River. A hydraulic study was undertaken that demonstrated that there will no effect to the base flood elevation that will occur from the fill proposed to be placed in the floodway of the Winnepesaukee River. (Exhibit K – Floodplain Information)

**5. Historic/Archaeological Resources**

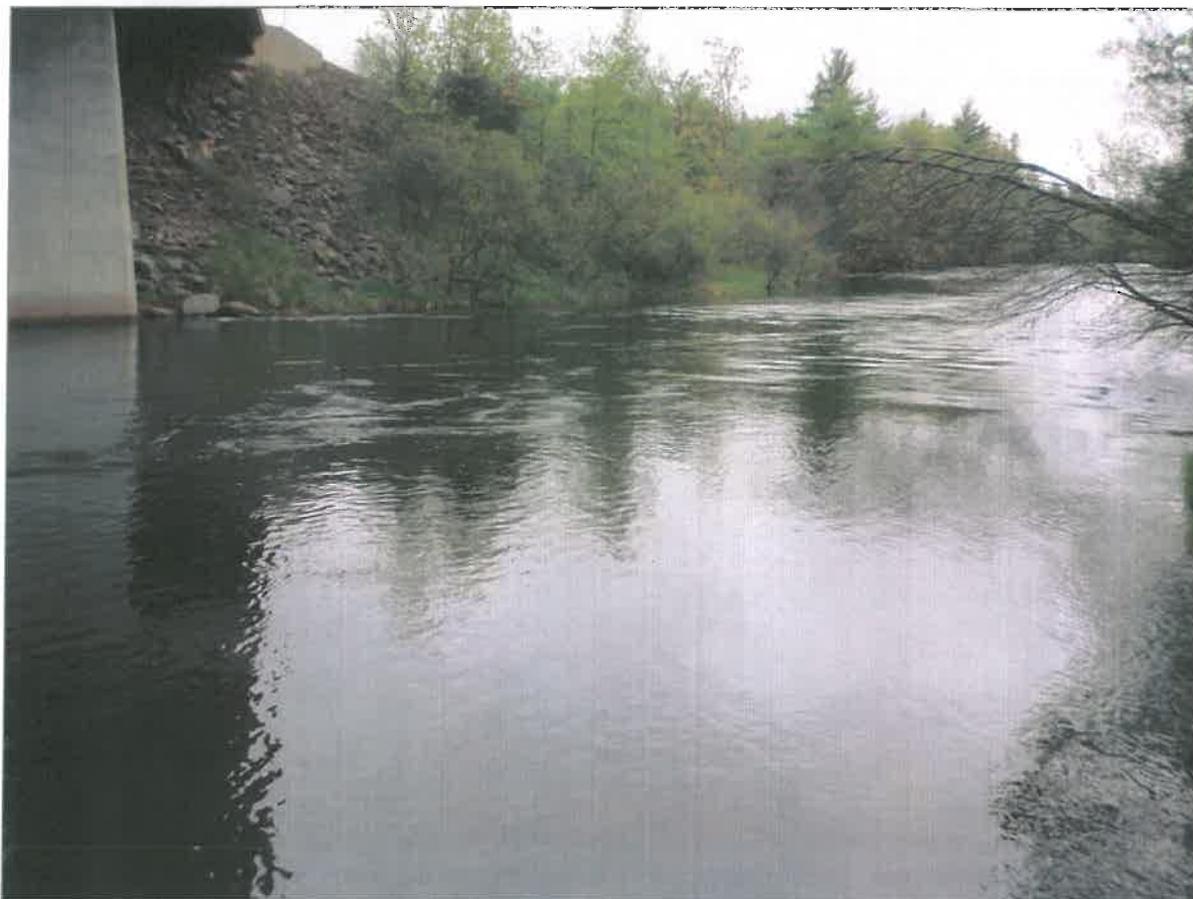
For a minor or major impact project - a copy of the Request for Project Review (RPR) Form ([www.nh.gov/nhdhr/review](http://www.nh.gov/nhdhr/review)) shall be sent to the NH Division of Historical Resources as required on Page 5 of the PGP.

The project bridges are part of the interstate highway system and as such are exempt from the requirements of Section 106 of the National Historic Preservation Act . Under the exemption, other areas around the bridge proposed to be affected are subject to Section 106 requirements. The Federal Highway Administration, lead federal agency for the project, determined that although there was an area of moderate archeological sensitivity in the northwest quadrant of the project, there would be no effect to this area and thus no potential effect to archaeological resources. Please see Exhibit H- Memorandum of No Effect.





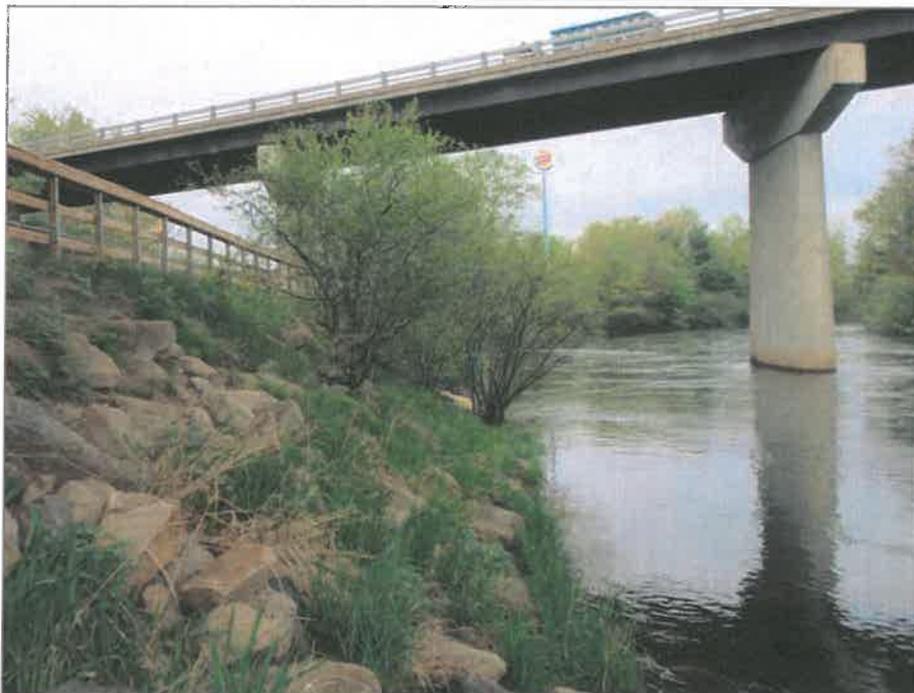
**Photo 1 View west of I-93 southbound bridge (June 3, 2015)**



**Photo 2: Southern bank of Winnepesaukee River, facing south (May 16, 2012)**



**Photo 3 North bank of river – view west. (May 16, 2012)**



**Photo 4 Northbound I-93 bridge pier in Winnepesaukee River, facing upstream/east (May 16, 2012)**



**Photo 5 Northbound I-93 center span, facing south**



**Photo 6 I -93 center median south of bridges, facing north (May 16, 2012)**



Photo 7 Median wetland - view north from I-93 northbound (September, 2013)



Photo 8 Median wetland - view south from I-93 southbound (September, 2013)

## **Construction Sequence Narrative**

### **Construction Sequence – 14744A – Scour Countermeasure Installation**

1. Install erosion control measures prior to any operation that will disturb the existing ground and potentially generate storm-water runoff.
2. Construct temporary access road to cross railroad tracks and reach the northern river bank.
3. As necessary, remove sections of wooden rail fence and chain link fence (as approved by the engineer) in order to construct a temporary access road between the I-93 NB Pier 2 and the railroad tracks, and gain access to the central staging area along the north bank between both bridges.
4. Complete clearing and grubbing operations along the north bank as necessary.
5. Install the water diversion structure and turbidity barriers around both Pier 2s as shown on the plans.
6. Construct temporary access platforms (potentially starting at the downstream most work area) as necessary around Pier 2 of the I-93 SB bridge to accommodate allowable pick distance for crane.
7. Install turbidity barrier around I-93 SB Pier 1.
8. Install riprap along Pier 1 of the I-93 SB bridge.
9. Excavate around Pier 2 of the I-93 SB bridge as shown on the plans and install filter material, bedding, and concrete armor matrix components.
10. Construct/modify temporary access platforms as necessary around Pier 2 of the I-93 NB bridge to accommodate allowable pick distance for crane.
11. Install turbidity barrier around I-93 NB Pier 1 as shown on the plans.
12. Install riprap along Pier 1 of the I-93 NB bridge.
13. Excavate around Pier 2 of the I-93 NB bridge as shown on the plans and install filter material, bedding, and concrete armor matrix components.
14. Remove turbidity barriers around both Pier 1's.
15. Remove material from all temporary access roads and work platforms below OHW line.
16. Remove water diversion structure and turbidity barrier.
17. Remove remaining temporary access roadway.
18. Re-establish and re-grade bank areas to existing elevations and slope.
19. Re-establish pedestrian walkway, and railroad crossing.

20. Re-install removed sections of all fencing
21. Remove erosion control measures and reestablish landscaping.
22. Work to be completed between August 1<sup>st</sup> and October 31<sup>st</sup>.

**Construction Sequence - 16147 Bridge Rehabilitation**

**Phase 1:**

1. Construct single lane Northbound Diversion in I-93 median. Maintain existing traffic configurations. Work may require off peak, temporary single lane closure or traffic shifts.
2. Mill and inlay existing rumble strips along Southbound and Northbound barrels of I-93 within Diversion limits.
3. Construct pavement shim on the East side of the existing Southbound Bridge in preparation of Northbound traffic. Work may require off peak, temporary single lane closure or traffic shifts.
4. Construct SB on ramp gore area.

**Phase 2:**

**2A:**

1. Shift Southbound traffic to two temporary lanes on the West side of the existing Southbound Bridge. The Southbound on ramp traffic will be merged with the Southbound traffic prior to the Bridge.
2. Shift I-93 Northbound traffic (single/high-speed lane) onto I-93 Northbound Diversion.
3. Shift remaining I-93 Northbound traffic (single lane) to a temporary lane on the West side of the Northbound Bridge.
4. Remove and reconstruct East side of the Northbound Bridge.
5. Begin reshaping I-93 Northbound between limits of I-93 Northbound Diversion.

**2B:**

1. Shift remaining I-93 Northbound traffic (single lane) to a temporary lane on the rehabilitated East portion of the Northbound Bridge.
2. Remove and reconstruct the West side of the Northbound Bridge.

**Phase 3:**

1. Shift all Northbound traffic to I-93 Northbound and the rehabilitated Northbound Bridge.
2. Shift Southbound traffic, including Southbound on ramp merge, back to its original location on the existing Southbound Bridge.
3. Remove portion of Northbound Diversion in anticipation of construction of Southbound Diversion. Work may require off peak, temporary single lane closure or traffic shifts.

Phase 4:

1. Reconfigure median and construct single lane Southbound Diversion. Maintain existing traffic configurations. Work may require off peak, temporary single lane closure or traffic shifts.
2. Maintain roadway configuration for the winter maintenance period.
3. Mill and inlay existing rumble strips along the Northbound barrel of I-93 within Diversion limits.

Phase 5:

5A:

1. Shift I-93 Northbound traffic to two temporary lanes on the East side of the rehabilitated Northbound Bridge.
2. Maintain two temporary Northbound lanes on the East side of the rehabilitated Northbound Bridge.
3. Shift I-93 Southbound traffic (single/high-speed lane) onto I-93 Southbound Diversion.
4. Shift remaining I-93 Southbound traffic (single lane) to a temporary lane on the West side of the Southbound Bridge.
5. Remove and reconstruct East side of the Southbound Bridge.
6. Begin reshaping I-93 Southbound between limits of I-93 Southbound Diversion.

5B:

1. Shift remaining I-93 Southbound traffic (single lane and on ramp) to the reconstructed width on the rehabilitated East portion of the Southbound Bridge.
2. Remove and reconstruct the West side of the Southbound Bridge.

Phase 6:

1. Shift all Northbound and Southbound traffic back to the I-93 Northbound and Southbound barrels and the rehabilitated Bridges.
2. Finalize reshaping, milling and overlay of I-93 Northbound and Southbound.
3. Shift all Northbound and Southbound traffic to its final location.
4. Remove Diversions and complete median work.

**Env-Wt 404.04 Rip-rap.**

Rip-rap applications shall be considered only where the applicant demonstrates that anticipated turbulence, flows, restricted space, or similar factors render vegetative and diversion methods physically impractical.

The scour study undertaken for the bridges indicated that the piers were in need of scour protection. Vegetative stabilization is not an option at this location.

**(b) Applications for rip-rap shall include:**

**(1) Designation of a minimum and maximum stone size;**

Materials specified for this project are:

- 1) Concrete armor matrix components (aka "A-Jacks" ®) with a tip-to-tip length of 24 inches and weighing 75 pounds each, and;
- 2) Riprap "Class V" as described in NHDOT's Supplemental Specification 583.

<b>Table 1</b>						
Riprap Classes and Sizes			Percentage Distribution of Particle Sizes by Volume (cubic feet)			
<b>Class</b>	<b>Nominal Size (in)</b>	<b>Maximum Size (in)</b>	<b>&lt; 15%</b>	<b>15% – 85%</b>	<b>&gt; 85%</b>	<b>Maximum</b>
<b>I</b>	6	12	0.05	0.14	0.31	1.0
<b>III</b>	12	24	0.4	1.0	2.5	6.5
<b>V</b>	18	36	1.3	3.5	8.5	22
<b>VII</b>	24	48	3	8	19	53
<b>IX</b>	36	72	10	27	65	179

Note: Nominal Size and Maximum Size are based on the Width dimension of the stone. The riprap classes conform to the standard classes described in the FHWA HEC-23 publication.

**(2) Gradation;**

As above.

**(3) Minimum rip-rap thickness;**

The stone will be placed at the minimum depth depicted on Sheet 8 of the Wetland Impact Plan set.

**(4) Type of bedding for stone;**

The riprap will be placed in situ with no change to the existing bedding. Bedding for the Concrete Armor Matrix Units will be 8" minimum of filter material (Crushed Aggregate for

Shoulders 304.33 from NHDOT Standard Specifications), 1" of bedding material (304.6 - "Very Coarse" from NHDOT Standard Specifications)

***(5) Cross-section and plan views of the proposed installation;***

See Sheets 8-10 in the Wetland Impact Plan Set.

***(6) Sufficient plans to clearly indicate the relationship of the project to fixed points of reference, abutting properties, and features of the natural shoreline; and***

See Sheet 8 in attached plan set.

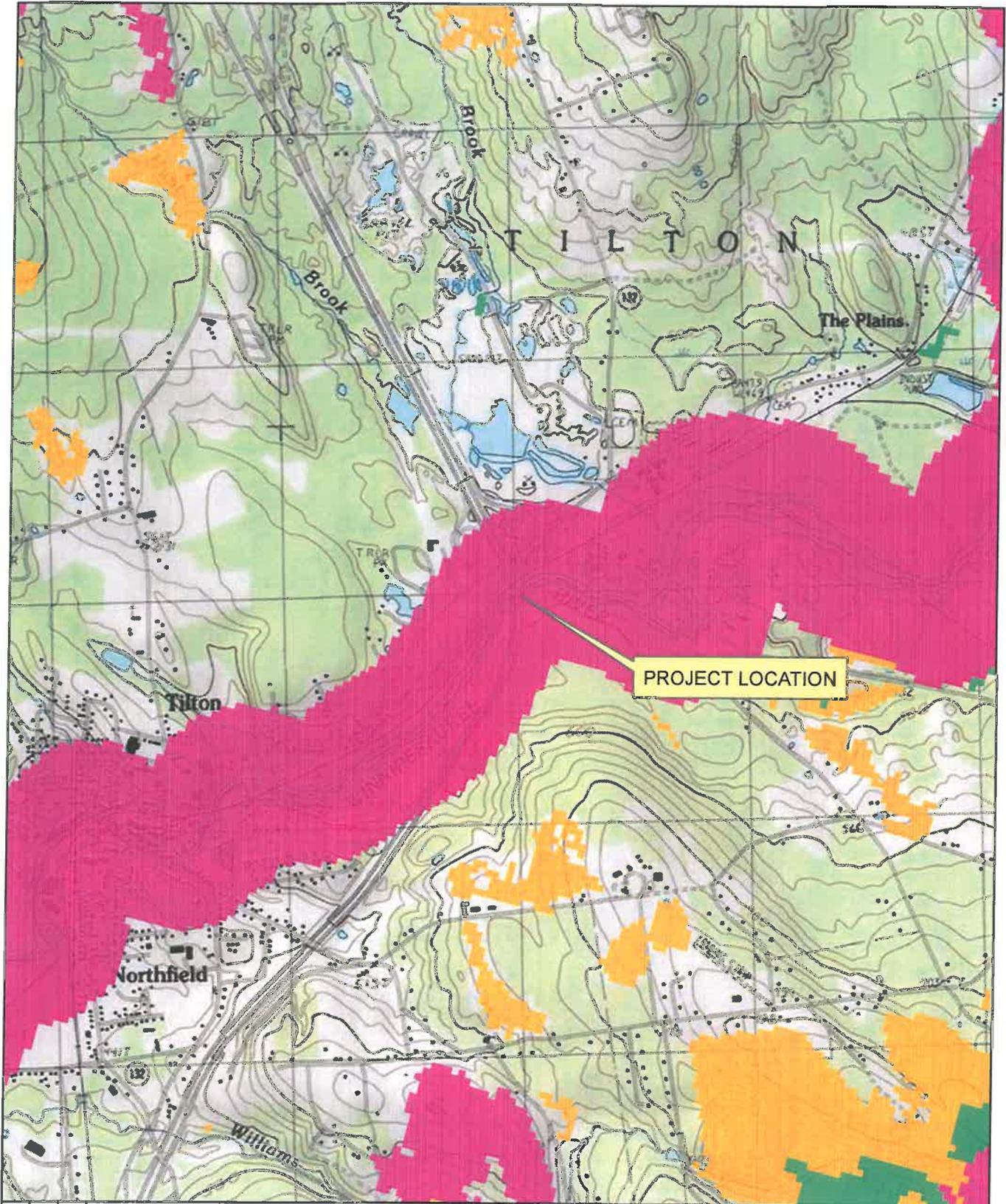
***(7) A description of anticipated turbulence, flows, restricted space, or similar factors that would render vegetative and diversion methods physically impractical.***

A scour analysis was undertaken that demonstrated that scour protection was needed at the subject piers. Vegetative and diversion methods are not practicable at this location because the piers are in the water. Additional information from the scour analysis is summarized below.

The subject piers are located in the channel, founded on spread footings and subjected to an angle of attack between 10-15 degrees for flood flows. Southern piers of both bridges have rip rap protection in place on the bank side of the piers however there is no stone protection along the river side of both piers. For both bridges the northerly pier is located in the main channel, founded on sand/gravel deposits and has no rip-rap protection. The record plans indicate roughly 11 feet of embedment at Pier 1 and roughly 8 feet of embedment at Pier 2. Recent diving inspections and field observations indicate a loss of up to 2 feet of embedment around the piers.

The existing scour analysis completed for both bridges predicts a total scour depth of 8 feet at Pier 1 and 9 feet at Pier 2 for the 100-year event with velocities of 9 feet per second. It is important to note that these predicted scour depths were based on an average velocity referenced from the FIS and CHA believes the velocity in the vicinity of the piers would be higher resulting in greater scour depths. All of the major floods (in the Winnepesaukee River Basin) listed in the Town of Tilton FIS (8/1997) predate the construction of the I-93 bridges (1960). However, according to records at USGS Gage 108100, the Winnepesaukee River experienced a 25-30 year flood event in 2005.





Date: 5/12/2016 Drawn By: vchase Project No: 22287.010	<b>WILDLIFE ACTION PLAN TIERS</b> 1 - HIGHEST RANKED HABITAT IN NH 2 - HIGHEST RANKED HABITAT IN ECOLOGICAL REGION 3 - SUPPORTING LANDSCAPES	<b>NHDOT</b> TILTON AND NORTHFIELD, NEW HAMPSHIRE 16147 & 14744A
	Data Source: New Hampshire Fish and Game Department, Wildlife Division Publication Date: 20151001 Title: NH Wildlife Action Plan 2015: Highest Ranked Wildlife Habitat Accessed 11/24/2015	<b>EXHIBIT K - 2015 WILDLIFE ACTION PLAN</b>
SCALE: 1:24,000		
		 25 Nashua Road Bedford, NH 03110 (603) 472-5191 www.normandeau.com
		MAY 2016





MARGARET WOOD HASSAN  
GOVERNOR

**STATE OF NEW HAMPSHIRE**  
**OFFICE OF ENERGY AND PLANNING**  
107 Pleasant Street, Johnson Hall  
Concord, NH 03301-3834  
Telephone: (603) 271-2155  
Fax: (603) 271-2615



Exhibit 5

**MEMORANDUM**

**TO:** Jameson Paine  
Normandeau Associates, Inc.

**FROM:** Jennifer Gilbert  
NH Floodplain Management Coordinator  
State NFIP Coordinator

**DATE:** February 6, 2014

**SUBJECT:** Northfield-Tilton, 16147 and 14744A  
I-93 Bridges Rehabilitation over Winnepesaukee River  
Scour Protection Measures in the Winnepesaukee River

I am writing in reference to your letter dated August 6, 2012 regarding the above-referenced project. I have reviewed and attached the current Flood Insurance Rate Maps. It appears the proposed project is located within a special flood hazard area (Zone AE) with a designated floodway in Northfield and Tilton.

Based on the project description, it does not appear that Project #16147 (bridge deck rehabilitation project) will have an impact on the floodplain/floodway. Project #14744 may have an impact on the floodway since the project involves working in the Winnepesaukee River. Since a floodway area is in the project areas, the proposed impact depends on whether the project's encroachment changes the base flood elevation.

Since Northfield and Tilton are participating communities of the NFIP, any development in a special flood hazard area should meet the community's floodplain management regulations. Development is defined under the NFIP as "any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials."

If the proposed project will impact the regulatory floodway, the following regulation contained in the floodplain regulations for Tilton and Northfield would apply:

Along watercourses with a designated Regulatory Floodway no encroachments, including fill, new construction, substantial improvements, and other development are allowed within the floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practices that the proposed encroachment would not result

in any increase in flood levels within the community during the base flood discharge.

In summary, any encroachment, fill, or development that occurs within the floodway (hatched area on map) requires hydrologic and hydraulic analyses to determine if the proposed work will cause any increase in the base flood elevation. If any increase in the base flood elevation is anticipated as a result of the project, coordination with FEMA through the Conditional Letter of Map Revision process is required.

If you need further assistance, please contact me at 271-2155 or [jennifer.gilbert@nh.gov](mailto:jennifer.gilbert@nh.gov).



MAP SCALE 1" = 500'



INTEGRATED

PANEL 0179E

# NATIONAL FLOOD INSURANCE PROGRAM

## FIRM FLOOD INSURANCE RATE MAP MERRIMACK COUNTY, NEW HAMPSHIRE (ALL JURISDICTIONS)

PANEL 179 OF 705  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)  
CONTAINS:  
COMMUNITY NUMBER 33010  
TOWNSHIP 0179  
SHEET 2

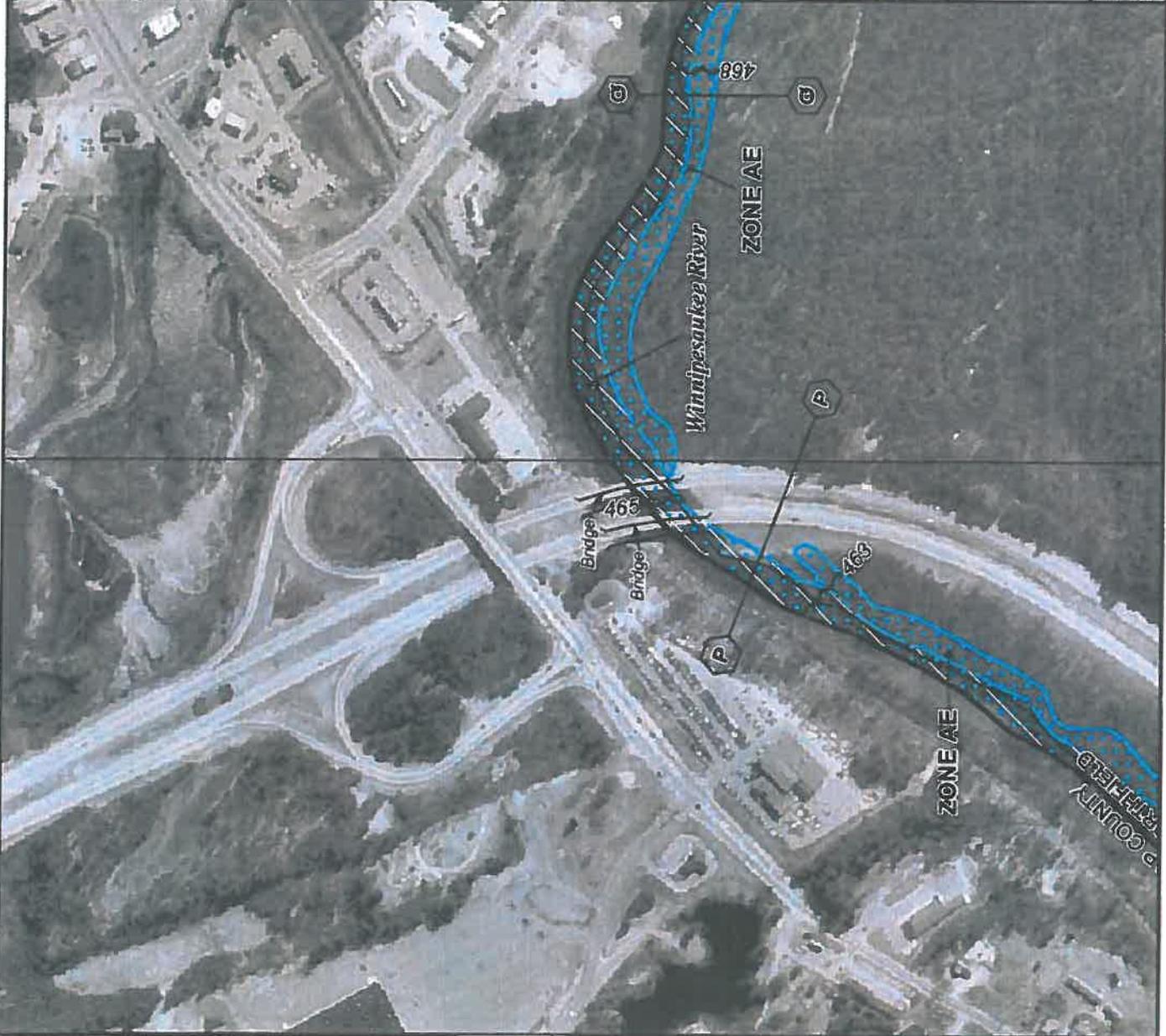
Notes to User: This map number should be used when placing maps within the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER  
33013C0179E  
EFFECTIVE DATE  
APRIL 19, 2010

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map R was extracted using F-MIT On-Lines. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.mnc.fema.gov](http://www.mnc.fema.gov)





APPROXIMATE SCALE



NATIONAL FLOOD INSURANCE PROGRAM

**FIRM**  
FLOOD INSURANCE RATE MAP

TOWN OF  
TILTON,  
NEW HAMPSHIRE  
BELKNAP COUNTY

ONLY PANEL PRINTED

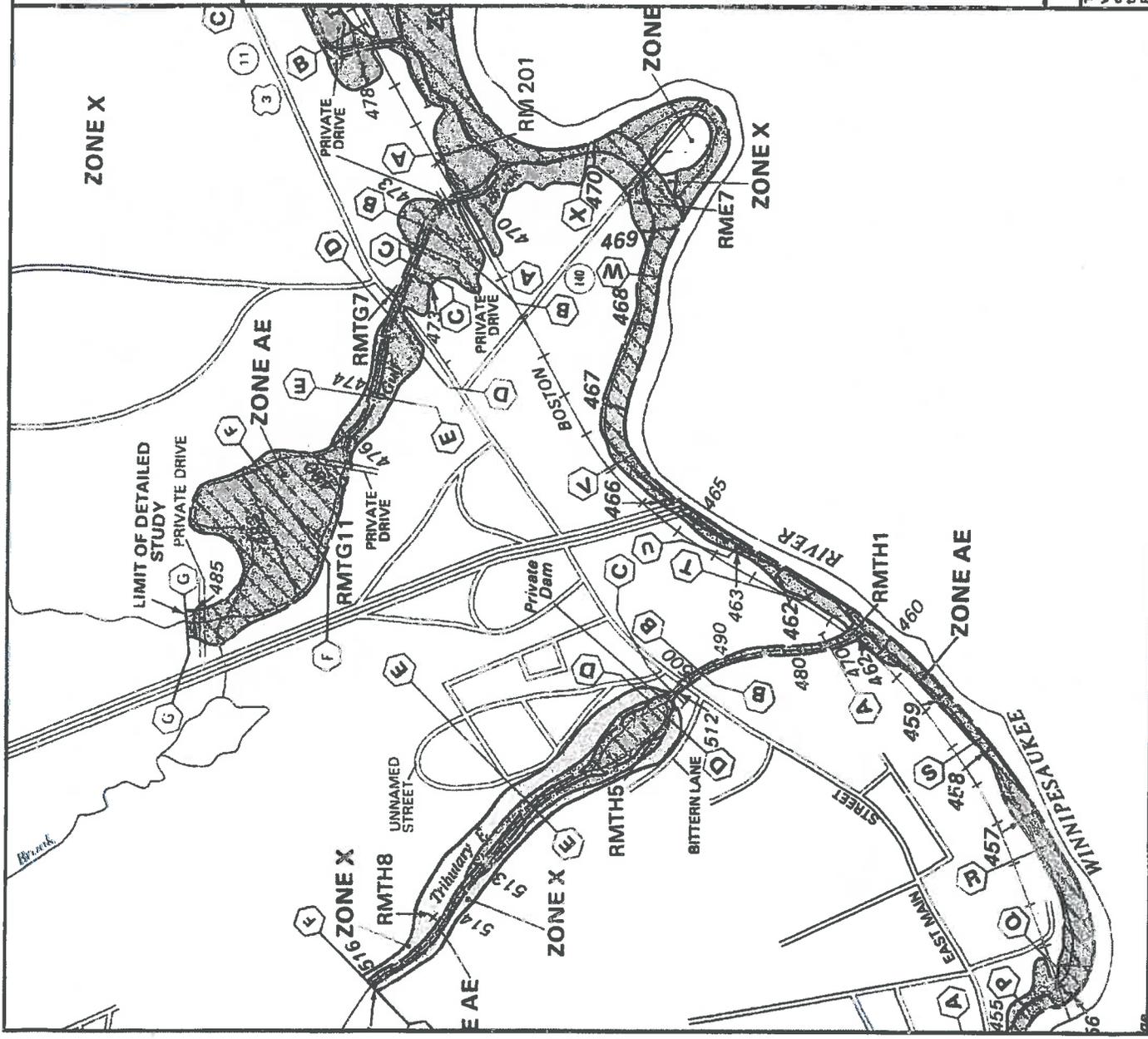
COMMUNITY PANEL NUMBER  
330009 0805 C

MAP REVISED:  
AUGUST 19, 1997



Federal Emergency Management Agency

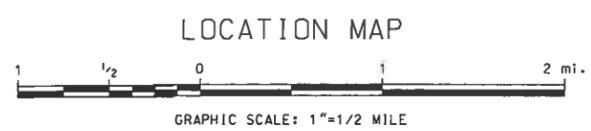
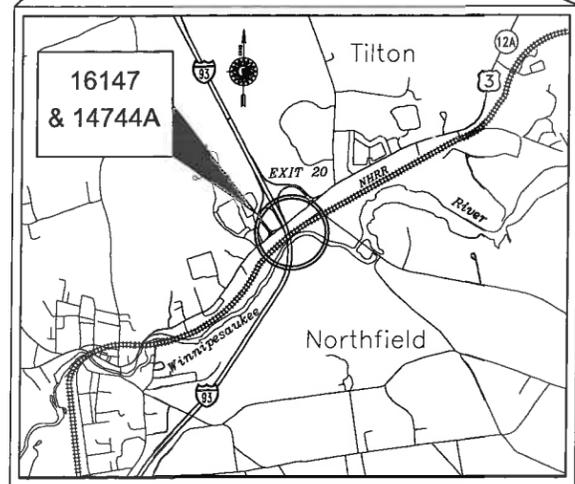
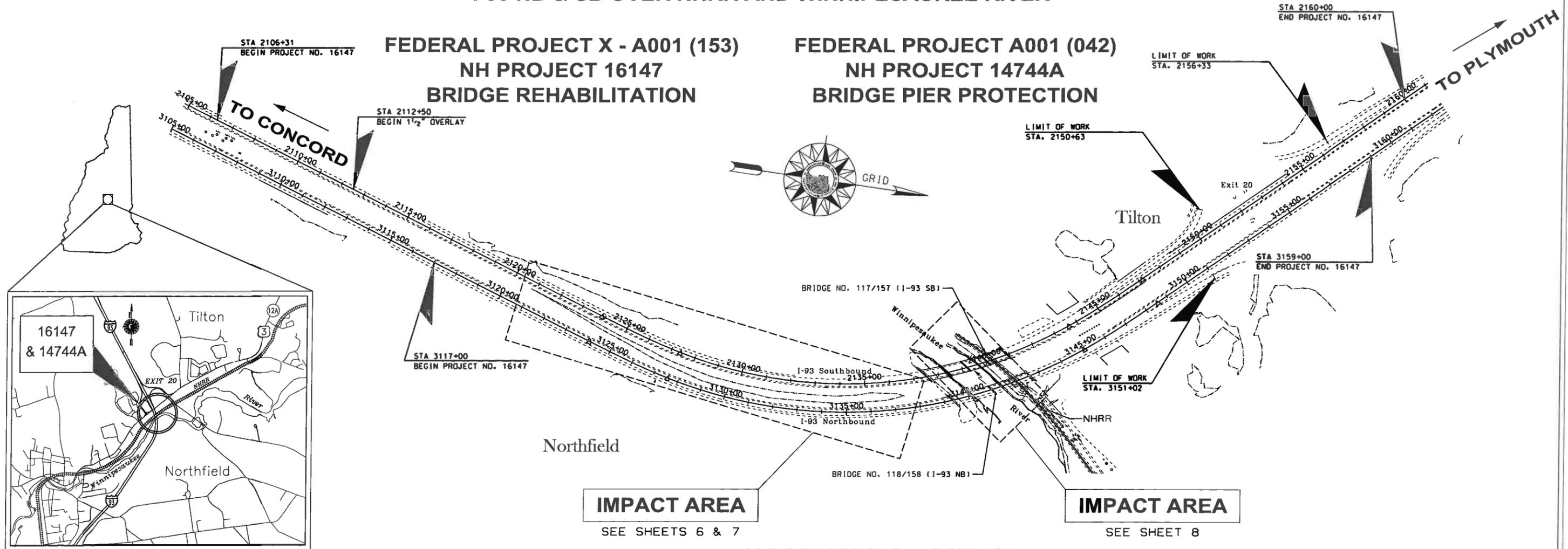
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT Ch-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)



THE STATE OF NEW HAMPSHIRE  
DEPARTMENT OF TRANSPORTATION  
**WETLAND IMPACT PLANS**  
I-93 NB & SB OVER NHRR AND WINNIPESAUKEE RIVER

**FEDERAL PROJECT X - A001 (153)**  
**NH PROJECT 16147**  
**BRIDGE REHABILITATION**

**FEDERAL PROJECT A001 (042)**  
**NH PROJECT 14744A**  
**BRIDGE PIER PROTECTION**



**IMPACT AREA**  
SEE SHEETS 6 & 7

**IMPACT AREA**  
SEE SHEET 8

**NORTHFIELD - TILTON**  
COUNTIES OF MERRIMACK & BELKNAP  
SCALE: 1" = 200'

FOR CONSTRUCTION AND ALIGNMENT  
DETAILS- SEE CONSTRUCTION PLANS

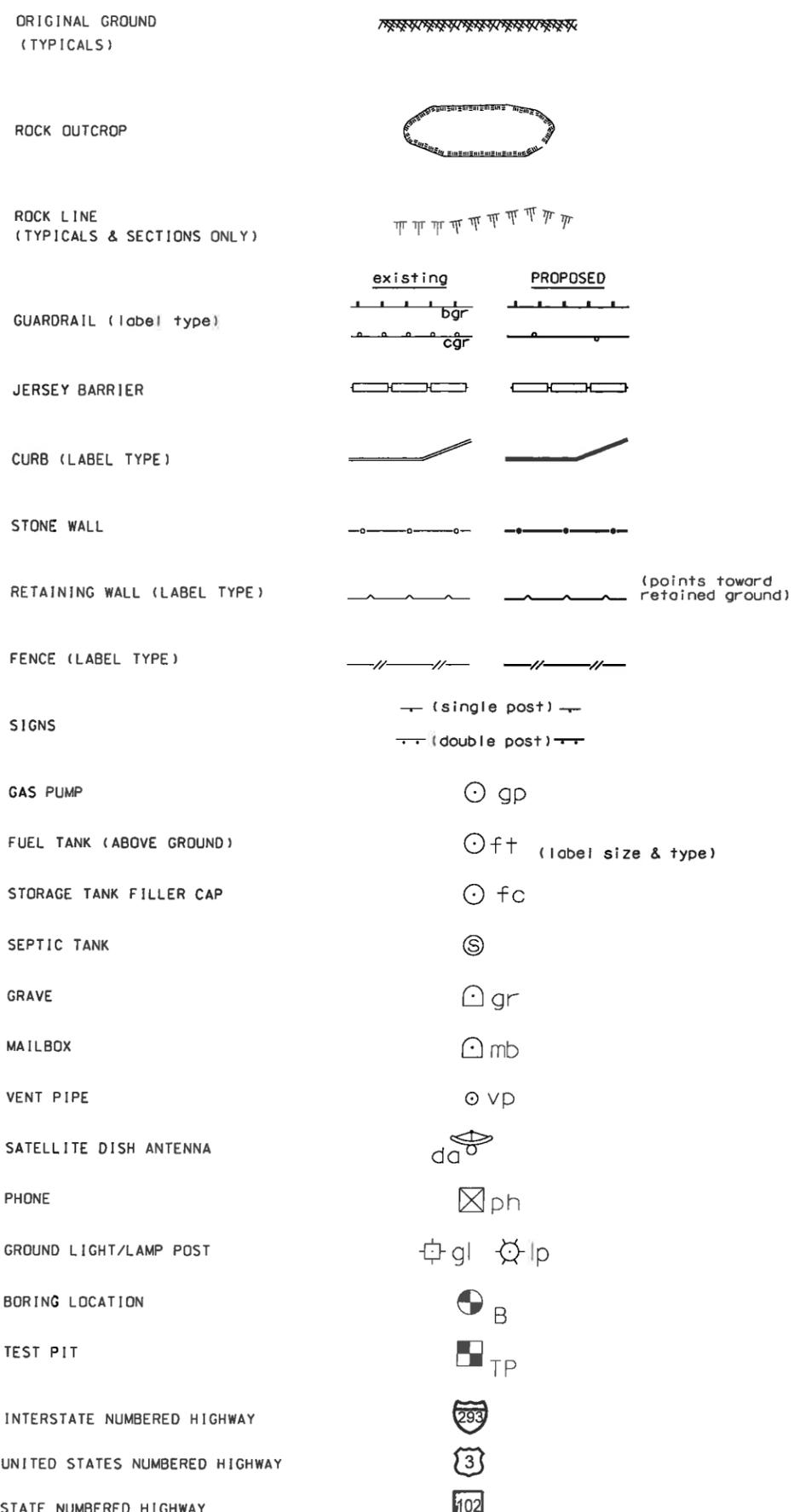
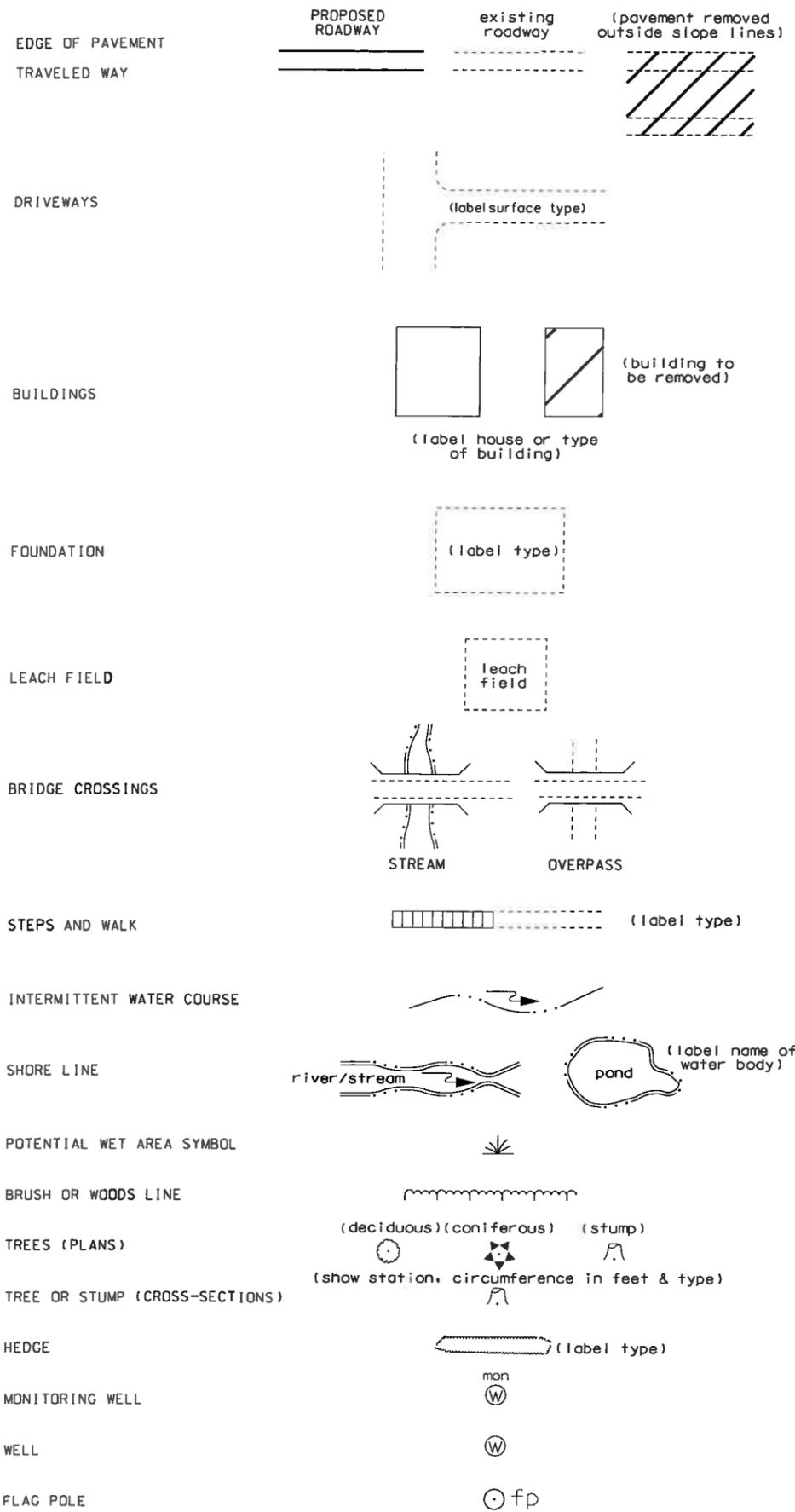
WETLANDS WERE DELINEATED BY NORMANDEAU ASSOCIATES, INC. ON MAY 17, 2012 AND BY NHDOT ON APRIL 20, 2016. THE WETLAND DELINEATIONS WERE COMPLETED IN ACCORDANCE WITH THE CRITERIA DESCRIBED IN THE U.S. ARMY CORPS OF ENGINEERS WETLAND DELINEATION MANUAL TECHNICAL REPORT Y-87-1 (JANUARY, 1987) AND THE REGIONAL SUPPLEMENT FOR THE NORTHCENTRAL AND NORTHEAST REGION (JANUARY, 2012) AND MEET THE CRITERIA FOR WETLAND DELINEATION IN ACCORDANCE WITH THE NH DES ADMINISTRATIVE RULES ENV-WT 301.01.

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	TITLE PAGE
2-3	STANDARD SYMBOLS
4	EROSION CONTROL STRATEGIES
5	CONSTRUCTION SEQUENCE AND EROSION CONTROL DETAILS
6-8	WETLAND IMPACT PLANS
9	WETLAND PLAN PIER 1
10	WETLAND PLAN PIER 2
11-15	EROSION CONTROL PLANS

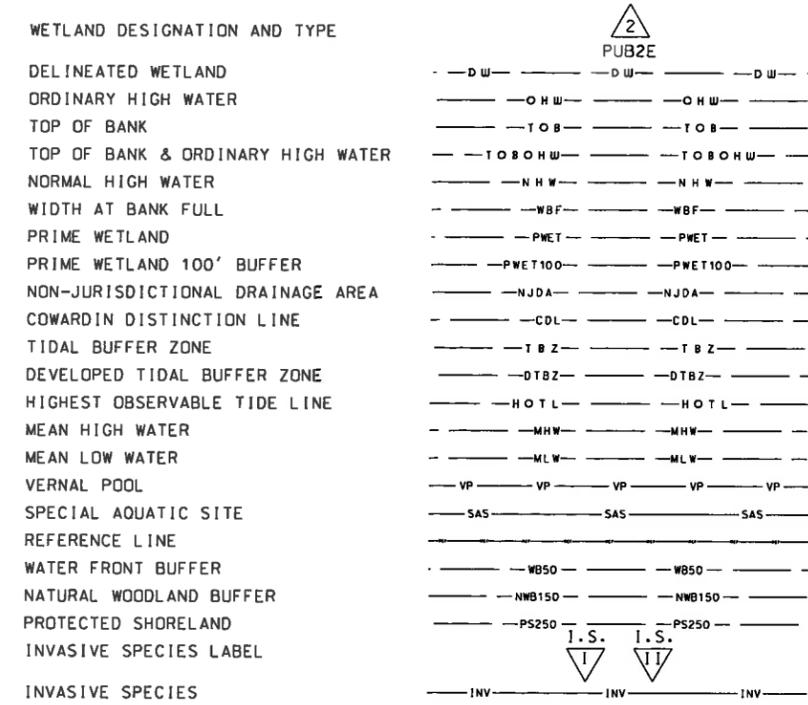
<b>NHDOT</b> THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION			
RECOMMENDED FOR APPROVAL:			
_____ DIRECTOR OF PROJECT DEVELOPMENT		_____ DATE	
APPROVED:			
_____ ASSISTANT COMMISSIONER AND CHIEF ENGINEER		_____ DATE	
U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION			
APPROVED:			
_____ DIVISION ADMINISTRATOR		_____ DATE	
FEDERAL PROJECT NO. X-A001(153)	STATE PROJECT NO. 16147	SHEET NO. 1	TOTAL SHEETS 15

DRAWN BY TPL DATE 04/16  
CHECKED BY DEM DATE 04/16

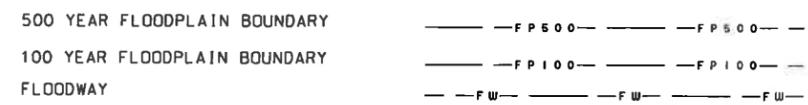
# GENERAL



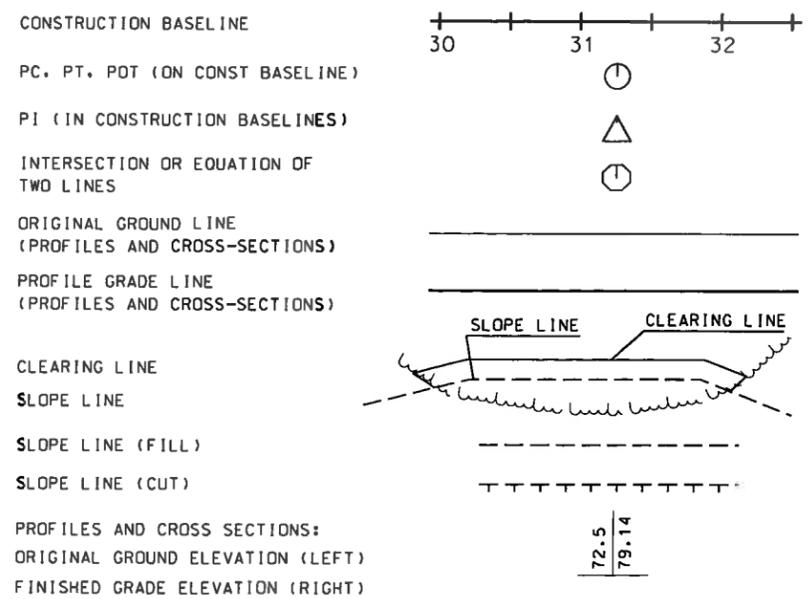
# SHORELAND - WETLAND



# FLOODPLAIN / FLOODWAY

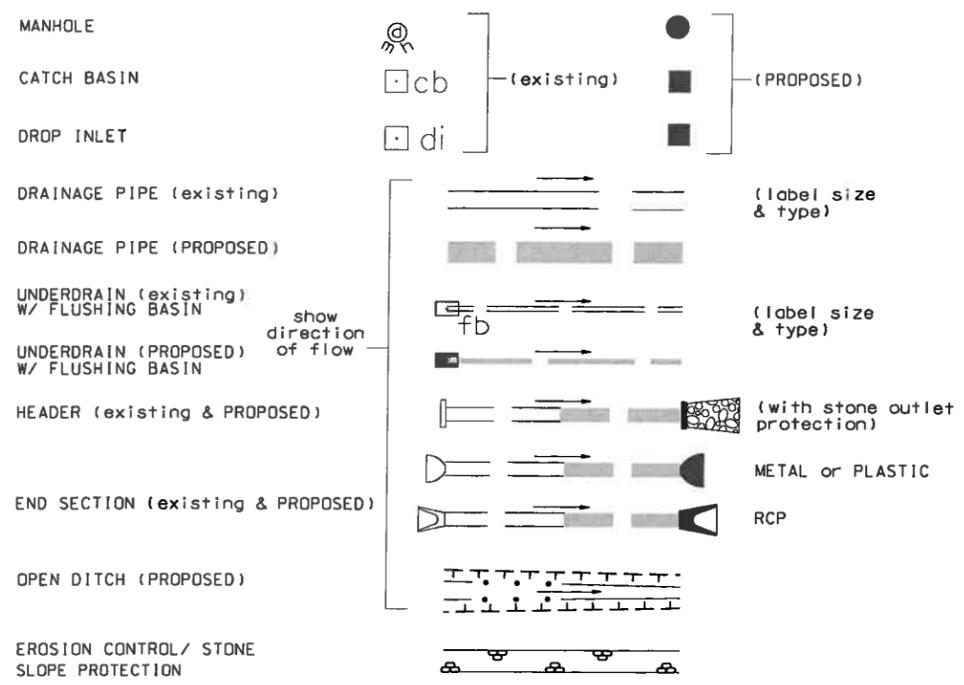


# ENGINEERING

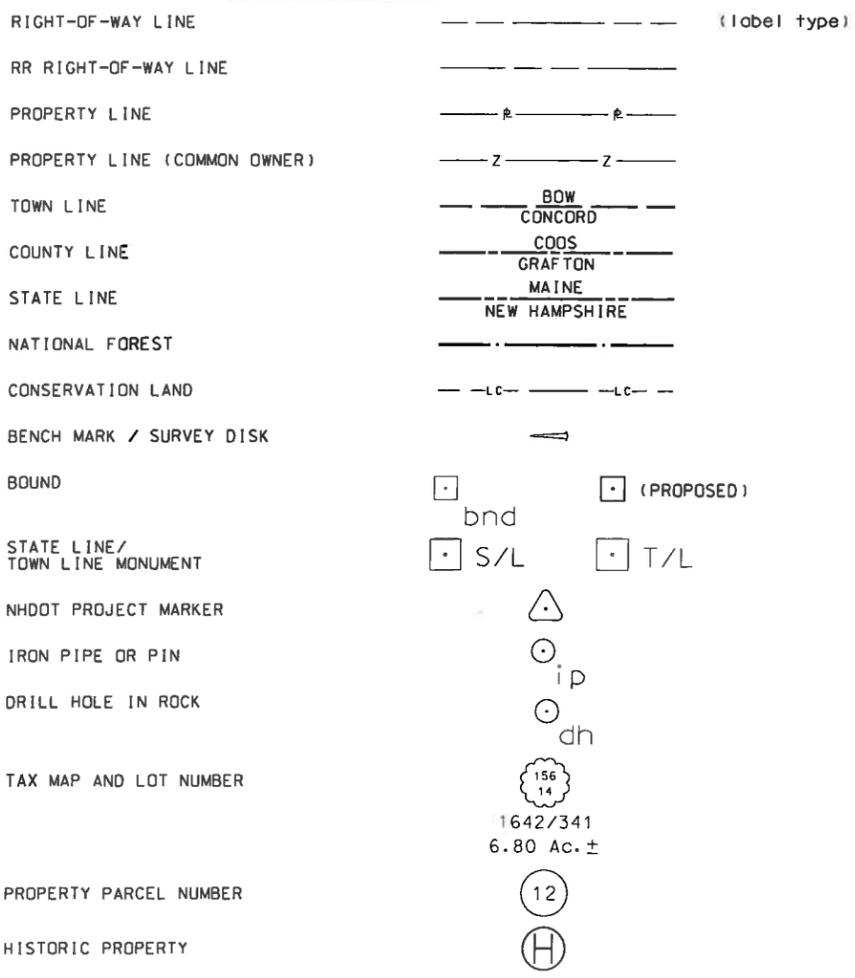


STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
<b>STANDARD SYMBOLS</b>			
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.
11-21-2014	stdsyml	16147	2
TOTAL SHEETS		15	

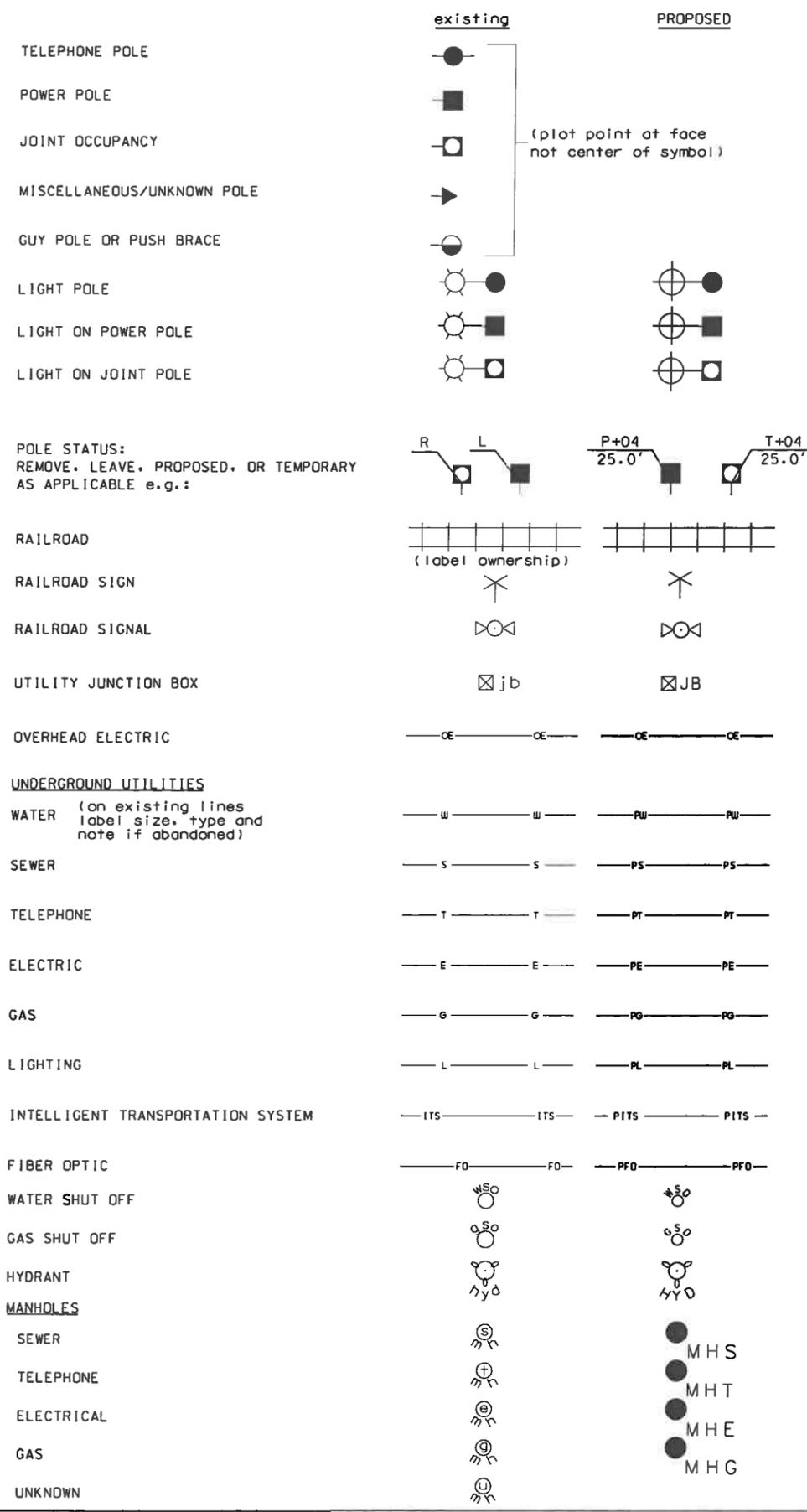
### DRAINAGE



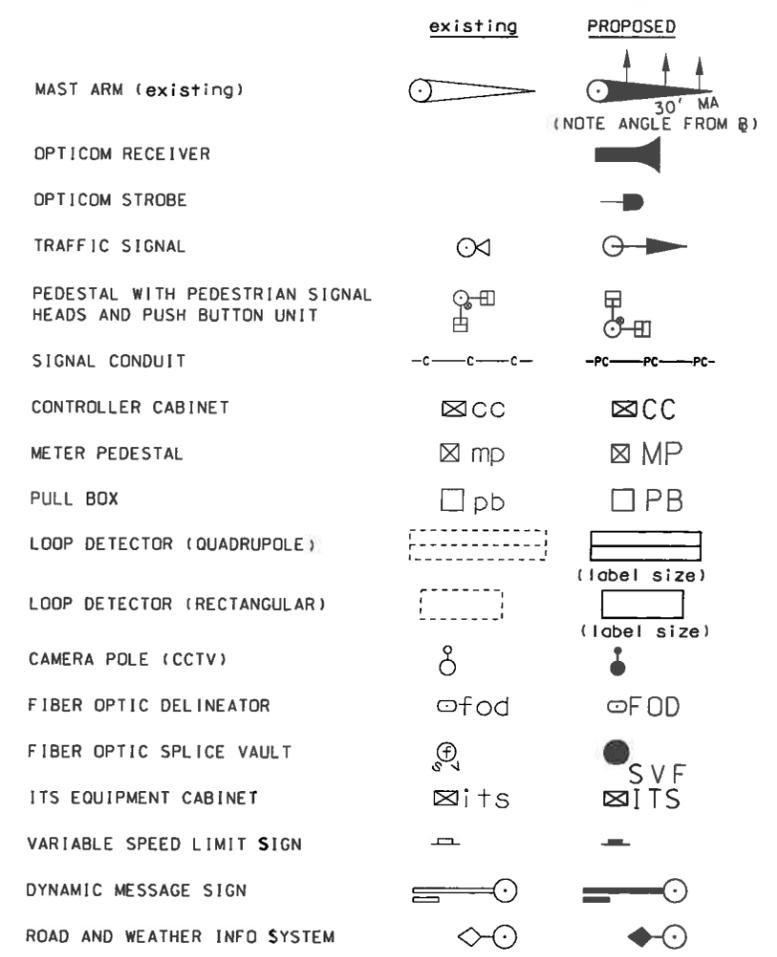
### BOUNDARIES / RIGHT-OF-WAY



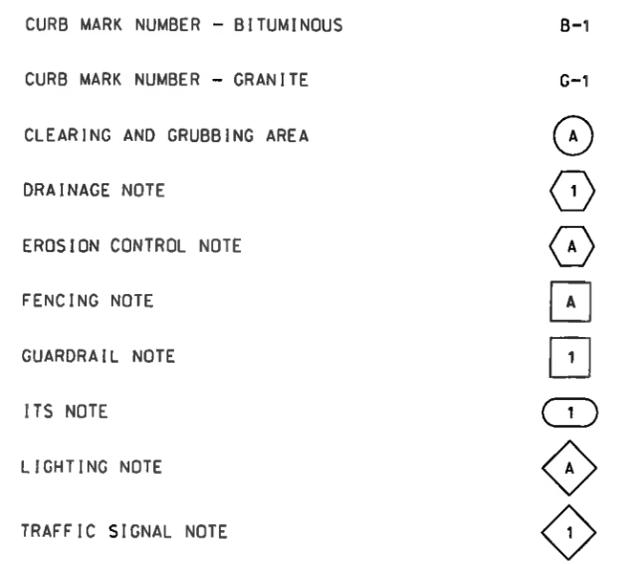
### UTILITIES



### TRAFFIC SIGNALS / ITS



### CONSTRUCTION NOTES



STATE OF NEW HAMPSHIRE				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
<b>STANDARD SYMBOLS</b>				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	stdsymb2	16147	3	15

# 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-WO 1500 REQUIREMENTS ([HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM](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<sup>th</sup> AND MAY 1<sup>st</sup> 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<sup>th</sup>, OR WHICH ARE DISTURBED AFTER OCTOBER 15<sup>th</sup>, 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<sup>th</sup>, OR WHICH ARE DISTURBED AFTER OCTOBER 15<sup>th</sup>, SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.
    - (C) AFTER NOVEMBER 30<sup>th</sup> 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-WO 1505.02 AND ENV-WO 1505.05.
    - (E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WO 1505.05) AND INCLUDING THE REQUIREMENTS OF NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30<sup>th</sup>.

## 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<sup>st</sup> THROUGH NOVEMBER 30<sup>th</sup>, 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-WO 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 485A:17 AND ENV-WO 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 485A:17 AND ENV-WO 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 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 MATRICES (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 485A:17 AND ENV-WO 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-WO 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 <sup>2</sup>				ROLLED EROSION CONTROL BLANKETS <sup>3</sup>			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES <sup>1</sup>												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES <sup>1</sup>	YES <sup>1</sup>	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	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				
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN				
<i>WETLAND IMPACT PLANS</i>				
REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12-21-2015	Erosion Strategies	16147	4	15

GENERAL NOTES

1. SITE PREPARATION TO INCLUDE, BUT NOT LIMITED TO PAVEMENT AND DEBRIS REMOVAL, CLEARING AND GRUBBING, TREE REMOVAL AND STRIPPING AND STOCKPILING TOPSOIL. IN GENERAL, THE CONTRACTOR SHALL LIMIT THE AREA OF DISTURBANCE COMMENSURATE WITH THE CONTRACTOR'S CAPABILITY AND PROGRESS IN KEEPING GRADING, MULCHING, SEEDING AND UTILIZING TEMPORARY AND PERMANENT EROSION CONTROL MEASURES CONCURRENT WITH OPERATIONS. EARTH STOCKPILES ARE TO BE SEEDED AND MULCHED AND HAVE SILT FENCE INSTALLED ON THE DOWNSLOPE SIDE.
2. INSTALL DRAINAGE SYSTEMS, PIPES, CULVERTS, DITCHES AND TEMPORARY EROSION CONTROL PROTECTIONS IN A SEQUENCE FROM OUTLET TO INLET, IN ORDER TO STABILIZE OUTLET AREAS BEFORE RUNOFF IS DIRECTED TO THEM.
3. ROUGH GRADE DIVERSIONS TO APPROXIMATE SUBGRADES ENSURING APPROPRIATE COMPACTION WHERE REQUIRED. REMOVE UNSUITABLE SOILS AS REQUIRED.
4. ALL ROADWAYS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE. THESE AREAS SHALL BE CONSIDERED STABLE WHEN BASE COURSE MATERIALS HAVE BEEN INSTALLED.
5. WINTER NOTES:
  - A. ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS.
  - B. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85 VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.
  - C. AFTER NOVEMBER 15TH, INCOMPLETE ROAD OR PARKING SURFACES WHERE WORK HAS STOPPED FOR THE WINTER SEASON SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3.
  - D. 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 CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.
17. INSTALL FINAL PAVEMENT IN SPRING OF 2019.
18. INSTALL PAVEMENT MARKINGS AND SIGNAGE IN SPRING OF 2019.
19. MAINTAIN AND CLEAN ALL TEMPORARY EROSION CONTROLS AND DRAINAGE FACILITIES UNTIL VEGETATED AREAS HAVE BEEN STABILIZED AND RUNOFF IS DIRECTED TOWARDS THEM.
20. REMOVE ACCUMULATED SEDIMENTS FROM EROSION CONTROL DEVICES AND DISPOSE OF IN A SECURE LOCATION. REMOVE TEMPORARY EROSION CONTROLS. DISTURBED AREAS RESULTING FROM THE REMOVAL OPERATION SHALL BE PERMANENTLY SEEDED.
21. WORK TO BE COMPLETED BY OCT. 31, 2019.

SCOUR COUNTERMEASURES FOR NORTHFIELD-TILTON (#14744A) GENERAL CONSTRUCTION SEQUENCE FOR COUNTERMEASURE INSTALLATIONS

1. INSTALL SEDIMENT CONTROL MEASURES PRIOR TO ANY OPERATION THAT WILL DISTURB THE EXISTING GROUND AND POTENTIALLY GENERATE STORM-WATER RUNOFF.
2. CONSTRUCT TEMPORARY ACCESS ROAD TO CROSS RAILROAD TRACKS AND REACH THE NORTHERN RIVER BANK.
3. AS NECESSARY, REMOVE SECTIONS OF WOODEN RAIL FENCE AND CHAIN LINK FENCE (AS APPROVED BY THE ENGINEER) IN ORDER TO CONSTRUCT TEMPORARY ACCESS ROAD BETWEEN I-93 NB PIER 2 AND THE RAILROAD TRACKS AND GAIN ACCESS TO THE CENTRAL STAGING AREA ALONG THE NORTH BANK BETWEEN BOTH BRIDGES.
4. COMPLETE CLEARING AND GRUBBING OPERATIONS ALONG THE NORTH BANK AS NECESSARY.
5. INSTALL WATER DIVERSION STRUCTURE AND TURBIDITY BARRIERS AROUND BOTH PIER 2'S AS SHOWN ON THE PLANS.
6. CONSTRUCT TEMPORARY ACCESS PLATFORMS (POTENTIALLY STARTING AT THE DOWNSTREAM MOST WORK AREA) AS NECESSARY AROUND PIER 2 OF THE I-93 SB BRIDGE TO ACCOMMODATE ALLOWABLE PICK DISTANCE FOR CRANE.
7. INSTALL TURBIDITY BARRIER AROUND I-93 SB PIER 1.
8. INSTALL RIPRAP ALONG PIER 1 OF THE I-93 SB BRIDGE.
9. EXCAVATE AROUND PIER 2 OF THE I-93 SB BRIDGE AS SHOWN ON THE PLANS AND INSTALL FILTER MATERIAL, BEDDING, AND CONCRETE ARMOR MATRIX COMPONENTS.
10. CONSTRUCT/MODIFY TEMPORARY ACCESS PLATFORMS AS NECESSARY AROUND PIER 2 OF THE I-93 NB BRIDGE TO ACCOMMODATE ALLOWABLE PICK DISTANCE FOR CRANE.
11. INSTALL TURBIDITY BARRIER AROUND I-93 NB PIER 1 AS SHOWN ON THE PLANS.
12. INSTALL RIPRAP ALONG PIER 1 OF THE I-93 NB BRIDGE.
13. EXCAVATE AROUND PIER 2 OF THE I-93 NB BRIDGE AS SHOWN ON THE PLANS AND INSTALL FILTER MATERIAL, BEDDING, AND CONCRETE ARMOR MATRIX COMPONENTS.
14. REMOVE TURBIDITY BARRIERS AROUND BOTH PIER 1'S.
15. REMOVE MATERIAL FROM ALL TEMPORARY ACCESS ROADS AND WORK PLATFORMS BELOW OHW LINE. THE CONTRACTOR MAY NEED TO WORK OUT OF THE RIVER IN STAGES.
16. REMOVE WATER DIVERSION STRUCTURE AND TURBIDITY BARRIER.
17. REMOVE REMAINING TEMPORARY ACCESS ROADWAY.
18. RE-ESTABLISH AND RE-GRADE BANK AREAS TO EXISTING ELEVATIONS AND SLOPE.
19. RE-ESTABLISH PEDESTRIAN WALKWAY, AND RAILROAD CROSSING.
20. RE-INSTALL REMOVED SECTIONS OF ALL FENCING
21. REMOVE EROSION CONTROL MEASURES AND RE-ESTABLISH LANDSCAPING.
22. WORK TO BE COMPLETED BETWEEN AUGUST 1, 2017 AND OCTOBER 31, 2017.

CONSTRUCTION SEQUENCE - 16147 BRIDGE REHABILITATION

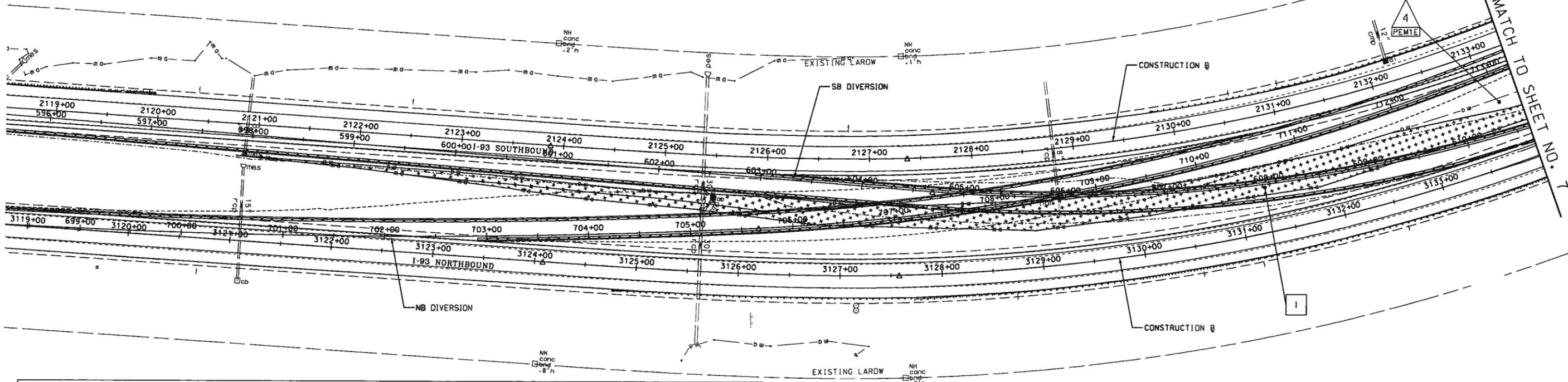
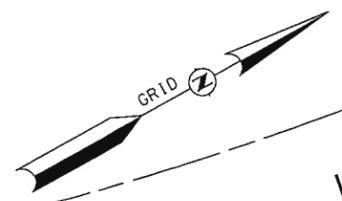
1. COMPLETE INSTALLATION OF STORMWATER CONTROLS BY THE TIME EACH PHASE OF EARTH-DISTURBANCE HAS BEGUN, UNLESS INFEASIBLE. BY THE TIME EARTH-DISTURBANCE ACTIVITIES IN ANY GIVEN PORTION OF THE SITE HAS BEGUN, UNLESS INFEASIBLE, ANY DOWNGRADIENT SEDIMENT CONTROLS SHALL BE INSTALLED AND OPERATIONAL (E.G., BUFFERS OR EQUIVALENT SEDIMENT CONTROLS, PERIMETER CONTROLS, EXIT POINT CONTROLS, STORMDRAIN INLET PROTECTION) THAT CONTROL DISCHARGES FROM THE INITIAL SITE CLEARING, GRADING, EXCAVATING, AND OTHER LAND-DISTURBING ACTIVITIES. (NOTE: WHERE IT IS INFEASIBLE TO INSTALL STORMWATER CONTROLS PRIOR TO THE INITIAL EARTH-DISTURBANCE, IT IS EPA'S EXPECTATION THAT IT WILL BE RARE CIRCUMSTANCE THAT WILL PREVENT THE OPERATOR FROM INSTALLING SUCH CONTROLS IMMEDIATELY FOLLOWING THE INITIAL EARTH-DISTURBANCE.) FOLLOWING THE INSTALLATION OF THESE INITIAL CONTROLS, ALL OTHER STORMWATER CONTROLS PLANNED FOR THIS PORTION OF THE SITE AND DESCRIBED IN THE SWPPP MUST BE INSTALLED AND MADE OPERATIONAL AS SOON AS CONDITIONS ON THE SITE ALLOW.
2. CONSTRUCTION SURVEY AND LAYOUT.
3. CONSTRUCT TEMPORARY STAGING AREAS.
4. INSTALL TEMPORARY DRAINAGE AND CONSTRUCT NORTHBOUND DIVERSION. WORK IS ANTICIPATED TO TAKE PLACE BETWEEN LATE MARCH AND EARLY MAY OF 2017.
  - A. STRIP AND STOCKPILE TOPSOIL FROM DIVERSION FOOTPRINT.
  - B. INSTALL FILL MATERIAL TO CONSTRUCT DIVERSION.
  - C. PLACE DIVERSION ROADWAY GRAVELS.
  - D. STABILIZE TEMPORARY FILL SLOPES AND DISTURBED MEDIAN AREAS.
  - E. PAVE DIVERSION.
5. MOVE TRAFFIC TO NORTHBOUND DIVERSION LAYOUT.
6. RECONSTRUCT NORTHBOUND BRIDGE.
7. RELOCATE TRAFFIC TO NORMAL CONFIGURATION FOR WINTER SEASON.
8. REMOVE NORTHBOUND DIVERSION AS NECESSARY.
9. INSTALL TEMPORARY DRAINAGE AND CONSTRUCT SOUTHBOUND DIVERSION. WORK IS ANTICIPATED TO TAKE PLACE IN SEPTEMBER AND OCTOBER OF 2017.
  - A. STRIP AND STOCKPILE TOPSOIL FROM DIVERSION FOOTPRINT.
  - B. INSTALL FILL MATERIAL TO CONSTRUCT DIVERSION.
  - C. PLACE DIVERSION ROADWAY GRAVELS.
  - D. STABILIZE TEMPORARY FILL SLOPES AND DISTURBED MEDIAN AREAS.
10. WINTER STABILIZATION, SEE NOTE 5 OF THE GENERAL NOTES ABOVE.
11. COMPLETE CONSTRUCTION OF SOUTHBOUND DIVERSION IN APRIL OF 2018.
  - A. PAVE DIVERSION
  - B. PLACE BARRIER
12. MOVE TRAFFIC TO SOUTHBOUND DIVERSION IN SPRING OF 2018.
13. RECONSTRUCT SOUTHBOUND BRIDGE.
14. RETURN TRAFFIC TO NORMAL LAYOUT FOR WINTER SEASON.
15. REMOVE SOUTHBOUND DIVERSION IN FALL OF 2018.
16. COMPLETE MEDIAN RESTORATION IN SPRING 2019.

SDR PROCESSED	DATE	03/16/15	REVISIONS AFTER PROPOSAL	
	NEW DESIGN	TAT	STATION	
	SHEET CHECKED	DEM	STATION	
	AS BUILT DETAILS	DATE	DATE	

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
11-21-2014	Constr_Sequence	16147	5	15

STATE OF NEW HAMPSHIRE  
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN  
**CONSTRUCTION SEQUENCE**

SLOPE LIMIT LEGEND	
---	SB DIVERSION SLOPE LIMIT
---	NB DIVERSION SLOPE LIMIT
---	MAINLINE SLOPE LIMIT



REVISIONS AFTER PROPOSAL	STATION	DESCRIPTION

NUMBER	DATE	DESCRIPTION

DATE	BY	DESCRIPTION
03/16/15		
04/16		
04/16		

**WETLAND IMPACT SUMMARY**

WETLAND NUMBER	WETLAND CLASSIFICATION	LOCATION	AREA					COMMENTS
			PERMANENT IMPACTS				TEMPORARY IMPACTS	
			N.H.W.B. (NON-WETLAND)	N.H.W.B. & A.C.O.E. (WETLAND)	BANK	CHANNEL		
1	R2UBH	A	SF	376	LF	61	SF	SB PIER 1
1	R2UBH	B					454	SB PIER 1
1	R2UBH	C		406		50		NB PIER 1
1	R2UBH	D					551	NB PIER 1
1	R2UBH	E		1,642		62		SB PIER 2
1	R2UBH	F					14,062	
1	R2UBH	G		1,268		52		NB PIER 2
3	BANK	H					1,466	
4	PEM1E	I					26,537	
5	PEM1Ed	J					128	
6	PEM1Ed	K					20	
TOTALS			0	3,692	0	225	43,218	

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

SHADING/HATCHING	WETLAND DESIGNATION NUMBER
	#
	#
	#
	MITIGATION



TOTAL IMPACTS FOR WETLANDS AND SHORELAND PERMITS	
<b>WETLAND IMPACTS</b>	
PERMANENT IMPACTS (WETLAND)	3,692 SF
PERMANENT IMPACTS (NON-WETLAND)	0 SF
TEMPORARY IMPACTS:	43,218 SF
<b>TOTAL IMPACTS:</b>	<b>46,910 SF</b>
<b>STREAM IMPACTS</b>	
PERMANENT IMPACTS TO BANKS	0 LF
PERMANENT IMPACTS TO CHANNEL	225 LF
<b>TOTAL STREAM IMPACTS:</b>	<b>225 LF</b>

WETLAND CLASSIFICATION CODES	
R2UBH	RIVERINE, LOWER PERENNIAL, UNCONSOLIDATED BOTTOM, PERMANENTLY FLOODED
PEM1E	PALUSTRINE, PERSISTENT EMERGENT VEGETATION, SEASONALLY FLOODED / SATURATED
BANK	NH JURISDICTIONAL RIVERBANK
PEM1Ed	PALUSTRINE, PERSISTENT EMERGENT VEGETATION, SEASONALLY FLOODED / SATURATED, DITCHED

STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
WETLAND IMPACT PLANS			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
Impact Plan 1	16147	6	15

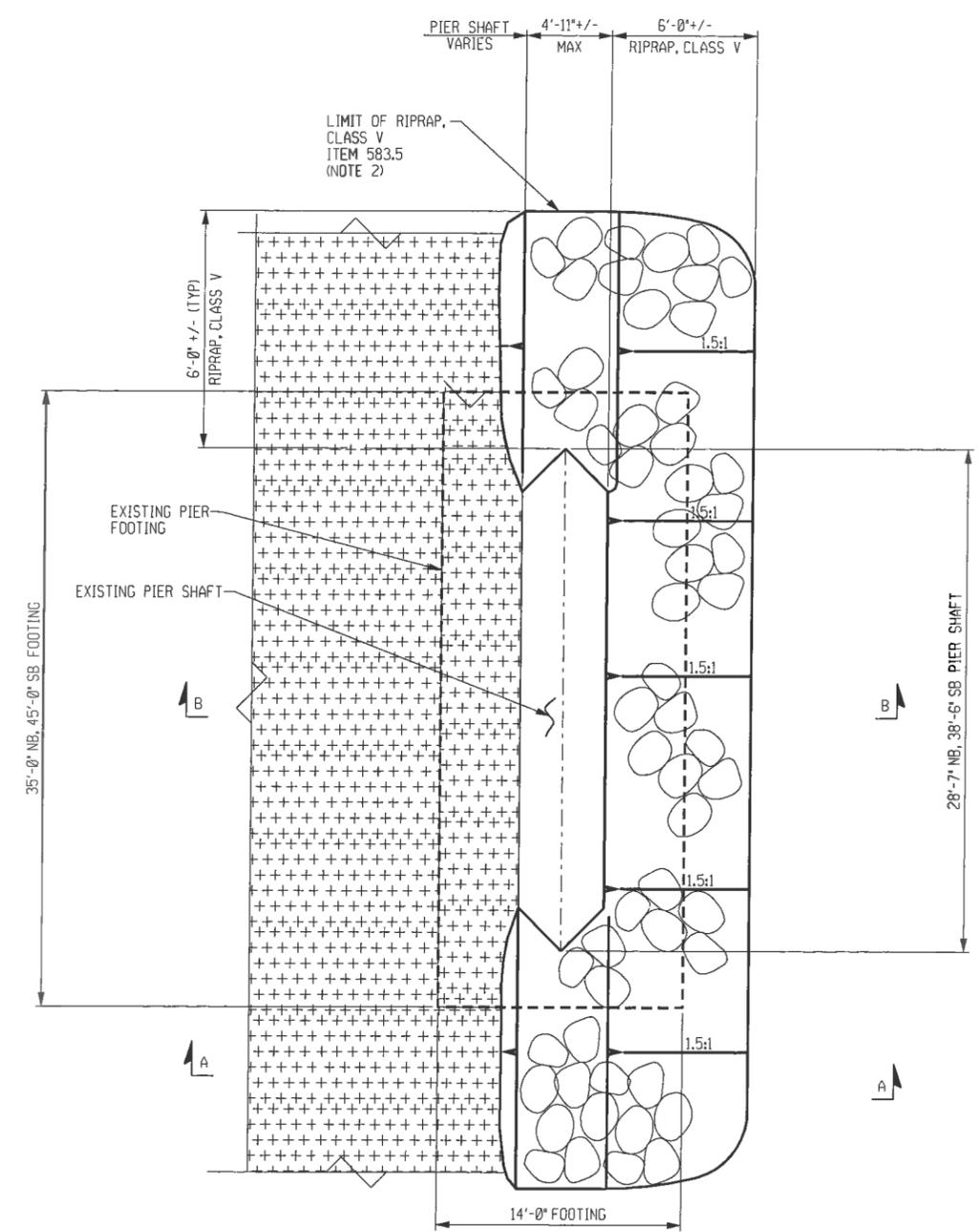






SDR PROCESSED	DATE	4/2012
NEW DESIGN	DATE	2/16/16
SHEET CHECKED	DATE	2/16/16
AS BUILT DETAILS	DATE	

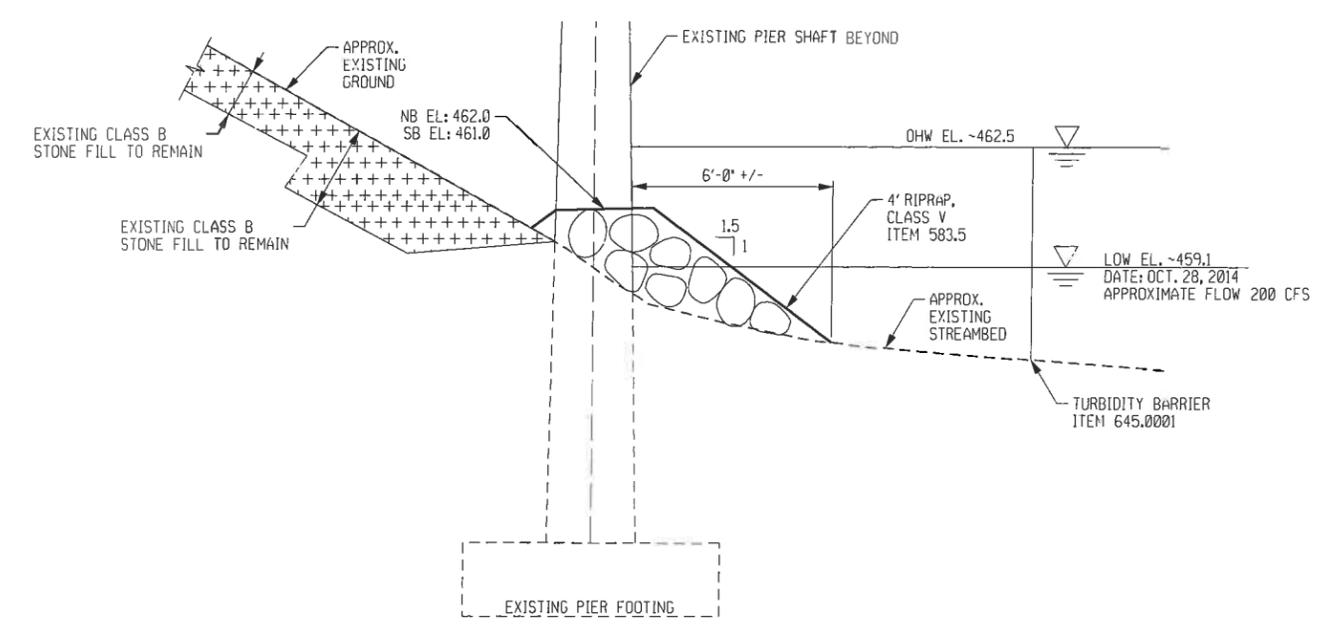
REVISIONS AFTER PROPOSAL	STATION	DESCRIPTION



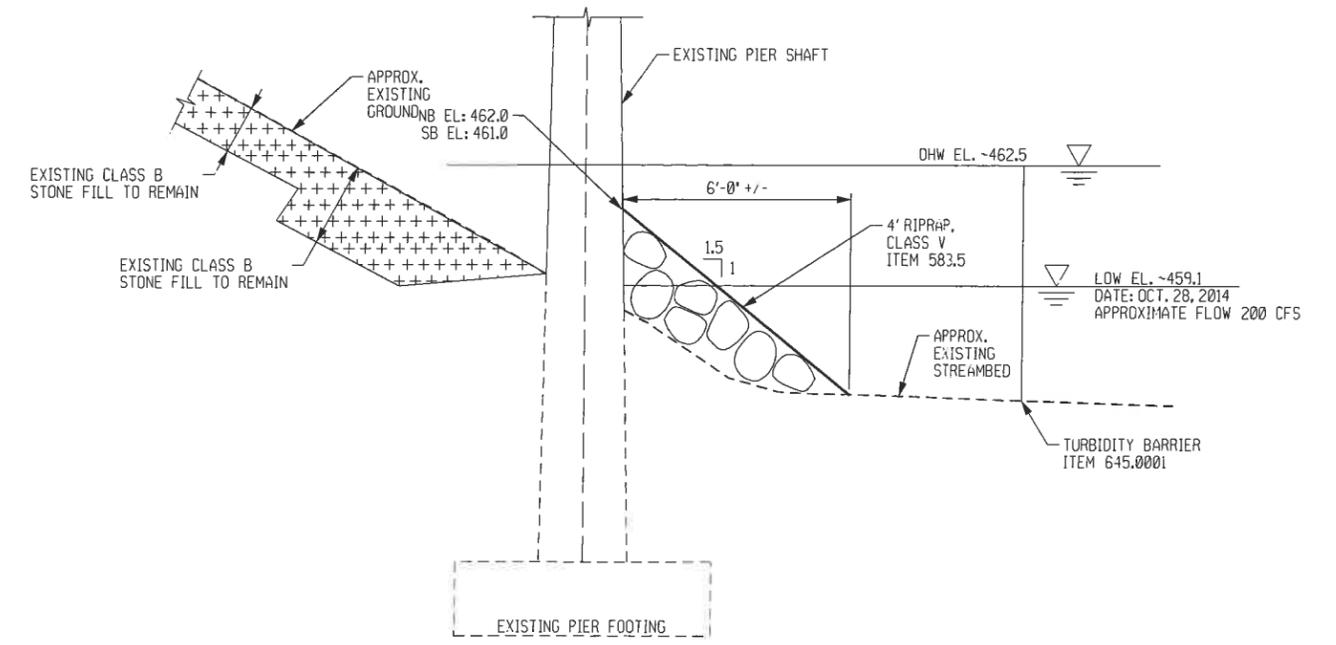
TYPICAL PLAN  
I-93 PIER 1 NORTHBOUND AND SOUTHBOUND  
NOT TO SCALE

- LEGEND:**
- RIPRAP, CLASS V (NEW CLASSIFICATION, SIMILAR TO PREVIOUS RIPRAP, CLASS C GRADATION) - ITEM 583.5
  - EXISTING STONE TO REMAIN

- NOTES:**
- EXISTING STREAMBED AND STONE DEPICTED ARE APPROXIMATE BASED ON CONTOURS FROM 2012 SURVEY, FIELD OBSERVATION, AND 1978 PLANS. CONTRACTOR SHALL VERIFY STREAM BED ELEVATIONS PRIOR TO COMMENCEMENT OF WORK.
  - RIPRAP SHALL BE PLACED ON TOP OF THE EXISTING STREAMBED AND BANK MATERIAL TO THE ELEVATION SHOWN, AS DIRECTED BY THE ENGINEER.



SECTION A-A - TYPICAL PIER 1 NORTHBOUND AND SOUTHBOUND  
NOT TO SCALE



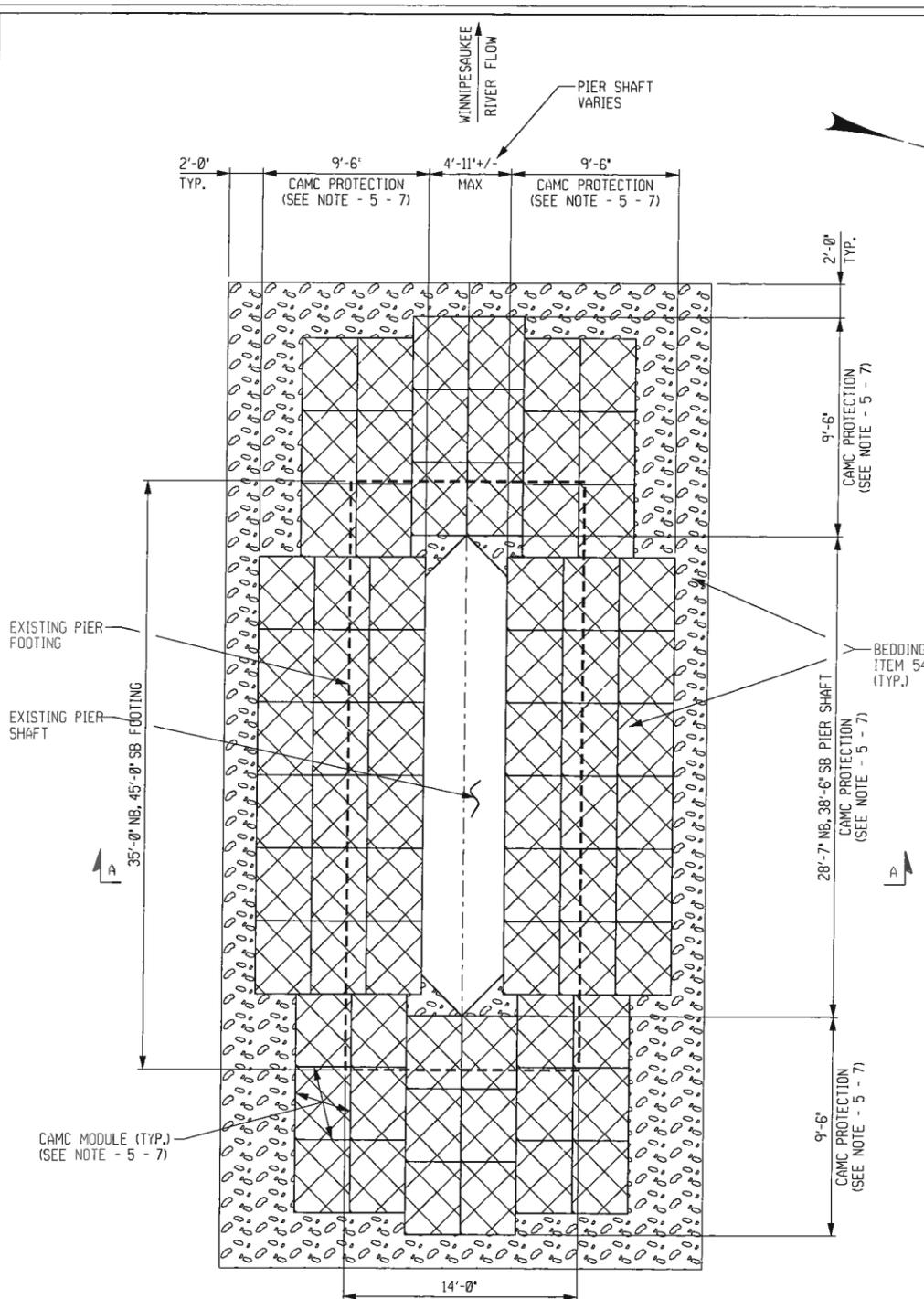
SECTION B-B - TYPICAL PIER 1 NORTHBOUND AND SOUTHBOUND  
NOT TO SCALE

Drawing Copyright © 2016

11 King Court  
Keene, NH 03431-4648  
603.357.2445 • www.chacompanies.com

STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF ENVIRONMENT			
WETLAND IMPACT PLANS PIER 1 I-93 OVER WINNIPESAUKEE RIVER NORTHFIELD & TILTON N.H.			
DGN	FERERAL PROJECT NO.	SHEET NO.	TOTAL SHEETS
30464_GENPLN.dgn	A001(042)	9	15

SDR PROCESSED	INDDT	DATE	4/2012
NEW DESIGN	PRP	DATE	2/16/16
SHEET CHECKED	SC	DATE	2/16/16
AS BUILT DETAILS		DATE	

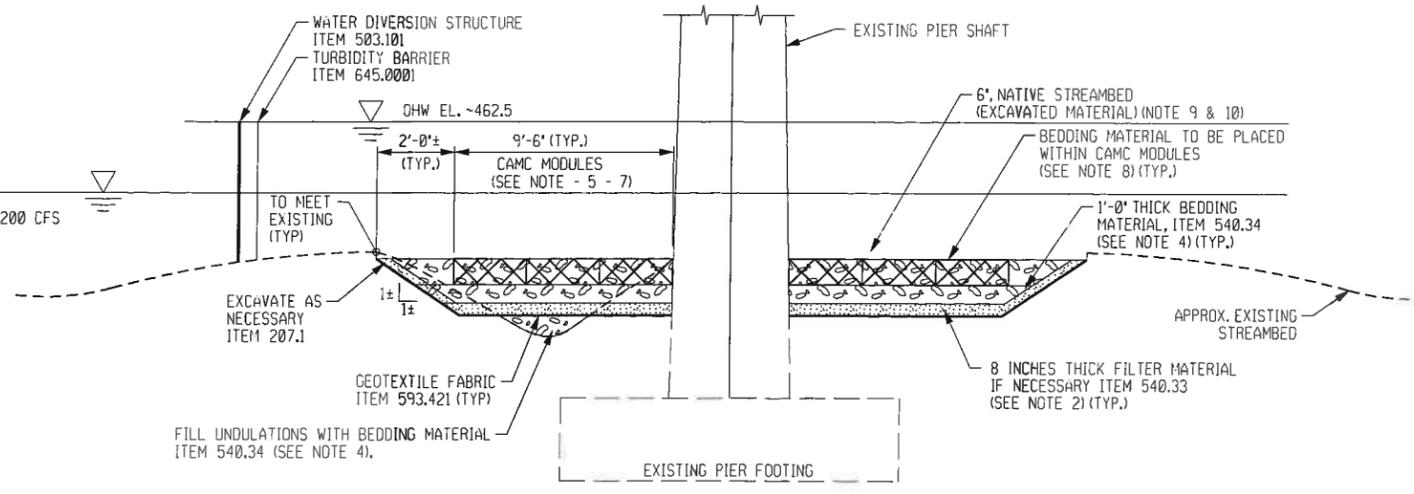


**TYPICAL PLAN**  
**I-93 PIER 2 NORTHBOUND**  
**AND SOUTHBOUND**  
 NOT TO SCALE

**LEGEND:**

	- CONCRETE ARMOR MATRIX COMPONENT (CAMC) - ITEM 540.31
	- BEDDING MATERIAL - ITEM 540.34
	- FILTER MATERIAL - ITEM 540.33

WINNIPESAUKEE RIVER FLOW  
 PIER SHAFT VARIES  
 NORTH  
 LOW EL. ~459.1  
 DATE: OCT. 28, 2014  
 APPROXIMATE FLOW 200 CFS



**SECTION A-A - PIER 2 I-93 NORTHBOUND & SOUTHBOUND**  
 NOT TO SCALE

- NOTES:**
- EXISTING STREAMBED IS APPROXIMATE BASED ON CONTOURS FROM 2012 SURVEY. CONTRACTOR SHALL DETERMINE STREAMBED ELEVATIONS AND PREPARE A CHANNEL BOTTOM CONTOUR MAP PRIOR TO COMMENCEMENT OF WORK.
  - REFER TO SECTION 540 SPECIAL PROVISION FOR ADDITIONAL INFORMATION.
  - FILTER MATERIAL (ITEM 540.33 SCOUR COUNTERMEASURE FILTER MATERIAL) MAY BE REQUIRED IF A GENERALLY UNIFORM LAYER OF SAND EXISTS AT THE BOTTOM OF EXCAVATION - REFER TO SPECIAL PROVISION FOR CLARIFICATION.
  - A 1'-0" LAYER OF BEDDING MATERIAL (ITEM 540.34 SCOUR COUNTERMEASURE BEDDING MATERIAL) SHALL BE PLACED OVER THE ENTIRE FOOTPRINT OF THE COUNTERMEASURE AREA PRIOR TO INSTALLATION OF THE CONCRETE ARMOR MATRIX COMPONENTS. BEDDING MATERIAL MAY BE USED TO SMOOTH THE SURFACE OF THE NATURAL STREAMBED IN THOSE AREAS OF HOLLOW OR UNULATIONS.
  - CONCRETE ARMOR MATRIX COMPONENT (CAMC) MODULES SHALL BE COMPRISED OF 24 INCH LONG A-JACKS COMPONENTS (PAID INDIVIDUALLY UNDER ITEM 540.31) IN A 5X4X5 COMPACT CONFIGURATION, HAVING 12 INCH SPACING BETWEEN ELEMENTS. THE EXACT DIMENSIONS OF MODULES MAY VARY ACCORDING TO THE SUPPLIER AND PLACEMENT OF INDIVIDUAL ELEMENTS WITHIN THE MODULE. THE DIMENSION BETWEEN ADJACENT ELEMENTS OF ADJACENT MODULES SHALL BE MINIMIZED DURING PLACEMENT TO GENERALLY MATCH THE SPACING OF ELEMENTS WITHIN MODULES.
  - THE NUMBER OF MODULES USED AND THEIR CONFIGURATION MAY BE ADJUSTED IN ACCORDANCE WITH THE A-JACK COMPONENT USED, AS APPROVED BY THE ENGINEER. AS SUCH, THE MODULES SHOWN IN THE PLAN VIEW ARE NOT SHOWN TO SCALE FOR DIMENSION OR QUANTITY.
  - PLACE THE CAMC MODULES WITH THE LONG AXIS PARALLEL TO STREAM FLOW AS SHOWN IN THE PLAN VIEW. PLACE A CABLE AROUND THE ENTIRE PERIMETER FOLLOWING PLACEMENT OF ALL MODULES.
  - PLACE BEDDING MATERIAL OVER THE COMPLETED A-JACKS INSTALLATION TO FILL VOIDS AND EMBED THE A-JACKS TO FULL HEIGHT.
  - NATURAL STREAMBED (EXCAVATED MATERIAL) TO BE PLACED ON TOP OF CAMC MODULES ONCE THEY ARE COMPLETELY FILLED WITH BEDDING MATERIAL.
  - FINAL ELEVATION (TOP OF COUNTERMEASURE) SHALL NOT EXCEED EXISTING STREAMBED CONTOURS AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

DETAILS ON THE DRAWINGS LABELED AS "NOT TO SCALE" ARE INTENTIONALLY DRAWN NOT TO SCALE FOR VISUAL CLARITY. ALL OTHER DETAILS, FOR WHICH NO SCALE IS SHOWN, ARE DRAWN PROPORTIONAL AND ARE FULLY DIMENSIONED.

Drawing Copyright © 2016

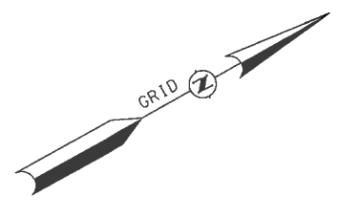
**CHA**

11 King Court  
 Keene, NH 03431-4648  
 603.357.2445 • www.chacompanies.com

STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF ENVIRONMENT			
<b>WETLAND IMPACT PLANS PIER 2</b>			
<b>I-93 OVER WINNIPESAUKEE RIVER</b>			
<b>NORTHFIELD &amp; TILTON N.H.</b>			
DGN	FERERAL PROJECT NO.	SHEET NO.	TOTAL SHEETS
30464_GENPLN.dgn	A001(042)	10	15

SDR PROCESSED	MMOD	DATE	03/16/15
NEW DESIGN	TPL	DATE	04/16
SHEET CHECKED	DEM	DATE	04/16
AS BUILT DETAILS		DATE	

REVISIONS AFTER PROPOSAL	DESCRIPTION
STATION	
STATION	
DATE	
NUMBER	

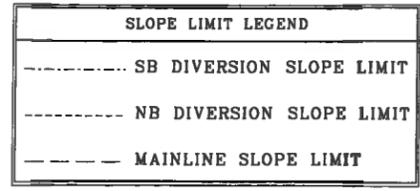
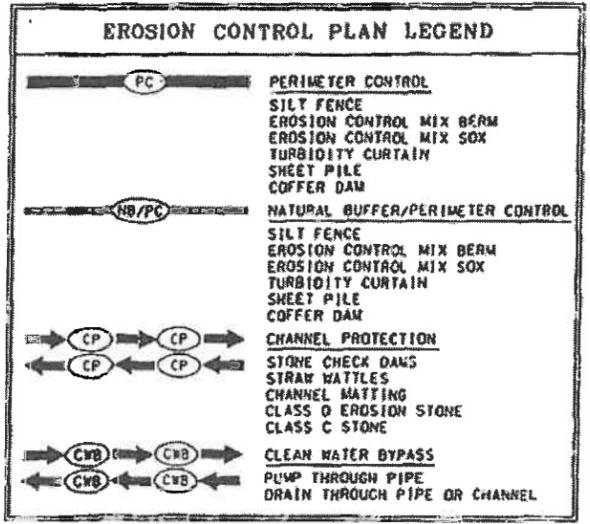
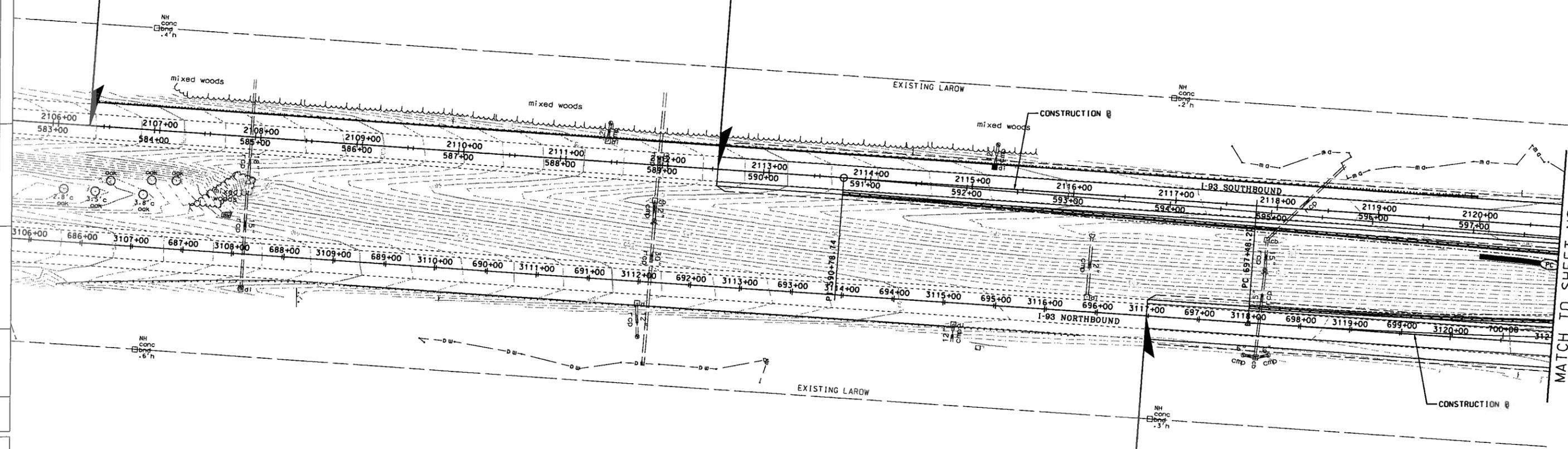


STA. 2106+31.00  
BEGIN PROJECT NO. 16147

STA. 2112+50.00  
BEGIN 1 1/2" OVERLAY

STA. 3117+00.00  
BEGIN PROJECT NO. 16147

MATCH TO SHEET NO. 12



STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
<b>EROSION CONTROL PLANS</b>			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
Erosion Plan 1	16147	11	15







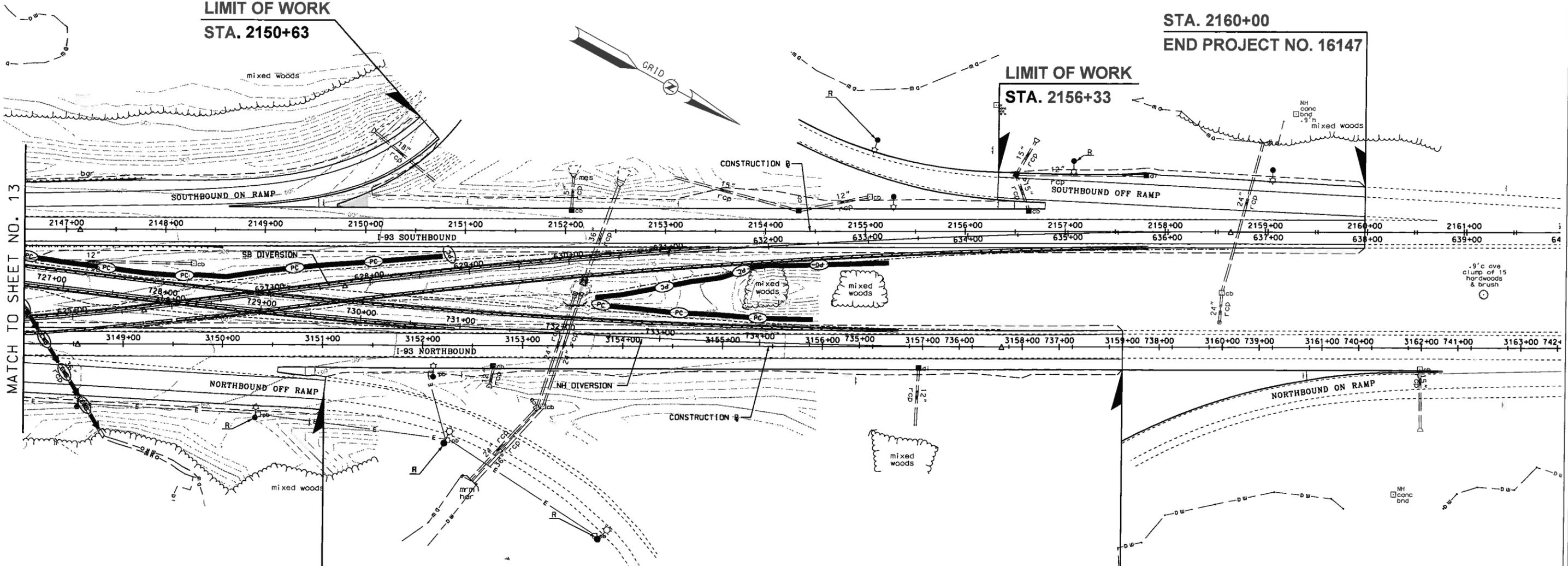
**LIMIT OF WORK  
STA. 2150+63**

**STA. 2160+00  
END PROJECT NO. 16147**

**LIMIT OF WORK  
STA. 2156+33**

**LIMIT OF WORK  
STA. 3151+02**

**STA. 3159+00  
END PROJECT NO. 16147**



SDR PROCESSED	INDDT	DATE	03/16/15
NEW DESIGN	TPL	DATE	04/16
SHEET CHECKED	DEM	DATE	04/16
AS BUILT DETAILS		DATE	

	<b>PERIMETER CONTROL</b> SILT FENCE EROSION CONTROL MIX BERM EROSION CONTROL MIX SOX TURBIDITY CURTAIN SHEET PILE COFFER DAM
	<b>NATURAL BUFFER/PERIMETER CONTROL</b> SILT FENCE EROSION CONTROL MIX BERM EROSION CONTROL MIX SOX TURBIDITY CURTAIN SHEET PILE COFFER DAM
	<b>CHANNEL PROTECTION</b> STONE CHECK DAMS STRAW WATTLES CHANNEL MATTING CLASS O EROSION STONE CLASS C STONE
	<b>CLEAN WATER BYPASS</b> PUMP THROUGH PIPE DRAIN THROUGH PIPE OR CHANNEL

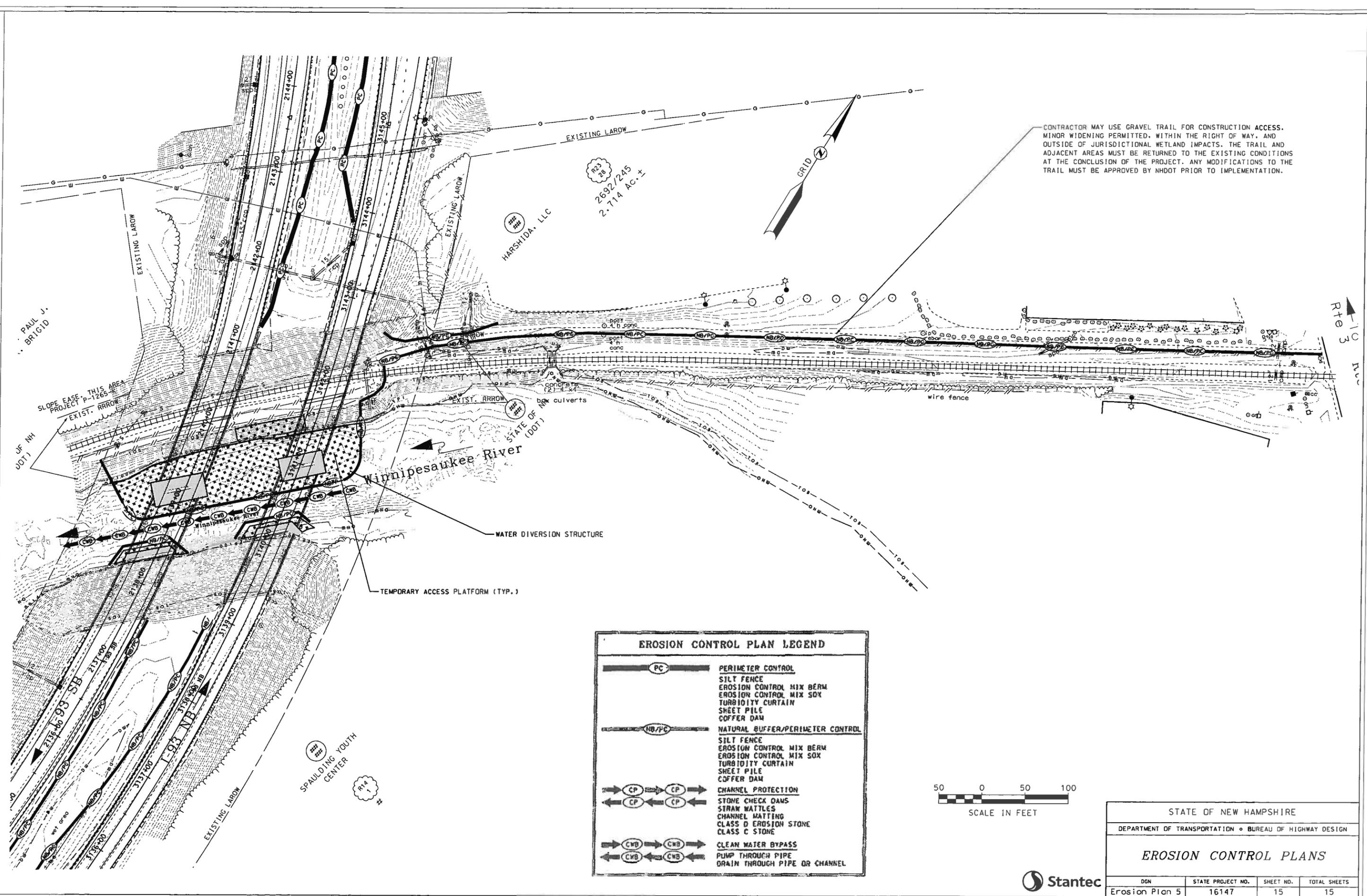
	SB DIVERSION SLOPE LIMIT
	NB DIVERSION SLOPE LIMIT
	MAINLINE SLOPE LIMIT



STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
<b>EROSION CONTROL PLANS</b>			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
Erosion Plan 4	16147	14	15



SDR PROCESSED	NHDDOT	DATE	03/16/15
NEW DESIGN	TPL	DATE	04/16
SHEET CHECKED	DEM	DATE	04/16
AS BUILT DETAILS		DATE	



CONTRACTOR MAY USE GRAVEL TRAIL FOR CONSTRUCTION ACCESS. MINOR WIDENING PERMITTED, WITHIN THE RIGHT OF WAY, AND OUTSIDE OF JURISDICTIONAL WETLAND IMPACTS. THE TRAIL AND ADJACENT AREAS MUST BE RETURNED TO THE EXISTING CONDITIONS AT THE CONCLUSION OF THE PROJECT. ANY MODIFICATIONS TO THE TRAIL MUST BE APPROVED BY NHDDOT PRIOR TO IMPLEMENTATION.

2692/245  
2.714 AC. ±

HARSHIDA, LLC

Winnepesaukee River

WATER DIVERSION STRUCTURE

TEMPORARY ACCESS PLATFORM (TYP.)

SPAULDING YOUTH CENTER

EROSION CONTROL PLAN LEGEND	
	<b>PERIMETER CONTROL</b> SILT FENCE EROSION CONTROL MIX BERM EROSION CONTROL MIX SOX TURBIDITY CURTAIN SHEET PILE COFFER DAM
	<b>NATURAL BUFFER/PERIMETER CONTROL</b> SILT FENCE EROSION CONTROL MIX BERM EROSION CONTROL MIX SOX TURBIDITY CURTAIN SHEET PILE COFFER DAM
	<b>CHANNEL PROTECTION</b> STONE CHECK DAMS STRAW WATTLES CHANNEL MATTING CLASS D EROSION STONE CLASS C STONE
	<b>CLEAN WATER BYPASS</b> PUMP THROUGH PIPE DRAIN THROUGH PIPE OR CHANNEL



STATE OF NEW HAMPSHIRE			
DEPARTMENT OF TRANSPORTATION • BUREAU OF HIGHWAY DESIGN			
<b>EROSION CONTROL PLANS</b>			
DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
Erosion Plan 5	16147	15	15

