NHDES-W-06-012

WETLANDS PERMIT APPLICATION

Water Division/ Wetlands Bureau
Land Resources Management

Check the status of your application: 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. To determine review time, refer to Guidance Document A for instructions.

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

2. MITIGATION REQUIREMENT:

If mitigation is required a Mitigation-Pre Application meeting must occur prior to submitting this Wetlands Permit Application. To determine if Mitigation is Required, please refer to the Determine if Mitigation is Required Frequently Asked Question.

Mitigation Pre-Application Meeting Date: Month: __ Day: __ Year: ____

☒ N/A - Mitigation is not required

3. PROJECT LOCATION:

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

ADDRESS: **NH 116 over Clark Brook (secondary channel)**			TOWN/CITY: **Haverhill**
TAX MAP: **NA**	BLOCK: **NA**	LOT: **NA**	UNIT: **NA**
USGS TOPO MAP WATERBODY NAME: **Clark Brook** ☐ NA		STREAM WATERSHED SIZE: **2.23 sq. mi.** ☐ NA	
LOCATION COORDINATES (If known): **044`05'12.31", 071`57'34.72"** ☐ UTM ☐ State Plane			☒ Latitude/Longitude

4. 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.

Repair base of bridge that carries NH 116 over Clark Brook (158/068). Existing structure is a corrugated pipe arch. Proposed work consists of the following: place sandbag cofferdams, adding stub walls at the base of the arch and removal of minor amount of deposition material within the culvert leaving a natural bottom.

5. SHORELINE FRONTAGE:

☒ NA This does not have 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.

6. RELATED NHDES LAND RESOURCES MANAGEMENT PERMIT APPLICATIONS ASSOCIATED WITH THIS PROJECT:

Please indicate if any of the following permit applications are required and, if required, the status of the application.

To determine if other Land Resources Management Permits are required, refer to the Land Resources Management Web Page.

Permit Type	Permit Required	File Number	Permit Application Status
Alteration of Terrain Permit Per RSA 485-A:17	☐ YES ☒ NO	____	☐ APPROVED ☐ PENDING ☐ DENIED
Individual Sewerage Disposal per RSA 485-A:2	☐ YES ☒ NO	____	☐ APPROVED ☐ PENDING ☐ DENIED
Subdivision Approval Per RSA 485-A	☐ YES ☒ NO	____	☐ APPROVED ☐ PENDING ☐ DENIED
Shoreland Permit Per RSA 483-B	☐ YES ☒ NO	____	☐ APPROVED ☐ PENDING ☐ DENIED

7. 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 **18** - **1554** .

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: ____

☒ N/A

8. APPLICANT INFORMATION (Desired permit holder)

LAST NAME, FIRST NAME, M.I.: **Johnson , Steve W**			
TRUST / COMPANY NAME: **NH Department of Transportation**	MAILING ADDRESS: **7 Hazen Drive**		
TOWN/CITY: **Concord**		STATE: **NH**	ZIP CODE: **03302**
EMAIL or FAX: **Steve.Johnson@dot.nh.gov**	PHONE: **603-271-3667**		
ELECTRONIC COMMUNICATION: By initialing here: SWJ, I hereby authorize NHDES to communicate all matters relative to this application electronically			

9. PROPERTY OWNER INFORMATION (If different than applicant)

LAST NAME, FIRST NAME, M.I.: **N/A**			
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			

10. AUTHORIZED AGENT INFORMATION

LAST NAME, FIRST NAME, M.I.: **Locker, Douglas B**	COMPANY NAME: **NH Department of Transportation**		
MAILING ADDRESS: **7 Hazen Drive**			
TOWN/CITY: **Concord**		STATE: **NH**	ZIP CODE: **03302**
EMAIL or FAX: **Douglas.Locker@dot.nh.gov**	PHONE: **603-271-3667**		
ELECTRONIC COMMUNICATION: By initialing here DL, I hereby authorize NHDES to communicate all matters relative to this application electronically			

11. PROPERTY OWNER SIGNATURE:

See the Instructions & Required Attachments document for clarification of the below statements

By signing the application, I am certifying that:

1. 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.
2. I have reviewed and submitted information & attachments outlined in the Instructions and Required Attachment document.
3. All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900.
4. I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type.
5. I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative.
6. 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.
7. I have submitted a Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) 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.
8. I authorize NHDES and the municipal conservation commission to inspect the site of the proposed project.
9. I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate.
10. 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.
11. I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining.
12. The mailing addresses I have provided are up to date and appropriate for receipt of NHDES correspondence. NHDES will not

Steve W Johnson Property Owner Signature	**Steve W Johnson** Print name legibly	5/19/2018 Date

MUNICIPAL SIGNATURES

12. 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.

13. 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.

14. 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	50	☐ ATF	58	☐ ATF
Scrub-shrub wetland		☐ ATF		☐ ATF
Emergent wetland		☐ ATF		☐ ATF
Wet meadow		☐ ATF		☐ ATF
Intermittent stream		☐ ATF		☐ ATF
Perennial Stream / River	70 / 35	☐ ATF	648 / 85	☐ ATF
Lake / Pond	/	☐ ATF	/	☐ ATF
Bank - Intermittent stream	/	☐ ATF	/	☐ ATF
Bank - Perennial stream / River	53 / 19	☐ ATF	564 / 62	☐ ATF
Bank - Lake / Pond	/	☐ ATF	/	☐ ATF
Tidal water	/	☐ ATF	/	☐ ATF
Salt marsh		☐ ATF		☐ ATF
Sand dune		☐ ATF		☐ ATF
Prime wetland		☐ ATF		☐ ATF
Prime wetland buffer		☐ ATF		☐ ATF
Undeveloped Tidal Buffer Zone (TBZ)		☐ ATF		☐ ATF
Previously-developed upland in TBZ		☐ ATF		☐ ATF
Docking - Lake / Pond		☐ ATF		☐ ATF
Docking - River		☐ ATF		☐ ATF
Docking - Tidal Water		☐ ATF		☐ ATF
TOTAL	173 / 54		1270 / 147	

15. 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) **1443** sq. ft. X $0.20 = **$ 288.60**

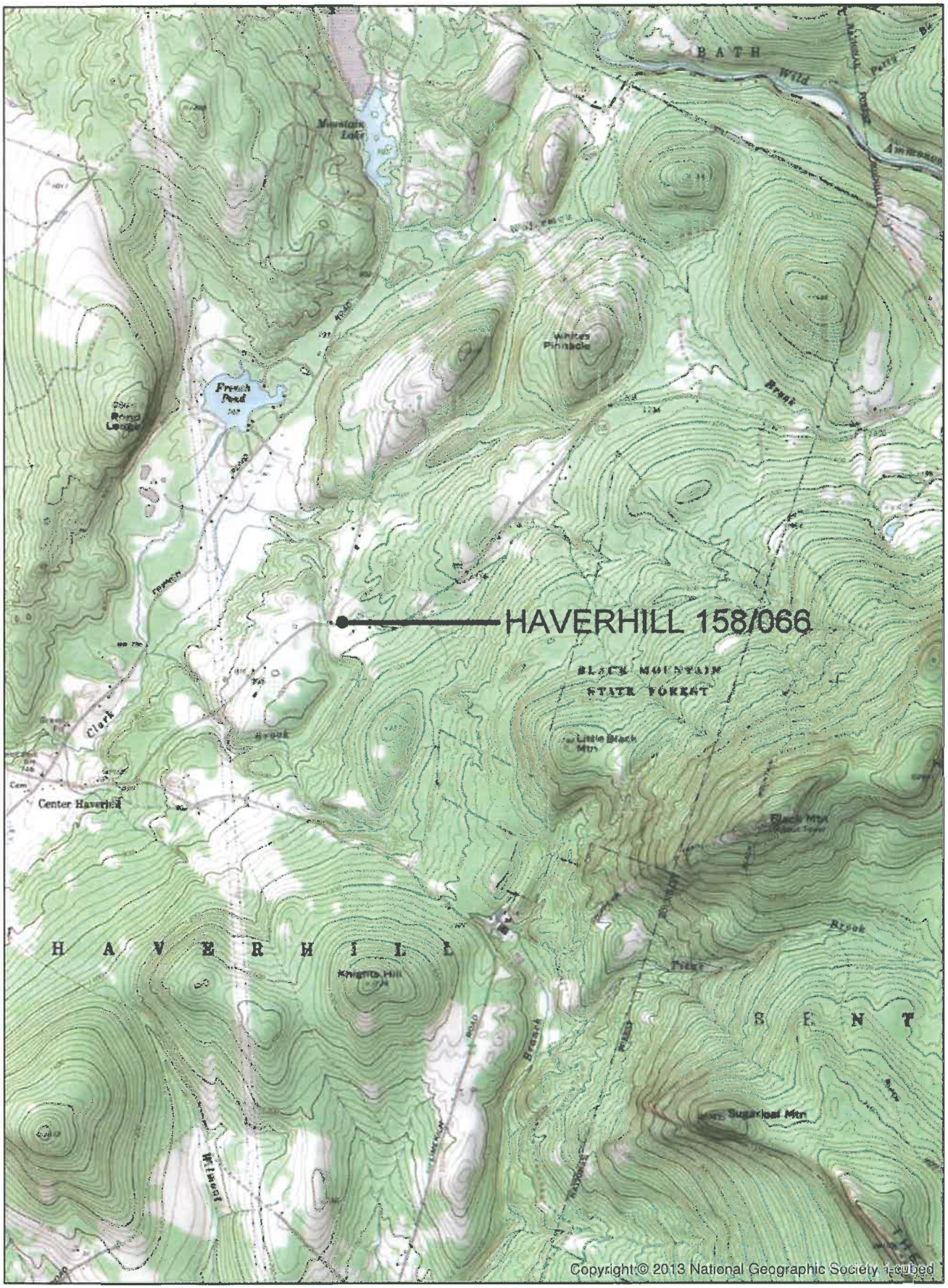
Temporary (seasonal) docking structure: _____ sq. ft. X $1.00 = $ _____

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 $200, whichever is greater = **$ 288.60**


N
HAVERHILL 158/066
BATH
Wild
Mountain Lake
White Pinnacle
French Pond
Brook
Clark
Brook
Center Haverhill
BLACK MOUNTAIN
STATE FOREST
Little Black Mtn
Black Mtn
Brook
H A V E R H I L L
Kingsbury Hill
Brook
S E N T
Sugarloaf Mtn
Wilmot
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Miles

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

WETLANDS PERMIT APPLICATION – ATTACHMENT A
MINOR AND MAJOR - 20 QUESTIONS

Land Resources Management
Wetlands Bureau

Check the Status of your application: www.des.nh.gov/onestop

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

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.

The base of the existing corrugated metal pipe arch that carries NH 116 over Clark Brook (secondary channel) is in poor condition and is need of repair. It is necessary to impact jurisdictional areas to repair the structure. If the structure is not repaired, it will eventually be load posted or closed to traffic.

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

1. Replace the structure with a new structure in compliance with NH Stream Crossing Guidelines:

A structure designed to meet the Stream Crossing rules would require a span of 18' to 24' depending upon the estimation of how much of the drainage area contributes to this secondary channel. An 18' span replacement structure would cost approximately $500,000. Any additional bank area gained under the roadway will have riprap installed to protect the new structure.

2. Repair the existing structure by extending concrete above the area of deterioration and place minimal riprap to protect the upstream wingwalls.

The work would require temporary dewatering of the existing structure, placing concrete on top of the existing footing above the area of deterioration, and placement of riprap to protect the upstream wingwalls. The estimated cost of this work is $50,000.

Spending an additional $450,000 to replace a structure which can be easily repaired with minimal permanent impacts is not praticable; therefore, repair of the existing structure is proposed.

3. The type and classification of the wetlands involved.

R2UB12- Riverine, lower perennial, unconsolidated bottom, cobble gravel and sand

PFO -Palustrine forested, broad-leaved deciduous, seasonally flooded/saturated

Bank

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

Clark brook eventually flows into the Connecticut River.

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

Clark Brook has not been identified as a rare surface water of the state.

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

718 sq. ft. Riverine (648 sq. ft. temporary, 70 sq. ft. permanent)

108 sq. ft. Palustrine (58 sq. ft. temporary, 50 sq. ft. permanent)

617 sq. ft. Bank (564 sq. ft. temporary, 53 sq. ft. permanent)

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) There have been no rare, special concern species outside of what is listed below present in the project area.

b) Through the U.S. Fish and Wildlife Service IPaC (05E1 NE00-2017-SLI-05917) the threatened Northern Long-eared Bat was listed as a "Threatened" species. The proposed work will not remove any trees greater than 3" in diameter at breast height. The Department has coordinated with DRED and the results of the NHB review revealed no records for state or federally listed threatened or endangered species in this area.

c) There are no species known to be at the extremities of their ranges located in the project area.

d) It was determined that work would occur during a non-migratory season and the migratory fish and wildlife will be unaffected.

e)The Department has coordinated with DRED and results of the NHB review revealed no records for state or federally listed threatened or endangered species in this area.

f) There were no vernal pools identified within the project limits.

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

During construction, access to nearby residents and/or commercial businesses will be maintained at all times. Clark brook is non-navigable water which makes it non-conducive to boaters. There are no recreational areas that have been identified in this area except for the possibility for fishing. During construction fishing activities from the banks fo the brook will need to occur outside of the construction work zone. When construction is completed, the project as proposed will be a benefit to the public commerce, the project as proposed will be a benefit to the public commerce.

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 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.

The project will not significantly interfere with the aesthetic interests of the general public. The proposed improvements will be more pleasing to the eye than the structure in poor condition.

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.

The project will not interfere with or obstruct the public rights of passage or access. During construction at least one lane of alternating traffic will be maintained at all times. This will ensure access to all nearby businesses and residnetial homes in this area.

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.

The project is expected to have a positive impact on abutting properties. The rehabilitated structure will better serve the abutting properties if they need to travel on the road. The riprap that is being installed will prevent a washout of the structure which will better protect the abutting properties.

The project as proposed will not alter the chance of flooding on abutting properties.

12. The benefit of a project to the health, safety, and well being of the general public.

The project will provide a safer, longer lasting structure and roadway. If the structure is not rehabilitated the bridge will eventually be load posted or closed. Keeping the roadway open benefits commerce, trade, emergency access, etc, for the general public.

13. The impact of a proposed project on quantity or quality of surface and groundwater. 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.

The proposed project will not significantly alter the existing surface water runoff or storm water discharge locations. The addition of riprap at the wingwalls will reduce erosion that is currently occuring. Best Management Practices will be used to prevent any adverse effect to water quality during construction.

14. The potential of a proposed project to cause or increase flooding, erosion, or sedimentation.

Flooding: The toewall repairs and the riprap will not increase the potential of flooding. The structure can pass the 100 year storm event and this project will not significantly change the capacity. The existing crossing has no history of flooding or overtopping of the banks of the stream.

Erosion: The riprap placed around the structure will prevent erosion and preserve the natural alignment and gradient of the stream channel.

Sedimentation: Nothing that will be a barrier to sediment transport will be installed in this project. Sedimentation in the open channel will not be caused as a resutl of this project.

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.

Surface waters will not be reflected or redirected as a result of this project. Clark Brook does not have enough surface water for wave energy to be an issue.

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.

The work consists of the repair of an existing bridge structure. There are no similar structures in the vicinity owned by other parties that would require repair.

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

It was determined that the construction for this project would occur outside of the migratory seasons, the work will occur not occur during the October or November spawing season. The work will occur in winter of early summer. The value of the wetland as a habitat for living organisms will be unchanged. The function of Clark Brook is to carry water from a higher elevation to a lower elevation. This project will not interfere with that function.

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.

This project is not located in or near any Natural Landmarks listed on the National Register.

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 areas as may be established under federal, state, or municipal laws for similar and related purposes such as estuarine and marine sanctuaries.

There are no areas named in acts of congress or presidential proclamations as national rivers, national wilderness areas, or national lakeshores that will be impacted as a result of this project.

20. The degree to which a project redirects water from one watershed to another.

The project as proposed will not redirect water from one watershed to another.

Additional comments

NOTES ON CONFERENCE:

Finalization March 15th, 2017 Meeting Minutes
Matt Urban asked the group if they had any additional comments for the March 15th 2017 meeting. BOE had received comments already from Gino and from a few other projects. The group did not have any further revisions. The minutes were finalized and posted in a subsequent day.

Haverhill, #40557 (Non-federal)
The purpose of the project is to repair the corrugated metal pipe arch that carries NH 116 over Clark Brook, and place riprap at the wingwalls and remove some deposited material within the culvert (Haverhill Bridge #158/066).

Steve Johnson presented an overview indicating that there are two bridges on NH 116 listed on the NHDOT inventory as crossing Clark brook. We are only addressing the western location. Clark Brook is unusual in that it splits just upstream from the bridge. StreamStats does not even show a stream at the location of this bridge and it shows only the main branch of Clark Brook continuing west crossing under Pinnacle Hill road, not crossing NH 116 at the subject bridge location.

Steve Johnson showed photos of Clark Brook at the Stream Split location, the pipe arch bridge that we propose to repair, and the upstream and downstream bridges on the main channel of Clark Brook. The pictures show that the bridges on the main channel upstream and downstream are significantly larger than the side channel where our project is located.

Steve Johnson indicated that the repair of the pipe arch would entail extending the concrete footing concrete up 8" to 1' above the deteriorated base of the pipe arch. Some riprap would also need to be placed at the wingwalls.

Lori Sommer asked the approximate size of the culvert. Steve Johnson indicated that he thought it was approximately 7' x 3' and he would clarify. **Subsequent to the meeting Steve Johnson clarified the bridge dimensions; the bridge is 7.6' x 4'.* A question was raised regarding the stream tier size. Steve Johnson indicated that it was difficult to determine the tier size since StreamStats does not even show a stream; however, Clark Brook is a Tier 3 Stream just upstream from the split.

Steve Johnson indicated that the preferred option for repair due to the restricted space would be to place a sandbag cofferdam at the stream split and divert all the water to the main branch of Clark Brook. The work would take approximately 3 weeks to complete. The other option would require placement of sandbags upstream and downstream of the culvert and putting a 12" pipe to carry the water through the structure. This option would take longer than twice the diversion option since we would need to rebuild the cofferdam between phases. Carol Henderson asked if we could sand bag down the middle of the pipe instead. Due to the restricted space, it is not feasible to place sandbags in the structure since this would limit the room available to work.

Mike Hicks indicated that Clark Brook is and Essential Fish Habitat and Carol Henderson indicated that two dams downstream had already been removed. Jamie Sikora asked that we confirm with the NHDOT historic coordinator that the bridge was not historic. Mike Hill asked if we had submitted the bat forms, it was answered that they would be submitted.

The group was questioned on whether stream diversion was a possibility. Carol Henderson indicated that if this was done, it would be best to do the work during low flow in the summer, after the beginning of June,

but before fall spawning in September and October. Installing the diversion cofferdam early in June would prevent fish from spawning in an area that could dry up. Steve Johnson indicated that we are unlikely to have a permit until July so we couldn't install the cofferdams at that time. Carol indicated that it would be OK if the work didn't occur until late July, or August.

The consensus of the group was that the stream diversion option was acceptable.

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

Bedford, #16156 (Non-federal)

Stantec presented an update to the Bedford 16156 - Bowman Brook culvert project. It had previously been presented at the July 16, 2014 and December 16, 2015 meetings. The project involves the addressing of the red listed culvert, which crosses under NH Route 114 and the Old Bedford Road bridge at a 45-degree skew.

Several box culvert alternatives were reviewed early in the process, but none were able to reasonably conform to the Stream Crossing Guidelines. The location of the bridge, depth of bedrock, traffic volumes, maintenance issues and significant costs all contributed to the decision to dismiss these alternatives.

In December 2015, Stantec discussed an alternative at the Resource Agency Meeting that would reduce the length of the existing pipe, creating additional natural bottom stream bed to self-mitigate the project. The remaining pipe would be lined, and retaining walls would be constructed to support the shortened pipe while maintaining the site grading. In order to maintain the upstream flood elevations, a 30" overflow pipe was required. This alternative created additional natural streambed, allowed for a roughened bottom of the remaining pipe, repaired scour near the existing pipe outlet and called for the installation of plantings downstream of the project site.

Since that time, Stantec has refined the design of the project, including the proposed retaining walls necessary to support the roadway embankments at the inlet and outlet of the shortened pipe. There are several areas of concern with the design, largely related to the wall size and site constraints. Stantec undertook a wall selection process, dismissing several common wall types due to site constraints. Gravity and MSE walls were not feasible due to the proximity of the roadways preventing open cuts necessary to construct these wall types, and the high ledge elevations prevent the ability to shore the excavations with sheeting. This also prevents a permanent sheet pile wall system as the solution. Stantec settled on a soil nail wall system. While this system is generally feasible with similar site constraints, there are still concerns. NHDOT reviewed the system from a geotechnical standpoint and concluded this configuration had too much construction risk. It is not a wall type commonly used in New Hampshire, and this site presents some similar attributes to other projects that have experienced construction difficulties with soil nail wall systems. The existing soils are generally fill, and less likely to be self-supporting during construction, groundwater is high, there are boulders and cobbles expected within the overburden, and there is an adjacent sewer line that could be impacted by the construction of the wall system. It is NHDOT's opinion that a soil nail wall is un desirable in this location.

Therefore, Stantec is now proposing to maintain the full pipe length, line it with a centrifugally cast concrete pipe, and add headwalls at the inlet and outlet. This eliminates the need for large retaining walls and the lined pipe does not require an overflow pipe to maintain upstream flood elevations due to the flow characteristics of the lining versus a natural streambed and improved inlet conditions.

The benefits of this option includes:

MITIGATION REPORT

This project is considered maintenance to an existing structure and therefore mitigation is not required.

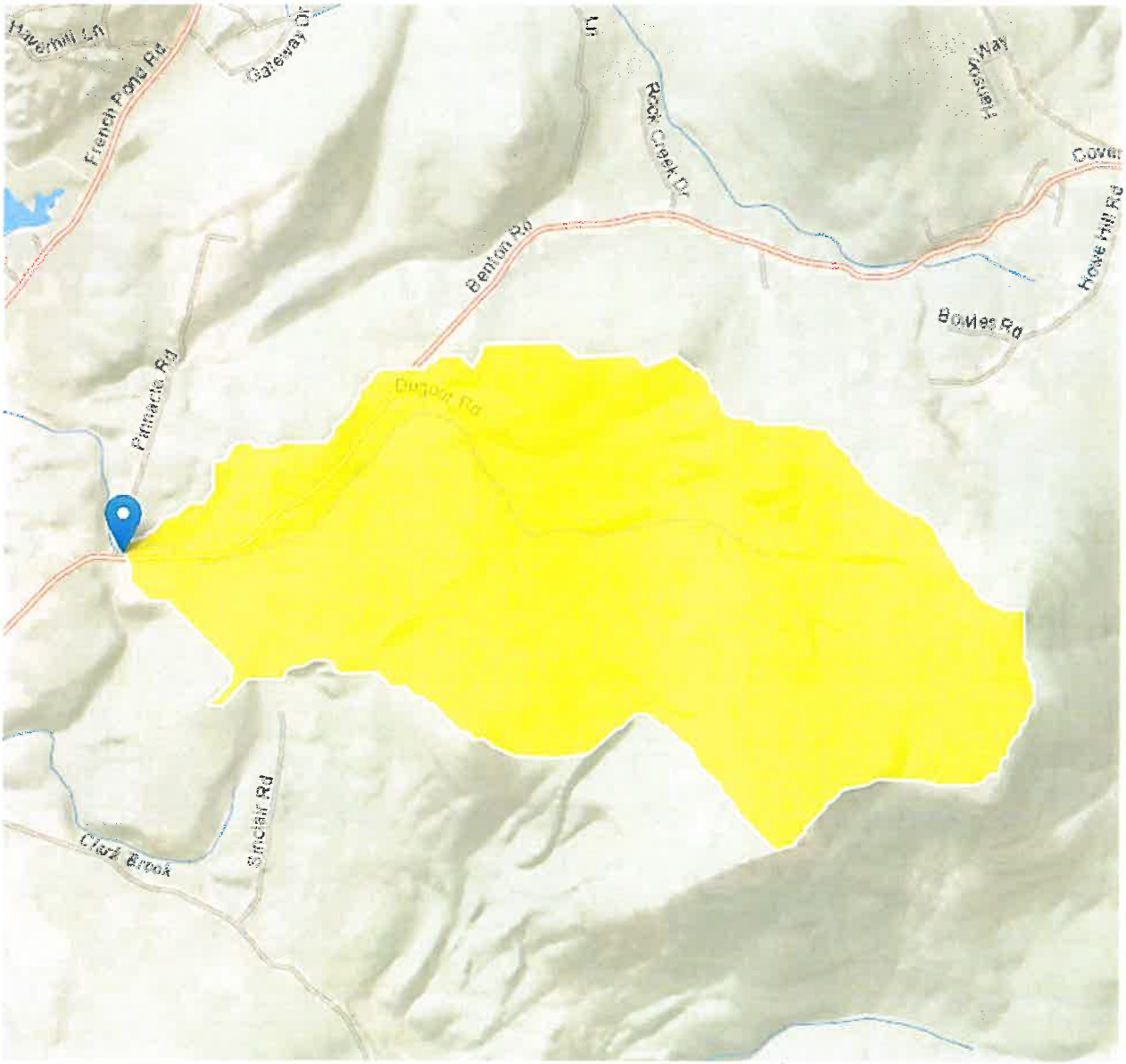
Hydraulic Data

Drainage Area – 2.23 square miles

Flow – Q 100 = 405 cfs (Clark Brook Secondary Branch will have a lower flow)

The proposed structure will pass the 100 year flood.

Watershed Boundaries Map



THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION
BUREAU OF BRIDGE MAINTENANCE
7 Hazen Drive, PO Box 483, Concord, NH 03302-0095
Phone: (603) 271-3667 Fax: (603) 271-1588

WETLANDS PERMIT APPLICATION – ATTACHMENT C
Stream Crossing Requirements & Information

Env-Wt 904.09(a) – If the applicant believes that installing the structure specified in the applicable rule is not practicable then the applicant may propose an alternative design in accordance with this section.
1. Please explain why the structure specified in the applicable rule is not practicable (Env-Wt 101.69 defines practicable as "*available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes*") *(question 2, Attachment A, Minor and Major 20 Questions)*:
Clark Brook has a drainage area of 2.23 square miles which qualifies this stream as a Tier 3 Crossing. The required span based on the NH Stream Crossing Guidelines for a new crossing is 24'-0. A structure of this size would typically cost approximately $500,000. Spending this much money on a structure that could be adequately preserved for approximately $50,000 with minimal impacts would not be a practicable use of resources.
2. Please explain how the proposed alternative meets the specific design criteria for Tier 2 and Tier 3 crossings to the *maximum extent practicable*. Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings – New Tier 2 stream crossings, replacement Tier 2 crossings that do not meet the requirements of Env-Wt 904.07, and new and replacement Tier 3 crossings shall be designed and constructed…
…In accordance with the NH Stream Crossing Guidelines;
The NH Stream Crossing Guidelines do not mention maintenance to a structure in a Tier 3 watershed. **The proposed structure will match the existing slope and alignment.** **The bottom of the existing structure is currently a gravel streambed and it will not be changed as a result of this project.** **Wildlife passage through the proposed structure will be no different than through the existing structure.** **The proposed structure will maintain the flow depths found in the existing structure.** **The proposed structure is expected to be able to pass the 100 year flood event.**
…With bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing;
Water depths and velocities within the crossing at a variety of flows will be comparable to the existing depths and velocities. These flows are comparable to those found in the natural channel upstream and downstream of the stream crossing.
…To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage;
It is not possible to provide vegetated banks on both sides of the watercourse below the roadway, regardless of the type of structure installed. Wildlife passage for the proposed structure will be the same as the existing condition
…To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the function of the natural floodplain *(questions 14 and 15, Attachment A, Minor and Major 20 Questions)*;
The natural alignment and gradient of the stream channel will not be altered as a result of this project. The toewalls and the riprap will not increase the potential of flooding. The structure can pass the 100 year storm event and this project will not significantly change the capacity. Surface waters will not be reflected or redirected as a result of this project.

...To accommodate the 100-year frequency flood and to ensure that there is no increase in flood stages on abutting properties *(questions 11 and 14, Attachment A, Minor and Major 20 Questions)*:
The toewall repairs and the riprap will not increase the potential of flooding. The structure can pass the 100 year storm event and this project will not significantly change the capacity. **The project as proposed will not alter the chance of flooding on abutting properties.**
...To simulate a natural stream channel
Excess Deposits of streambed materials within the culvert will be removed however a natural streambed bottom will be maintained when complete
...So as not to alter sediment transport competence *(question 14, Attachment A, Minor and Major 20 Questions)*:
Nothing that will be a barrier to sediment transport will be installed in this project.
Env-Wt 904.09(c)(3) – The alternative design must meet the general design criteria specified in Env-Wt 904.01:
(a) Not be a barrier to sediment transport *(question 14, Attachment A, Minor and Major 20 Questions)*;
Nothing that will be a barrier to sediment transport will be installed in this project.
(b) Prevent the restriction of high flows and maintain existing low flows *(question 14, Attachment A, Minor and Major 20 Questions)*;
The toewall repairs and the riprap will not alter the existing high and low flows.
(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the water body beyond the actual duration of construction *(question 7, Attachment A, Minor and Major 20 Questions)*;
The completed structure will provide the same degree of aquatic passage as the existing structure.
(d) Not cause an increase in the frequency of flooding or overtopping of banks *(question 14, Attachment A, Minor and Major 20 Questions)*;
The toewall repairs and the riprap will not increase the potential of flooding. The structure can pass the 100 year storm event and this project will not significantly change the capacity. The existing crossing has no history of flooding or overtopping of the banks of the stream. **The project as proposed will not alter the chance of flooding on abutting properties.**
(e) Preserve watercourse connectivity where it currently exists *(question 15, Attachment A, Minor and Major 20 Questions)*;
Connectivity will be temporarily changed due to construction. The main channel is expected to be able to handle the capacity of the entire flow during construction. After the proposed project is complete the connectivity will return to the natural flow.
(f) Restore watercourse connectivity where...
...connectivity previously was disrupted as a result of human activity(ies) *(question 15, Attachment A, Minor and Major 20 Questions)*;
Connectivity will be temporarily changed due to construction. The main channel is expected to be able to handle the capacity of the entire flow during construction. After the proposed project is complete the connectivity will return to the natural flow.
...restoration of connectivity will benefit aquatic life upstream or downstream of the crossing *(question 15, Attachment A,*

Minor and Major 20 Questions);
Aquatic life upstream and downstream will not be affected as a result of the finished project. Temporary impacts were considered acceptable at the Natural Resource meeting.
(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing *(question 14, Attachment A, Minor and Major 20 Questions);*
The riprap placed at the inlet will prevent erosion and preserve the natural alignment and gradation of the stream channel. **Nothing that will be a barrier to sediment transport will be installed in this project.**
(h) Not cause water quality degradation *(question 13, Attachment A, Minor and Major 20 Questions).*
The project as proposed will not impact the quantity or quality of surface and/or groundwater at this site. Best Management Practices will be used to prevent any adverse effect to water quality during construction.

New Hampshire Natural Heritage Bureau

To: Douglas Locker
7 Hazen Drive
Concord, NH 03302

Date: 5/21/2018

From: NH Natural Heritage Bureau

Re: Review by NH Natural Heritage Bureau of request dated 5/21/2018

NHB File ID: NHB18-1554 Applicant: Steve Johnson

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

Project Description: Repair base of bridge that carries NH 116 over Clark Brook.

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

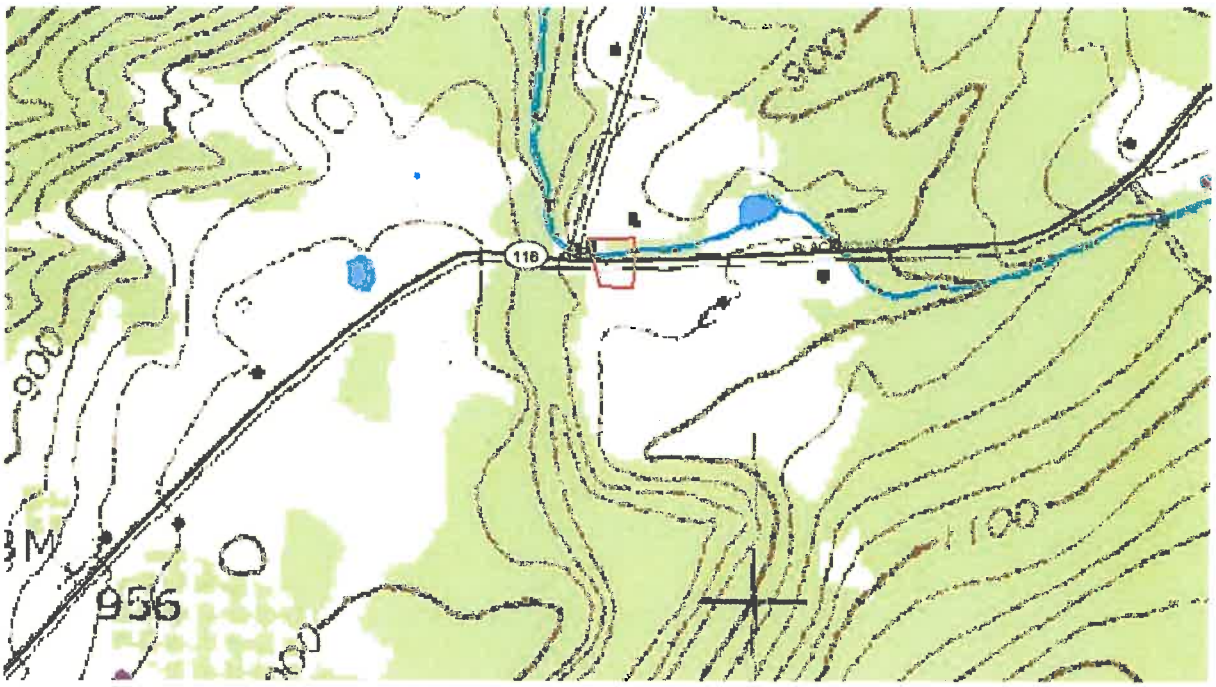
A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed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

This report is valid through 5/20/2019.

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

DRED/NHB
172 Pembroke Road
Concord NH 03301

MAP OF PROJECT BOUNDARIES FOR NHB FILE ID: NHB18-1554



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

DRED/NHB
172 Pembroke Road
Concord NH 03301

Johnson, Steve

From: Henderson, Carol
Sent: Friday, September 22, 2017 3:14 PM
To: Johnson, Steve
Subject: RE: 5 Natural Resource Meeting Minutes Haverhill 158-066.docx

Hi John:

Pursuant to our conversation today regarding this project, NH Fish and Game believes that this project will have minimal impacts to the fishery within the secondary stream as proposed for construction during the winter . We understand that a coffer dam will be installed in the section of the stream that needs the repair and that the primary stream will remain open for fish to move from the construction section of this project. No timing restriction is being requested. This Department's request is to complete the necessary repairs in the shortest amount of time necessary and return the stream to its natural conditions as soon as possible. If you have any questions, please do not hesitate to contact me. Thank you, Carol Henderson, Environmental Review Coordinator

---

From: Johnson, Steve
Sent: Friday, September 22, 2017 2:21 PM
To: Henderson, Carol
Subject: RE: 5 Natural Resource Meeting Minutes Haverhill 158-066.docx

Carol,

My number is 271-3667. I have to go through your front desk to get your number.
Please call me.

Thanks

From: Henderson, Carol
Sent: Friday, September 22, 2017 2:08 PM
To: Johnson, Steve
Subject: RE: 5 Natural Resource Meeting Minutes Haverhill 158-066.docx

Hi Steve:

Could you give me a call when you have a minute? I couldn't make out the phone number you left on the voice mail. Thanks, Carol

---

From: Johnson, Steve
Sent: Thursday, September 14, 2017 3:15 PM
To: Henderson, Carol
Cc: Locker, Douglas
Subject: 5 Natural Resource Meeting Minutes Haverhill 158-066.docx

Carol,

At the April 14th Natural Resource meeting, we discussed finishing the project September. We now looking at doing the project during the winter. Do you have any date restrictions after the beginning of November through April 30th for the proposed work?

United States Department of the Interior

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

In Reply Refer To:
Consultation Code: 05E1NE00-2017-SLI-2686
Event Code: 05E1NE00-2017-E-05917
Project Name: Haverhill 158/066

September 14, 2017

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). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

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

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

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

Project Summary

Consultation Code: 05E1NE00-2017-SLI-2686

Event Code: 05E1NE00-2017-E-05917

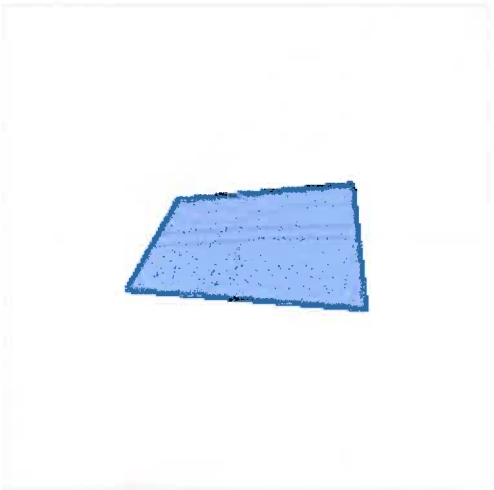
Project Name: Haverhill 158/066

Project Type: BRIDGE CONSTRUCTION / MAINTENANCE

Project Description: Divert upstream, bring toewalls up over rust line, telephone utilities immediately downstream

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/44.0867527420185N71.95792100054658W



Counties: Grafton, NH

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

Mammals

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

Critical habitats

There are no critical habitats within your project area under this office's jurisdiction.

Project____Haverhill 40557_____

Wetland Application – NHDOT Cultural Resources Review

For the purpose of compliance with regulations of the National Historic Preservation Act, the Advisory Council on Historic Preservation's *Procedures for the Protection of Historic Properties* (36 CFR 800), the US Army Corps of Engineers' *Appendix C*, and/or state regulation RSA 227-C:9, *Directive for Cooperation in the Protection of Historic Resources*, the NHDOT Cultural Resources Program has reviewed the enclosed Standard Dredge and Fill Application for potential impacts to historic properties.

Proposed Project: repair base of culvert which is a corrugated metal pipe arch (7.6" X 4'); place sandbag cofferdams, add stub walls at the base if the arch, remove depositional material within the culvert; place riprap at the wing walls

Above Ground Review

Known/approximate age of structure:
Corrugated Metal Pipe Arch 158/066 NH 116 over Clark Brook (secondary channel)

Original culvert was built1931; rebuilt in 1983

☒ No Potential to Cause Effect/No Concerns
Steel plate arches are a post-1945 Section 106 bridge type under the Program Comment.

☐ Concerns:

Below Ground Review

Recorded Archaeological site: ☐Yes ☒No

Nearest Recorded Archaeological Site Name & Number: 27-GR-0185 E. Haverhill Limekilns
☐Pre-Contact ☒Post-Contact

Distance from Project Area: 1.448 miles (2.33 km) southeast of project area

☒ No Potential to Cause Effect/No Concerns
The proposed work has a limited footprint and work will not impact undisturbed areas. Further, the project does not propose wc rk that will result in any noteworthy visual or aesthetic changes to the area.

☐ Concerns:

Reviewed by:

Sheila Charles

NHDOT Cultural Resources Staff

11/17/2017

Date:

US Army Corps of Engineers®
New England District

U.S. Army Corps of Engineers
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 http://des.nh.gov/organization/divisions/water/wmb/section401/impaired_waters.htm to determine if there is an impaired water in the vicinity of your work area.*		X
2. Wetlands	Yes	No
2.1 Are there are streams, brooks, rivers, ponds, or lakes within 200 feet of any proposed work?	X	
2.2 Are there proposed impacts to SAS, 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, www.nhnaturalheritage.org, specifically the book Natural Community Systems of New Hampshire.		X
2.3 If wetland crossings are proposed, are they adequately designed to maintain hydrology, sediment transport & wildlife passage?	X	
2.4 Would the project remove part or all of a riparian buffer? (Riparian buffers are lands adjacent to streams where vegetation is strongly influenced by the presence of water. They are often thin lines of vegetation containing native grasses, flowers, shrubs and/or trees that line the stream banks. They are also called vegetated buffer zones.)	X	
2.5 The overall project site is more than 40 acres.		X
2.6 What is the size of the existing impervious surface area?	1591	
2.7 What is the size of the proposed impervious surface area?	1591	
2.8 What is the % of the impervious area (new and existing) to the overall project site?	0%	
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: • PDF: www.wildlife.state.nh.us/Wildlife/Wildlife_Plan/highest_ranking_habitat.htm. • Data Mapper: www.granit.unh.edu. • GIS: www.granit.unh.edu/data/downloadfreedata/category/databycategory.html.		X
3.3 Would the project impact more than 20 acres of an undeveloped land block (upland, wetland/waterway) on the entire project site and/or on an adjoining property(s)?		X
3.4 Does the project propose more than a 10-lot residential subdivision, or a commercial or industrial development?		X
3.5 Are stream crossings designed in accordance with the PGP, GC 21?		X

4. Flooding/Floodplain Values	Yes	No
4.1 Is the proposed project within the 100-year floodplain of an adjacent river or stream?	X	
4.2 If 4.1 is yes, will compensatory flood storage be provided if the project results in a loss of flood storage?		X
5. Historic/Archaeological Resources		
If a minor or major impact project, has a copy of the Request for Project Review (RPR) Form (www.nh.gov/nhdhr/review) been 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.

Culvert Inlet

Culvert Outlet

Downstream Channel

Upstream Channel and Stream Split

CONSTRUCTION SEQUENCE

1. Sandbags cofferdams will be placed across the brook diverting the stream to the primary channel only and the work zone will be dewatered.
2. Concrete toewalls will be placed and excess streambed material will be removed.
3. Riprap will be placed around the inlet.
4. All dewatering devices will be removed and the site will be restored to its original quality.

Note: The Project will utilize BMP's from the Best Management Practices manual during all phases of construction.

PART Env-Wt 404 CRITERIA FOR SHORELINE STABILIZATION

The rehabilitation of the bridge that carries NH Rte. 116 over Clark Brook proposes the placement of stone fill within areas under the jurisdiction of the NH Wetlands Bureau and the US Army Corps of Engineers. The stone fill will be located along the bank of the proposed structure as shown on the plans.

Pursuant to PART Wt 404 Criteria for Shoreline Stabilization, the following addresses each codified section of the Administrative Rules:

Env-Wt 404.01 Least Intrusive Method.

The riverbank stabilization treatment proposed is the least intrusive construction method necessary to minimize the disruption to the existing shorelines. The stone treatment can be reasonably constructed utilizing general highway construction methods.

Env-Wt 404.02 Diversion of Water.

Proposed roadway drainage will allow storm water run-off to be diverted so that it will flow over vegetated areas, insofar as possible, prior to entering Clark Brook. This will minimize erosion of the shoreline.

Env-Wt 404.03 Vegetative Stabilization.

Natural vegetation will be left undisturbed to the maximum extent possible. The only locations being disturbed are the impacted areas on the plan for construction. All newly developed slopes and disturbed areas will have hummus and seed applied for turf establishment, which will help stabilize the project area.

Env-Wt 404.04 Rip-rap.

(a) Stone fill, as proposed, is shown on the attached plans to protect the channel as necessary. Stable embankments are necessary to maintain the structural integrity of the bridge during all flow conditions.

(b) (1-5) The minimum and maximum stone size, the gradation, cross sections of the stone fill, proposed location, and other details have been provided on the attached plans. Bedding for the stone will consist of natural ground excavated to the proposed underside of the stone fill.

(b) (6) Enclosed are plan sheets to sufficiently indicate the relationship of the project to fixed points of reference, abutting properties, and features of the natural shoreline.

(b) (7) Stone fill is recommended for the limits shown on the attached plans to protect the streambed from erosion during flood flows and scour during all flows, and slopes greater than 2:1 have difficulty supporting vegetation.

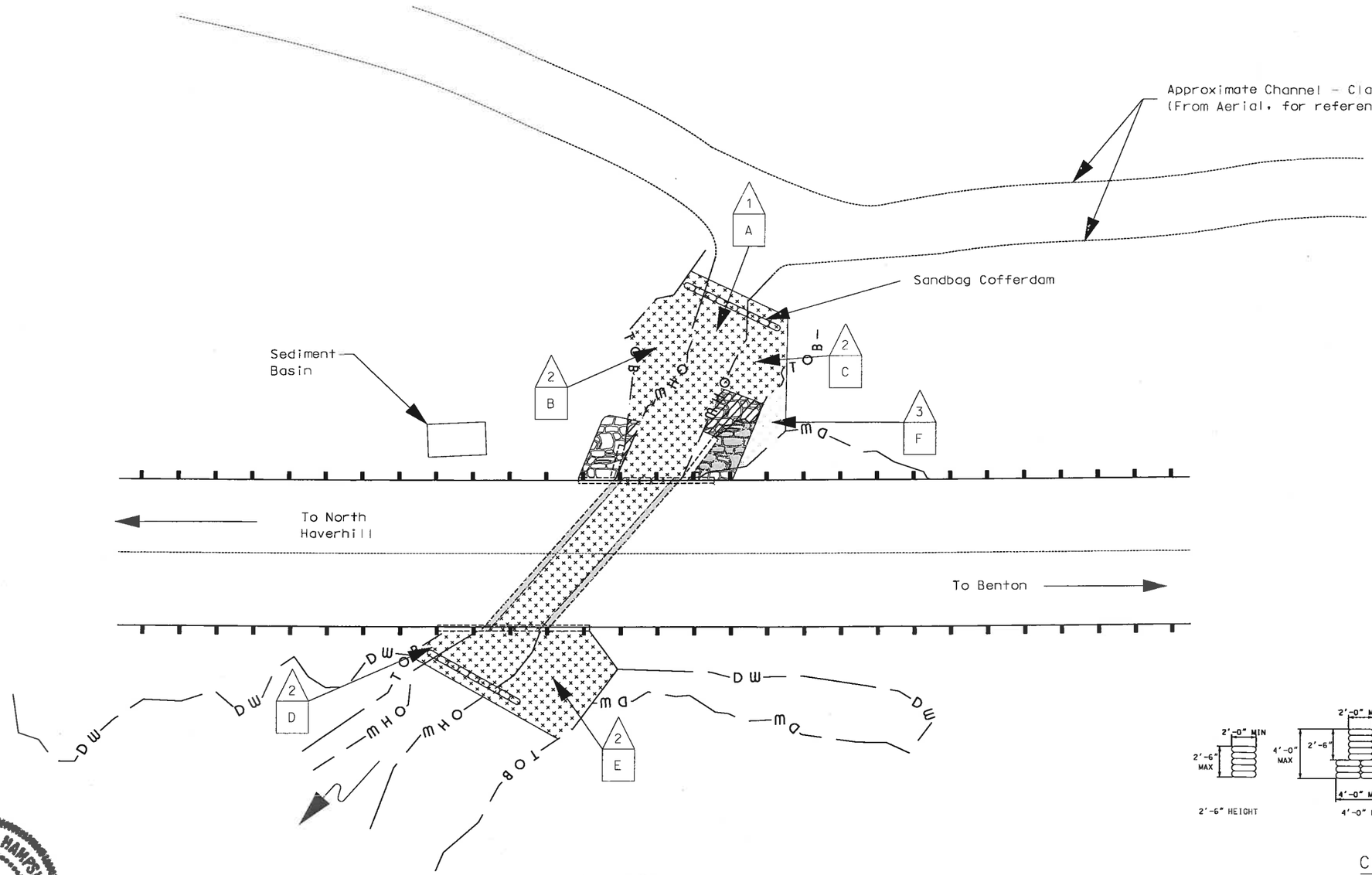
(c) This project is not located adjacent to a great pond or water body where the state holds fee simple ownership.

(d) Stone fill is proposed to extend down to and adequately keyed into the channel bottom to prevent possible undermining of the slope.

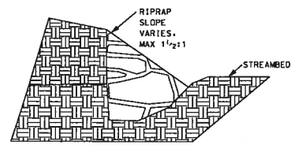
(e) The enclosed plan has been stamped by a professional engineer.

N

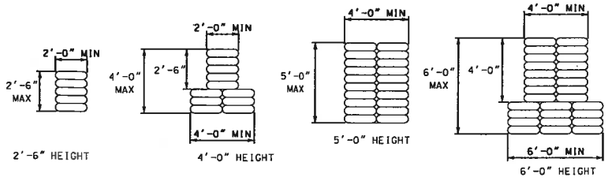
RIPRAP GRADATION
D15 < 10.5"
D50 < 14"
D100 < 24"



WETLAND IMPACTS
SCALE: 1" = 20'-0"



SECTION A-A
NOT TO SCALE



COFFERDAM DETAILS
NOT TO SCALE

WETLANDS DELINEATED BY SARAH LARGE AND MATT URBAN SEPTEMBER 2016

THE STATE OF NEW HAMPSHIRE
STEVE W. JOHNSON
No. 7885
LICENSED PROFESSIONAL ENGINEER
5/19/18

10 0 10 20
SCALE IN FEET

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE MAINTENANCE

TOWN HAVERHILL BRIDGE NO. 158/066 STATE PROJECT 40557
LOCATION NH 116 OVER CLARK BROOK

WETLAND IMPACTS

BRIDGE SHEET 1 OF 3

REVISIONS AFTER PROPOSAL	BY	DATE		BY	DATE
			DESIGNED SWJ	5/14/17	CHECKED
			DRAWN SWJ	5/14/17	CHECKED
			QUANTITIES		CHECKED

FILE NUMBER HAERHILL 158/066

SHEET SCALE	ISSUE DATE	FISCAL YEAR	CREW	SHEET NO.	TOTAL SHEETS
AS NOTED	REV. DATE	2017	10	1	3

Haverhill 158/066

WETLAND IMPACT SUMMARY

WETLAND NUMBER	WETLAND CLASSIFICATION	LOCATION	AREA IMPACTS						LINEAR STREAM IMPACTS FOR MITIGATION		
			PERMANENT				TEMPORARY		PERMANENT		
			N.H.W.B. (NON WETLAND)		N.H.W.B. & A.C.O.E. (WETLAND)				BANK LEFT	BANK RIGHT	CHANNEL
			SF	LF	SF	LF	SF	LF	LF	LF	LF
1	R2UB12	A			70	35	648	85			
2	BANK	B	10	11			178	16			
2	BANK	C	43	8			123	20			
2	BANK	D					26	11			
2	BANK	E					237	15			
3	PFO1E	F			50		58				
		I									
		J									
		K									
		L									
		TOTAL	53	19	120	35	1270	147	0	0	0

PERMANENT IMPACTS: 173 SF
TEMPORARY IMPACTS: 1270 SF
TOTAL IMPACTS: 1443 SF

SUBTOTALS		PERMANENT				TEMPORARY	
		N.H.W.B. (NON WETLAND)		N.H.W.B. & A.C.O.E. (WETLAND)			
CLASS	DESCRIPTION	SF	LF	SF	LF	SF	LF
R2UB12	RIVERINE	0	0	70	35	648	85
BANK	BANK	53	19	0	0	564	62
PFO1E	PALUSTRINE	0	0	50	0	58	0
		0	0	0	0	0	0
		0	0	0	0	0	0

WETLAND CLASSIFICATION CODES	
R2UB1.2	RIVERINE, LOWER PERENNIAL, UNCONSOLIDATED BOTTOM, COBBLE GRAVEL, SAND
PFO1E	PALUSTRINE FORESTED BROAD-LEAVED DECIDUOUS
BANK	BANK

LEGEND

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

WETLAND DESIGNATION NUMBER
WETLAND IMPACT LOCATION
WETLAND MITIGATION AREA
MITIGATION

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE MAINTENANCE

TOWN HAVERHILL BRIDGE NO. 158/066 STATE PROJECT 40557
LOCATION NH 116 OVER CLARK BROOK

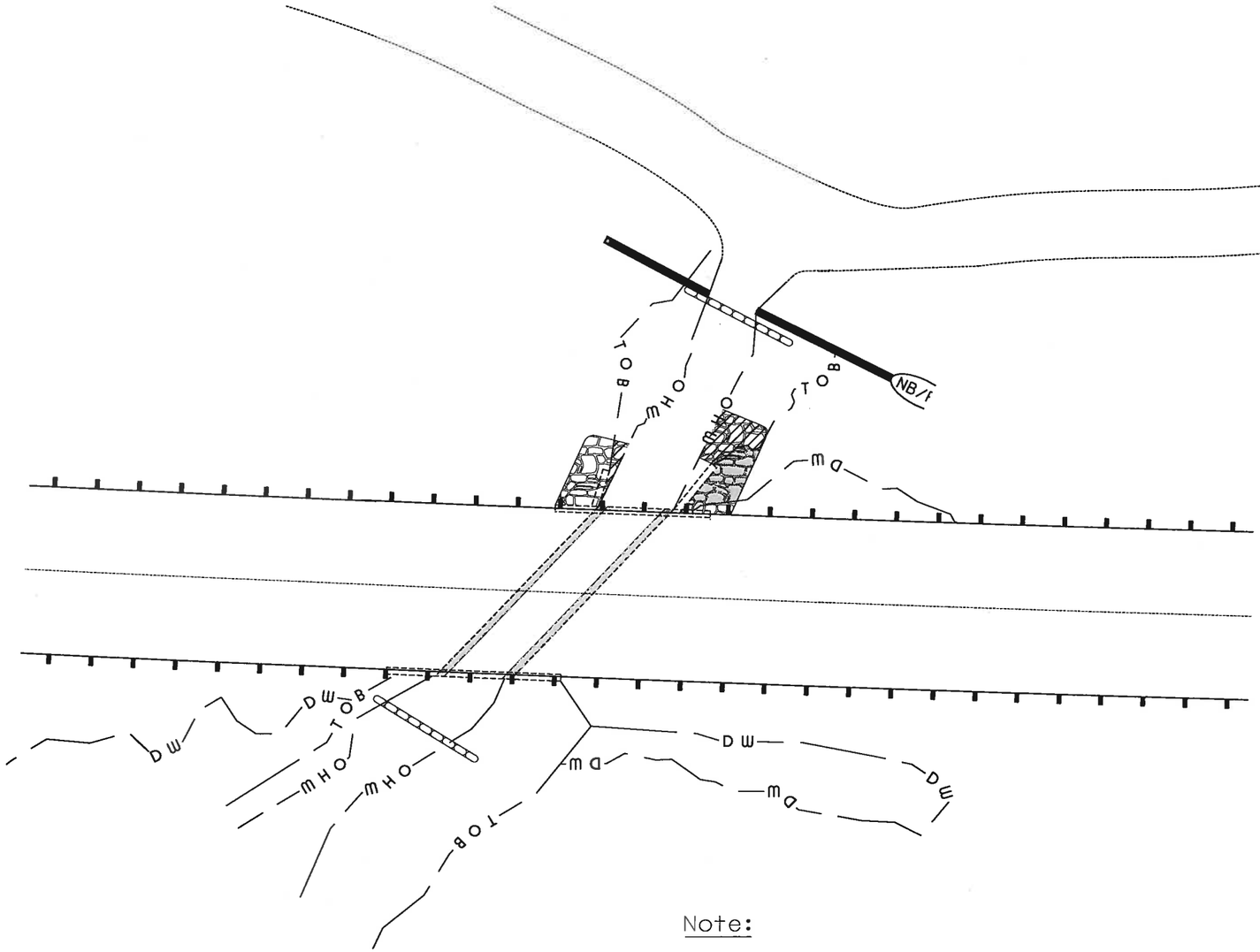
WETLAND KEY AND SUMMARY

BRIDGE SHEET 2 OF 3

REVISIONS AFTER PROPOSAL	BY	DATE		BY	DATE
	DBL	2/5/18	CHECKED		
DESIGNED	DBL	2/5/18	CHECKED		
DRAWN			CHECKED		
QUANTITIES					

FILE NUMBER BROOKLINE 091/076

SHEET SCALE	ISSUE DATE	FISCAL YEAR	CREW	SHEET NO.	TOTAL SHEETS
AS NOTED	REV. DATE	2016	10	2	3



EROSION CONTROL PLAN LEGEND

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

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

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

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

Note:

Natural Buffer/Perimeter Control measures shall installed to protect outside the dewatered area if access or work in a non-jurisdictional area causes earth disturbance.

Quadrants without earth disturbance shall be protected with appropriate Best Management Practices as needed.

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION * BUREAU OF BRIDGE MAINTENANCE

TOWN HAVERHILL — BRIDGE NO. 158/066 — STATE PROJECT 40557

LOCATION NH 116 OVER CLARK BROOK

EROSION CONTROL PLANS

BRIDGE SHEET: 3 OF 3

REVISIONS AFTER PROPOSAL	BY	DATE

	BY	DATE		BY	DATE
DESIGNED	DBL	2/5/18	CHECKED		
DRAWN	DBL	2/5/18	CHECKED		
QUANTITIES			CHECKED		

FILE NUMBER: BROOKLINE 091/076

SHEET SCALE	ISSUE DATE	FISCAL YEAR	CREW	SHEET NO.	TOTAL SHEETS
AS NOTED	REV. DATE	2016	14	3	3