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December 5, 2016

VIA ELECTRONIC FILING
Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

Re: TransCanada Hydro Northeast Inc.'s June 17, 2016 and August 1, 2016 Updated Study Report – Response to Comments - Addendum
Project Nos. 1892-026, 1855-045, and 1904-073

Dear Secretary Bose:

TransCanada Hydro Northeast Inc. ("TransCanada") is the owner and licensee of the Wilder Hydroelectric Project (FERC No. 1892), the Bellows Falls Hydroelectric Project (FERC No. 1855), and the Vernon Hydroelectric Project (FERC No. 1904). The current licenses for these projects each expire on April 30, 2019. On October 31, 2012, TransCanada initiated the Integrated Licensing Process by filing with the Federal Energy Regulatory Commission ("FERC" or "Commission") its Notice of Intent to seek new licenses for each project, along with a separate Pre-Application Document for each project.

On October 31, 2016 TransCanada submitted responses to various comments and specifically to Disagreements and Requests to Amend Study Plans regarding the Study Reports filed on June 17, 2016 and August 1, 2016 for the three projects, as required by 18 C.F.R. §5.15(c)(5). It has come to our attention, through the Director's November 29, 2016 Study Plan Determination, that our response to Messer's McIntyre and Mudge letters commenting on Study Report 2/3 (comments 63-78) – Riverbank Transect and Riverbank Erosion Study were not included in the October 31, 2016 filing. We apologize for this unintentional omission.

Therefore, with this filing, TransCanada submits the missing responses to Comments, Disagreements and Requests to Amend Study 2/3, #s 63–78, in the table below entitled "TransCanada Addendum to Response to June 17, 2016 and August 1, 2016 USR Comments, Study 2/3".

If there are any questions regarding the information provided in this filing or the process, please contact John Ragonese at 603-498-2851 or by emailing john_ragonese@transcanada.com.

Sincerely,

John L. Ragonese
FERC License Manager

Attachment: Addendum to Response to June 17, 2016 and August 1, 2016 USR Comments, Study 2/3

cc: Interested Parties List (distribution through email notification of availability and download from TransCanada's relicensing web site www.transcanada-relicensing.com).

Study 2/3 – Riverbank Transect and Riverbank Erosion Study Response to Comments 63 - 78

Comment #	Study #	Source	Comment	Response
63	2/3	Mr. McIntyre	The maps of erosion sites, now brought up to 2014, are wrong or misleading for two sites in Lyme [River Road North, and River Road South, photos and annotated study report maps included and relative to study mapping as "stable" and condition of the road at the two locations]…Immediately north of the section shown in Figure 5 and 6 [in the comment letter] another several hundred feet of River road is threatened by erosion and is subject to collapse. A survey of the rest of the road by the Town of Lyme reveals additional segments constituting about a mile in total that are in danger.	The commenter may be using the comparison of erosion maps from 1958, 1978, and 2014 to ascertain the bank stability conditions at the site in 2014 as "stable". However, the report makes clear that in the comparison of erosion maps, only the "eroding" stability category of 2014 was used in the historical comparison given that the earlier mapping efforts likely did not classify the "vegetated eroding" and "failing armor" categories as eroding. Consequently, a section of bank mapped as "vegetated eroding" in 2014 and not mapped as eroding in earlier mapping efforts would be recorded as "still stable" as it is believed that the earlier mapping efforts would have described the "vegetated eroding" category as "stable". The location of the sites in question are not precisely known but considerable lengths of bank in the general area in question are mapped as "vegetated eroding". For the precise locations in question, the GIS data for bank stability mapping in 2014 (and not the comparisons of erosion mapping

Comment #	Study #	Source	Comment	Response
				from different years) can be consulted to confirm this (see attached figures showing a) River Rd North; and b) River Rd South locations with 2014 stability categories).
64	2/3	Mr. McIntyre	From the methodology described in the study report, I understand that update of the GIS georeference files employed aerial photographs from 2010. The figures above [in the comment letter] are labeled "Comparison of 1958 and 2014 erosion. I do not find aerial photos from 2014 mentioned. Where was the data for the period, 2010 to 2014 obtained? From the field mapping of bank conditions described in section 5.6 of the report? From LIDAR? I was with Mr. Field when he visited both sections of river road described above, and climbed down and around the hole under the section recently closed to traffic. How did this section of the bank get classified incorrectly? At the August 25 meeting…TransCanada stated that… the figures I described in the report Appendix…would be changed.	See response to comment # 63 as to why the bank would seem to be classified incorrectly if only the erosion comparison maps were consulted without also looking at the GIS data of bank stability mapped in 2014. The georeferencing of aerial photographs utilized aerial photographs from 2010. This analysis is completely independent from the maps of bank stability that were completed through field observations in 2014. As the commenter indicated in a statement following this comment, the report (p. 24) pointed out the limitations of historical comparison and states: "Despite these limitations, the analysis does provide some insights into where and when significant changes in channel position have occurred within the study area." Further, the study was not designed to

Comment #	Study #	Source	Comment	Response
				evaluate specific locations of erosion, except at the 21 monitoring sites, and as the report states (p. 114): "The focus of the Study 2 and Study 3 erosion studies was to identify broad patterns of erosion along more than 250 miles of riverbank and these studies were not intended to detail or understand the numerous local characteristics potentially controlling erosion at specific locations." With regard to changing figures, we believe that the 2014 mapping was correct and those areas were classified as "vegetated eroding" in those areas visited by Dr. Field.
65	2/3	Mr. McIntyre	The sequence shown in the figure [Figure 5.6.2-1 of the study report] adequately describes what is seen when one examines a site of erosion. And one must agree that one of the steps in streambank erosion is the removal of bench material by high water events so that he cycle can repeat itself. The lesson that was offered, however, ignored or failed to give adequate emphasis to an important cause of the type of erosion most likely to be active as a result of dam operations. This is piping, or as referred to by the applicant in the report "seepage" erosion. The failure of the report of studies 2 and 3 to	The cycle of erosion describes the formation of notches and overhangs and also attributes seepage as one possible mechanism for creating the overhangs, and a description of that process was included in the study report in Section 5.6.2. In the impoundments, more than 75 percent of the bank length experiences a median WSE fluctuation of less than 1.5 ft, a range considered ineffective at causing erosion because of the limited

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			include a diagram like the one shown [Figure 9 in the comment letter] as part of the tutorial on erosion is a deplorable omission. The photo of the "sink-hole" shown on the Mudge property in the study report [Figure 5.4.2-5] probably shows a result of piping erosion. Piping may also have been an important factor in damage to River Road in Lyme as stated by Lyme's consulting engineer who studied the River Road North collapse.	hydraulic gradient that would develop between the lowering river level and groundwater that seeps into the bank when the river is at the upper limit of the WSE fluctuation range. Figure 5.4.2-5 was only presented as an example of a localized bank collapse and recession on a more extensive, seemingly non-receding bank based on monitoring duration and was not necessarily provided as an example of seepage erosion. More detailed site specific studies beyond the project scope would be needed to establish whether the erosion is caused by seepage forces and, if so, whether the seepage is related to project-related WSE fluctuations, natural groundwater seepage, or other causes.
66	2/3	Mr. McIntyre	The report...takes the position that water level fluctuations in the Wilder impoundment were unlikely to be an important cause of erosion. This conclusion was based upon correlating information on the magnitude of water level fluctuations and the frequency and location of erosive action seen on the banks of the impoundment rather than any direct measurements concerning the amount of	The operations model (Study 5) shows the greatest fluctuations in upper Wilder impoundment of up to 9 feet under normal project operations. However, WSE fluctuations in the upper impoundment are primarily the result of inflows from upstream and not Wilder Project operations. WSE fluctuations associated only with Wilder Project

Comment #	Study #	Source	Comment	Response
			erosion caused by such fluctuations. For the applicant's present analysis of erosion the fluctuations are assumed to be greatest at the upper portion of the impoundment. The Pre application document (PAD) states that they are greater at the dam. What is true? Where are the measurements of the fluctuating water levels in the report? [and] Why was modeling of water level fluctuations at each of the 21 study sites used to define the range of likely water level changes [rather than water level monitors]?	operations are greatest closest to the dam. The use of modeling data allowed a better defined flow range/exceedance probability associated with no spill conditions to be identified over a longer timeframe. The water level data was used to confirm that the operations model adequately described the typical fluctuations recorded by the monitors. Use of the water level data alone to define the range would have lacked any specificity as to the exceedance probabilities involved and would provide no way of establishing whether the ranges involved were associated with spill or no spill conditions.
67	2/3	Mr. McIntyre	Because there are so many confounding factors at work at every site of erosion, it is imperative that direct measurements be made of erosion as caused by such fluctuations. Until we know how the weight of silt removed by each rise and fall of water level of a given height at a given site, of a given soil composition, at a given temperature, etc. we don't know anything about the matter.	We concur that there are many confounding factors at work and that each erosion site is different; and p. 115 of the report states: "Attempting to identify a single cause for erosion fails to recognize that multiple processes operate collectively to effect change on the riverbanks through space and time." Detailed site specific measurements of erosion caused by seepage forces were

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				beyond the scope of the approved study plan. Hours of anecdotal observations during the course of the study did not show turbidity near-shore during normal project operations so we do not believe detailed studies would provide measurable quantities of silt during normal project operations and, thus, would not materially change the conclusions of this study.
68	2/3	Mr. McIntyre	If we supposed that the dams had not been built and the river was in a free and unencumbered state, how much erosion would be occurring? The only erosion that would then occur *at the present erosion sites* described in studies 1-3 would be on the occasion of 100 year floods. Using this rationale, we might then assign perhaps 90% of the erosive damage we see today to the presence of the dam and its operation.	The baseline for the erosion study was current project operations, so a detailed study of erosion rates prior to construction of the dams was beyond the scope of this study. Given the sandy nature of most of the riverbanks within the study area and the velocities associated with natural flows significantly below 100-year flood levels, erosion likely occurred prior to dam construction. Stream flow velocities are reduced by the impounded water behind mainstem dams and therefore it is likely that erosion is less than pre-dam conditions. Construction of US Army Corps of Engineer flood control projects in the tributaries as well as Moore Dam on the

Comment #	Study #	Source	Comment	Response
				mainstem have reduced peak flows and the erosive forces associated with those flows during spring runoff and weather related storm events. Consequently, the erosive forces during flood flows under current conditions would be less than before the dams began operating and under flood conditions.
69	2/3	Mr. Mudge	In Study 2/3, Figure 5.6.2-1, page 70, is TransCanada's diagram of the "Cycle of Erosion"… [T]hose sketches should be compared to the sketches that I included in my original Study Request of February 25, 2013 [which included sketched-in water levels in relation to various erosion types]…To have excluded the raising and lowering of the river from the "cycle of erosion" diagrams…discredits that discussion… TransCanada [has] repeatedly stated that they do not raise and lower the water very much. However, both the Study 2/3 report itself and Appendix A of the report include many pictures of the river when it has been lowered. There is a "cycle of erosion" along the riverbank and all factors contributing to it must be included in any and all schematic diagrams of it. TransCanada does not do that.	See response to comment # 65.
70	2/3	Mr. Mudge	[The report states on page 105 in relation to the Mudge property associated with monitoring site 02-W09]: "…an additional 8 ft of erosion [as	The letter prepared by the licensed surveyor hired by the commenter clearly states that the distances measured were

Comment #	Study #	Source	Comment	Response
			measured in 2015 as part of the study] has occurred since 1989." For that to be true, the line would measure 910.6 feet. There is no indication that the measurement was made by a licensed surveyor. I then had a licensed surveyor in New Hampshire measure the line, and it is 903.1 feet.	"between 2 found boundary pins". This suggests the distances reported were between the boundary pin near River Road set several years ago and a boundary pin established in 2015 by Field Geology Services approximately 8 ft from the top of the bank at the time of their survey discussed in the Study 2/3 report. It appears the professional survey did not measure to the top of the riverbank but approximately 8 ft from the top of the bank, explaining the difference in the reported distances. Consequently, the erosion rates at the Mudge property calculated in the Study 2/3 report are considered accurate.
71	2/3	Mr. Mudge	Study 1, Appendix A, Plate A-5, identifies this same land, my fields, as being on the border between "Still Stable" and "Destabilized." Surveys document that it has been eroding since 1961.	See response to comment # 63.
72	2/3	Mr. Mudge	In its Assessment of Project Effects, Study 2/3 reads, page 110: "Absent other changes, however, the banks will eventually re-stabilize when an equilibrium condition is reached with the new impoundment level." That might be true if there was a *new* impoundment level", but for more than sixty (60!) years the impoundment level" has changed frequently, sometimes daily,	Impoundment level is different than impoundment fluctuation (WSE fluctuations). The "new" impoundment level refers to the overall level established with construction and raising of Wilder dam in 1950. WSE fluctuations are the changes in water level at the dam that result from both normal

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			and that causes the ongoing cycle of erosion. There is no "new impoundment level."	project operations and high flow operations. Fluctuations in water level greater than those associated with normal project operations are the result of high inflows.
73	2/3	Mr. Mudge	There is no empirical data that supports the conclusions of the Study 2/3 Report…The Study Report includes no technical data to support its conclusions. The author of Study 2/3 has stated that geotechnical studies were not done as a part of this work, but *he has also stated that those studies could be done.* More study of the erosion along the Connecticut River in Vermont and New Hampshire should be done.	Same as response to comment # 60 and included below. FERC's September 13, 2013 Study Plan Determination did not require geotechnical analysis (p. B7): "Such an analysis could be useful in designing an embankment for a site-specific mitigation measure. However, because mitigation proposals and designs are premature at this stage of the licensing process, it is unclear how the requested information would inform potential license conditions."
74	2/3	Mr. Mudge	The "erosion ratio" is first used on page 82 of Study 2/3, and it is then used in a number of charts and graphs on the following pages. It has been acknowledged that the "erosion ratio" is not an accepted methodology as it has not been peer reviewed and accepted by the geology profession as a whole.	Same as response to comment #'s 15 and 61 and included below. The erosion ratio was initially developed by Field Geology Services to identify potential causes of erosion in the Turners Falls Pool (Field, 2007) and we believe it is a valid approach for the TC projects. At that time no concerns with the methodology were raised by the Connecticut River Streambank Erosion

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				Committee and the report utilizing the erosion ratio methodology was accepted by FERC. No other studies utilizing methods similar to the erosion ratio are known. But the method relies on data that has been collected using standard geomorphological methods. The purpose of using the erosion ratio was to identify if erosion preferentially occurs within a given feature; to identify a preferential occurrence or tendency or relationship to erosion cause or effect. However, we will include a statistical analysis of the data using logistic regression in the revised study report. We also note that the Bank and Toe erosion model mentioned is for site-specific analysis and for a snapshot in time. The method establishes shear stresses based on bank geometry so cannot establish stresses associated with seepage forces that might be created by WSE fluctuations. The model is developed for an un-impounded river and is thus not adequate for Study 2/3 analysis.

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75	2/3	Mr. Mudge	On page 52 of Study 2/3 is a 2015 photo, (Figure 5.4.2-5), of a bank collapse on the Mudge property in Lyme, New Hampshire. On page 62 is a photo, (Figure 5.6.1-2) of a "tunnel scour" in Fairlee, Vermont, that initially formed in 2014. On page 110 is a reference to a bank collapse/bank recession/tunnel scour/circular depression near Route 10 in Hanover, New Hampshire… I believe that a complete and thorough study of these three sites…would show that this type of erosion is all caused by…the saturation of the soils when the water level is raised and then, when the water level is lowered, particles of soil are dislodged and carried in suspension away from the bank…Study 2/3 implies that this type of erosion primarily occurs "in the winter months." That is a totally false and misleading statement. Those of us who live along the river and walk along the riverbank see these holes/recessions/scours being formed at all times of the year.	The report did not attempt to mislead, and the statement about winter erosion is true when read in its proper context. The report (on pp. 109-110) states: "Tractive force erosion has been observed to occur during small to moderate floods during the winter months (Green et al., 1999; Simon et al., 2000), and "is consistent with wintertime bank recession at the three monitoring sites that recorded such change" during the 2-year monitoring period. And, "[a]lthough a July 2016 bank collapse along Route 10 in Hanover, NH demonstrates that bank recession does not always occur in the winter months… the monitoring data appear to demonstrate significant bank recession is more likely to occur in the winter or during the spring freshet."
76	2/3	Mr. Mudge	Page 71 of Study 2/3 notes that "a bare skeleton of roots are less effective at protecting the bank." Many of the photographs in the study and in the appendices show either a "skeleton of roots" or root systems that are in a high riverbank and the roots are so far above the water that the trees will topple and fall into the river. Many of the photographs clearly illustrate	To clarify, on p. 84, the report discusses riparian vegetation and distinguishes between locations with vegetation on the bank slope itself (which can be stabilizing to the bank) versus vegetation on the edge of the floodplain or high terrace high above the river (not stabilizing to the bank, and the majority

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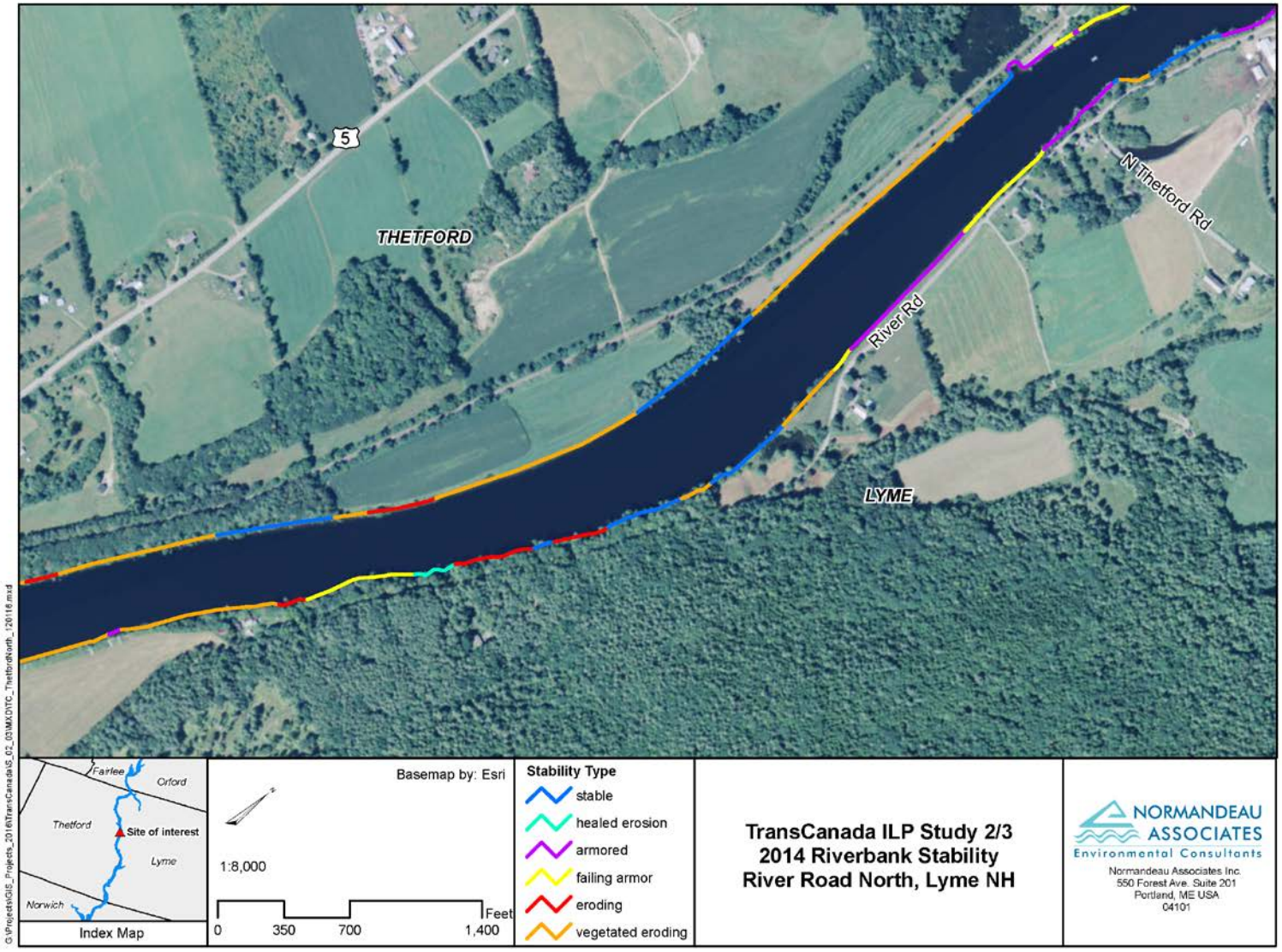
			that there is no root mass there to protect the riverbank from erosion. Study 2/3 includes no drilling of the riverbank to determine the root mass that would help to reduce erosion. Where there is no strong root mass, there will be an unstable riverbank.	of vegetation mapped). The study also included mapping of the river bank riparian vegetation from 2010 digital aerial photographs (Appendix C GIS shapefile). However, the study found little influence of vegetation on the distribution of erosion. Drilling to determine root mass contributions to reduce erosion in any specific location, even if that contribution could be determined, is well beyond the scope of the approved study plan.
77	2/3	Mr. Mudge	A sentence on page ES-1, the Executive Summary, of Study 2/3 reads: "Nearly 40 percent of the riverbanks in the study area were mapped as unstable during bank stability mapping completed in 2014." Is it 40% or is it 58% of the riverbank that is unstable?... Given that the Study also discusses how armoring of the bank has failed and "healed erosion" may be very questionable, these five classifications must be included in the erosion figure.	Same as response to comment # 50 and included below. The report (p. ES-1 and throughout, specifically Section 5.6.3) uses the term "unstable" to include areas categorized as eroding, vegetated eroding, and failing armor (or 39% of the total). Armored and healed erosion categories were not considered to be unstable; however, the report recognizes that areas mapped as stable presently may have been eroding in the past (healed erosion) or could erode in the future (armoring that fails later) as corroborated by the comparison of

Comment #	Study #	Source	Comment	Response
				erosion maps from different years that show considerable change in the location of erosion over time. On page 83, the report discusses preventive armoring as the likely explanation for the presence of armoring on inside bends rather than outside bends as would be expected in an unaltered river. Armoring locations in the study area indicate purposeful historical river alterations and straightening, rather than armoring in reaction to erosion (which also occurs along shorter bank sections).
78	2/3	Mr. Mudge	Page 48 of the PAL report [referring to an archaeological site located on the property identified in Study 33 – Cultural and Historic Resources, Archaeological Phase II Determination of Eligibility - Lampshire Meadow Site filed August 1, 2016 and provided to the landowner] reads: "PAL recommends that TransCanada take measures to preserve and protect the site, including the establishment of a program to monitor its condition over time and mitigate any identified impacts. The specifics of this archaeological monitoring program and mitigation measures would be identified in a Historic Property Management Plan that will be	As the commenter notes, a Historic Properties Management Plan will be developed. Any action, including monitoring or testing that requires access to private property will require landowner consultation and permission.

Comment #	Study #	Source	Comment	Response
			developed through consultation among the FERC, the NH SHPO and TransCanada in advance of the impending relicensing of the Wilder project." Not mentioned in the PAL report is that any plan for and monitoring of this site should be done in consultation with the landowner. The "identified impacts" on this site are very simple, erosion. My family has already taken steps to preserve this land by placing conservation easements on it that will prohibit any future development. What steps does TransCanada propose that will prevent any future erosion and destruction of historic sites such as this one?	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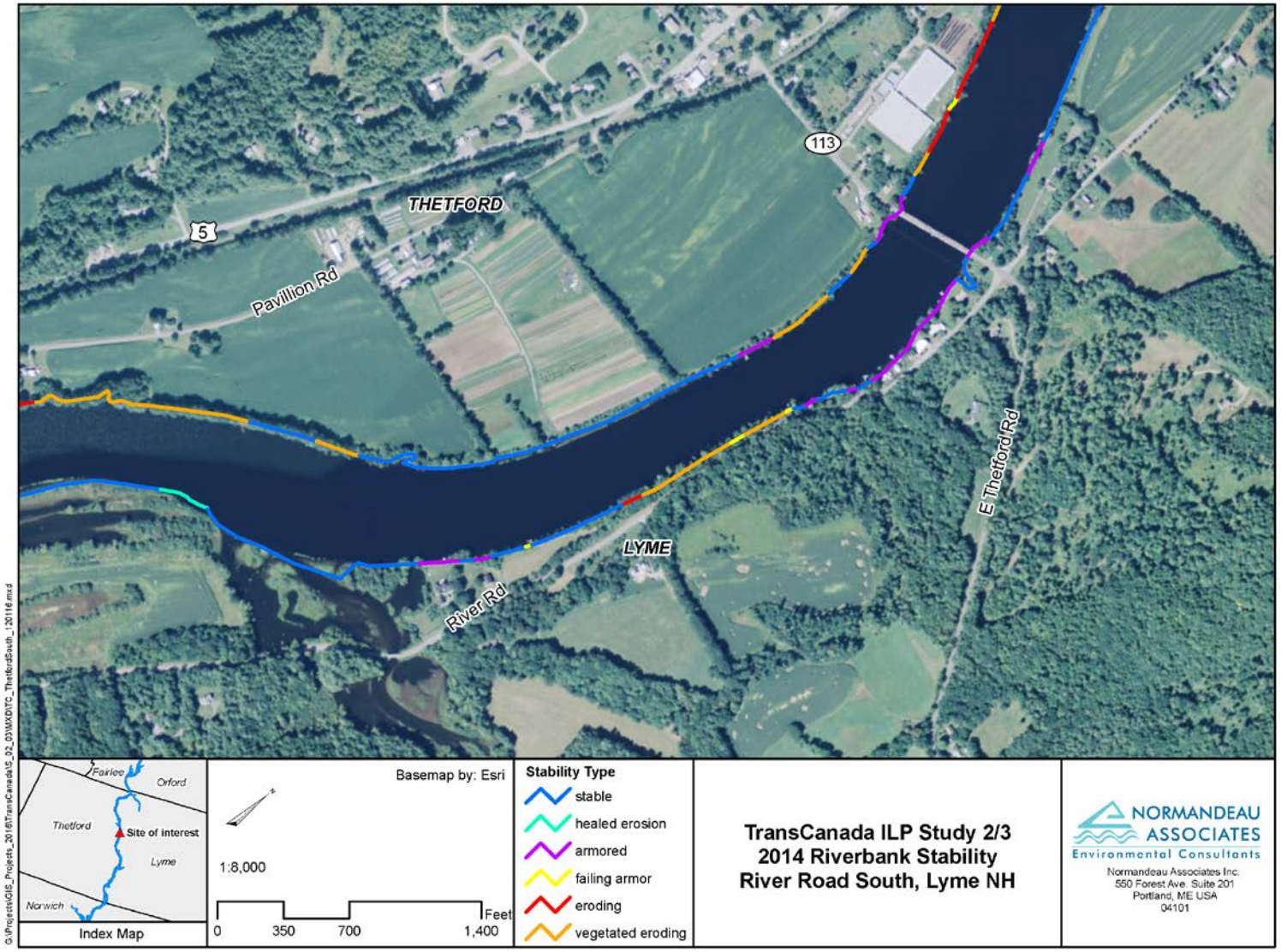
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