

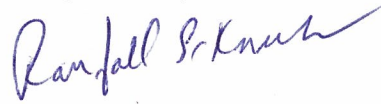
STATE OF NEW HAMPSHIRE

Inter-Department Communication

DATE: October 7, 2014

AT (OFFICE): NHPUC

FROM: Randy Knepper
Director of Safety & Security



SUBJECT: Review of PSNH Petition for Revision to four Existing 34.5kv (Line 317) Crossings at four separate locations namely the Warner River, in Webster; Blackwater River in Hopkinton; the Contoocook River in Concord; and the Rolfe Canal (Contoocook River in Concord)
Docket No. DE 14-197

TO: Debra Howland, Executive Director
Tom Frantz, Director, Electric Division
Les Stachow, Assistant Director, Electric Division
Michael Sheehan, Staff Attorney

The Safety Division review of the above petition consisted of the following elements:

- Petition contents and history
- Applicable State statute
- Review of existing crossing(s) already licensed by the PUC
- Review of land ownership of existing pole structures
- Review of NESC code requirements as described in Puc 300 rules
- Review of public need and public impact, including applicability of other State regulations
- Conclusions and Recommendations

1. Petition contents and history.

- On July 23, 2014, Public Service Company of New Hampshire filed a petition to alter four existing crossings for the 317 circuit which operates as a 34.5 kv (3 phase) sub transmission line. The entire circuit is located in previously acquired Right of Ways, which had placed pole structures and conductors. The 317 circuit from Penacook to Webster has been abandoned for a number of years and was no longer conveying power for these segments of the circuit. Tree trimming of the right of way had been minimized during those years. Other segments of the 317 circuit were energized including from the Davisville substation in Webster northerly leading to the Bradford Substation. PSNH states this revamped circuit will connect the existing 317 line from the Davisville Substation in Webster with the branch near Unitil's Penacook

Davisville Substation in Webster with the branch near Unitil's Penacook Substation. The four river crossings are comprised of the Warner River in Webster, the Blackwater River in Hopkinton, the Contoocook River in Concord and the Rolfe Canal which acts a branch of the Contoocook River in Concord. Each crossing will be rebuilt including replacement of conductors and existing poles will be removed. The following will occur:

- Warner River Crossing: The Warner River has two existing circuits over it. The first was an abandoned circuit 317 that was previously de-energized; the second is an energized 317 circuit. The existing four pole arrangement that is 2 sets of poles on the westerly and easterly side of the river will be replaced with a single pole on each side of the river that would carry 2 sets of conductors. The proposed Warner River crossing will occur between two round-wood structures with a span length of approximately 230 feet. The 317 line will be built comprised of three 795 AAC phase conductor wires and one 19#8 Alumoweld messenger wire arranged in a Hendrix 3-phase configuration. The existing 317 line crossing at this location will also be rebuilt using the Hendrix 3-phase configuration to create a double circuit structure. At the crossing the messenger wire will serve as the neutral wire for each of the 317 lines. The structure on the east side of the river, number 204, is a double Hendrix tangent structure, constructed with a single class H3, 50' western red cedar (WRC) pole. Pole 204 will be approximately 272 feet westerly of Dustin Road. The structure on the west side of the river, number 205, is a double Hendrix tangent structure, constructed with a single class H3, 50' western red cedar (WRC) pole.
- Blackwater River Crossing: The proposed Blackwater River crossing will occur between two round-wood structures with a span length of approximately 232' feet. The single circuit 317 line will be built comprised of 477 ACSR 18/1 phase conductor wires and a 4/0 A WG 6/1 neutral. The structure on the east side of the river, number 166, is a vertical angle structure, constructed with a single class 2, 65' WRC pole. The conductor arrangement is vertically spaced with 5 feet of separation between phases. The structure on the west side of the river, number 167, is a single arm tangent structure, constructed with a single class 1, 50' WRC pole. The conductor arrangement is horizontally spaced with 5 feet of separation between phases. The phase conductors roll from vertical to horizontal configuration over the Blackwater River. The river crossing is approximately 256 feet north of East Penacook Rd.
- Contoocook River Crossing: The proposed Contoocook River crossing will occur between two three-pole wood structures with a span length of approximately 572' feet. The 317 line will be built comprised of 477 ACSR 18/1 phase conductor wires and a 4/0 A WG 6/1 neutral. The structure on the east side of the river, number 82, is a horizontal angle structure, constructed with three class 1, 85' WRC poles. The structure on the west side of the river,

number 83, is a horizontal angle structure, constructed with three class 1, 85' WRC poles. Due to soil conditions, the structure on the west side of the river (structure 83) will be embedded an additional 5'.

- Rolfe Canal Crossing: The proposed Rolfe Canal crossing will occur between two wood structures with a span length of approximately 308' feet. The 317 line will be built comprised of 477 ACSR 18/1 phase conductor wires and a 4/0 A WG 6/1 neutral. The structure on the east side of the river, number 77, is a single arm tangent structure, constructed with a single class 2, 60' WRC pole. The structure on the west side of the river, number 78, is a vertical angle structure, constructed with a single class 2, 60' WRC pole. The phase conductors roll from horizontal to vertical configuration over the Rolfe Canal.
- The majority of the 317 circuit will be reconductored using 477 kcm ACSR (26/7 configuration) and will have a 4/0 ACSR (6/1) neutral wire installed below the phase wire configurations. This will be applicable to the Blackwater River, Contoocook River and Rolfe Canal crossings. It will be tensioned to 3,000 psig. The Warner River will have a heavier 795 kcm ACSR and will have a single 19/8 AWG neutral wire installed below the phase wire configurations.
- The Warner River clearance over the 10 year flood level is 42.3 feet for the neutral wire. Clearance above the Blackwater River 10 year Flood Levels is 29.1 ft for the neutral and is being designed to accommodate a 26 ft clearance level of a future communication line. Clearance above the Contoocook River 10 year Flood Levels is 30.1 ft for the lowest line (neutral). The crossing is being designed to accommodate a 26.4 ft clearance level of a future communication line. Clearance above the Rolfe Canal 10 year Flood Levels is 33.3 ft based on the lowest height of the neutral wire. The crossing is being designed to accommodate a 30.1 ft clearance level of a future communication line.
- All clearance requirements were met using the NESC heavy conditions and at 120 deg F. The neutral wire in the 120 deg F scenario was the governing condition which yielded the greatest sags and lowest clearances. PSNH provided cross sections in sufficient detail that showed the various scenarios. PSNH provided Appendices A- D which detailed the clearance scenarios.
- There are more than ample clearances above those required by the NESC.
- All four water clearances are from the 10 year flood level that was derived by PSNH based on NAVD 88 datum and FEMA flood maps. The Warner River (flood elev 358 ft) used Map # 33013C0501E (panel 501 eff. 4/19/2010). The Blackwater River (flood elev 357.25 ft) used Map# 33013C0502E (panel 502 eff. 4/19/2010). The Contoocook River (flood elev 346 ft) used Map#

33013C0338E (panel 338 eff. 4/19/2010). The Rolfe Canal (flood elev 344.5 ft) used Map# 33013C0338E (panel 338 eff. 4/19/2010).

- In August, 2014, PSNH contacted the Safety Division to state that they were scheduled to begin construction on the circuit in the fall of 2014. The work is extensive on this circuit and approval of each of the river crossings will enable to PSNH to efficiently reconstruct the circuit.

2. New Hampshire statute referenced in petition.

TITLE XXXIV PUBLIC UTILITIES CHAPTER 371 PROCEEDINGS TO ACQUIRE PROPERTY OR RIGHTS

Rights in Public Waters and Lands

371:17 Petition. – Whenever it is necessary, in order to meet the reasonable requirements of service to the public, that any public utility should construct a pipeline, cable, or conduit, or a line of poles or towers and wires and fixtures thereon, over, under or across any of the public waters of this state, or over, under or across any of the land owned by this state, it shall petition the commission for a license to construct and maintain the same. For the purposes of this section, "public waters" are defined to be all ponds of more than 10 acres, tidewater bodies, and such streams or portions thereof as the commission may prescribe. Every corporation and individual desiring to cross any public water or land for any purpose herein defined shall petition the commission for a license in the same manner prescribed for a public utility.

Source. 1921, 82:1. PL 244:8. RL 294:16. 1951, 203:48 par. 17. 1953, 52:1, eff. March 30, 1953.

3. Review of existing license(s) and permissions previously granted by the PUC for the Warner River Crossing in Webster, Blackwater River in Hopkinton, Contoocook River, Concord and Rolfe Canal, in Concord and ownership of lands.

The existing four crossings were never originally licensed as stated within the petition. A review by the staff of river crossings at these locations did not find any licenses existed.

4. Review of land ownership of existing pole structures.

All four crossings are located in a right of way of multiple widths that PSNH owns through a paid fee has obtained a permanent easement for its lines and facilities along the 317 circuit. The structures are to be located approximately in the centerline from the edge of the ROW. There are no other circuits or known utilities located within the ROW.

5. Review of NESC code requirements as described in Puc 300.

N.H. Code of Administrative Rules PART Puc 306 requires

- (a) each utility shall construct, install, operate and maintain its plant, structures and equipment and lines, as follows:
 - (1) In accordance with good utility practice;
 - (2) After weighing all factors, including potential delay, cost and safety issues, in such a manner to best accommodate the public; and
 - (3) To prevent interference with other underground and above ground facilities, including facilities furnishing communications, gas, water, sewer or steam service.
- (b) For purposes of this section, “good utility practice” means in accordance with the standards established by:
 - (1) The National Electrical Safety Code C2-2012...

PSNH in its petition states that the 2007 National Electrical Safety Code C2-2007 was used for compliance. The Safety Division reviewed the differences between the C2-2007 and C2-2012 edition for section 23 Clearances and found the differences were mainly additional clarity in the later edition, but no clearance values were adjusted that would have an impact on this crossing.

This crossing does not meet the applicable activities that trigger an individual permit nor a general programmatic permitting review from the Army Corps of Engineers.

The new water crossing structures will be set within the protected shoreland of the Contoocook River as defined by RSA 383-B. Installation of the new structures within the protected shoreland has been submitted and was approved by the NH Department of Environmental Services (NHDES) on September 21, 2014 in Shoreland File #2014-02094. In addition, a Standard Dredge and Fill permit as defined by RSA 482-A is required by NHDES for temporary impacts to wetlands that will result from access to the new water crossing structure locations. This permit application was filed with NHDES on May 22, 2014 and has been approved September 21, 2014 *see DES wetland permit file #2014-01257*.

The Safety Division reviewed 12 supporting statements contained in the petition, the three statements in Appendix A, the nine statements of Appendix B, C, and D, Figure 1, Exhibits 1, 2, 3 and 4 and found them to be in conformance with the applicable sections of the NESC code C2-2012. PSNH provided sufficient detail to verify that no potential safety hazards will result from the alteration of the river crossing under a multitude of appropriate design scenarios.

6. Review of public need and public impact.

PSNH states the crossings are needed because an adjacent circuit 311 is projected to exceed its thermal rating due to load growth projections under certain conditions. The installation of the revamped 317 line will alleviate that condition by shifting load from the 311 line to the 317 line. This will improve system reliability by adding an additional feed that will connect Oak Hill Substation in Concord to the Davisville Substation in Webster and allow for easier switching capability when power outages occur.

PSNH states the proposed lines and licenses “may be exercised without substantially affecting the rights of the public in the public waters of the Warner River, the Blackwater River, the Contoocook River and the Rolfe Canal. Minimum safe line clearances above the water surface and affected shorelines will be maintained at all times. The use and enjoyment by the public of the rivers will not be diminished in any material respect as a result of the overhead line crossings.”

7. Recommendations and Conclusions.

The Safety Division recommends approval of PSNH’s petition to the Commission with the following conditions:

- a. The Commission should require that all future alterations that may impact the public to the crossing conform to the requirements of the 2012 editions of the NESC and be resubmitted to the Commission 60 days prior to the alteration.
- b. PSNH should be required to maintain and operate the crossings in conformance with the NESC or risk future revocation of the license.

Appendix A

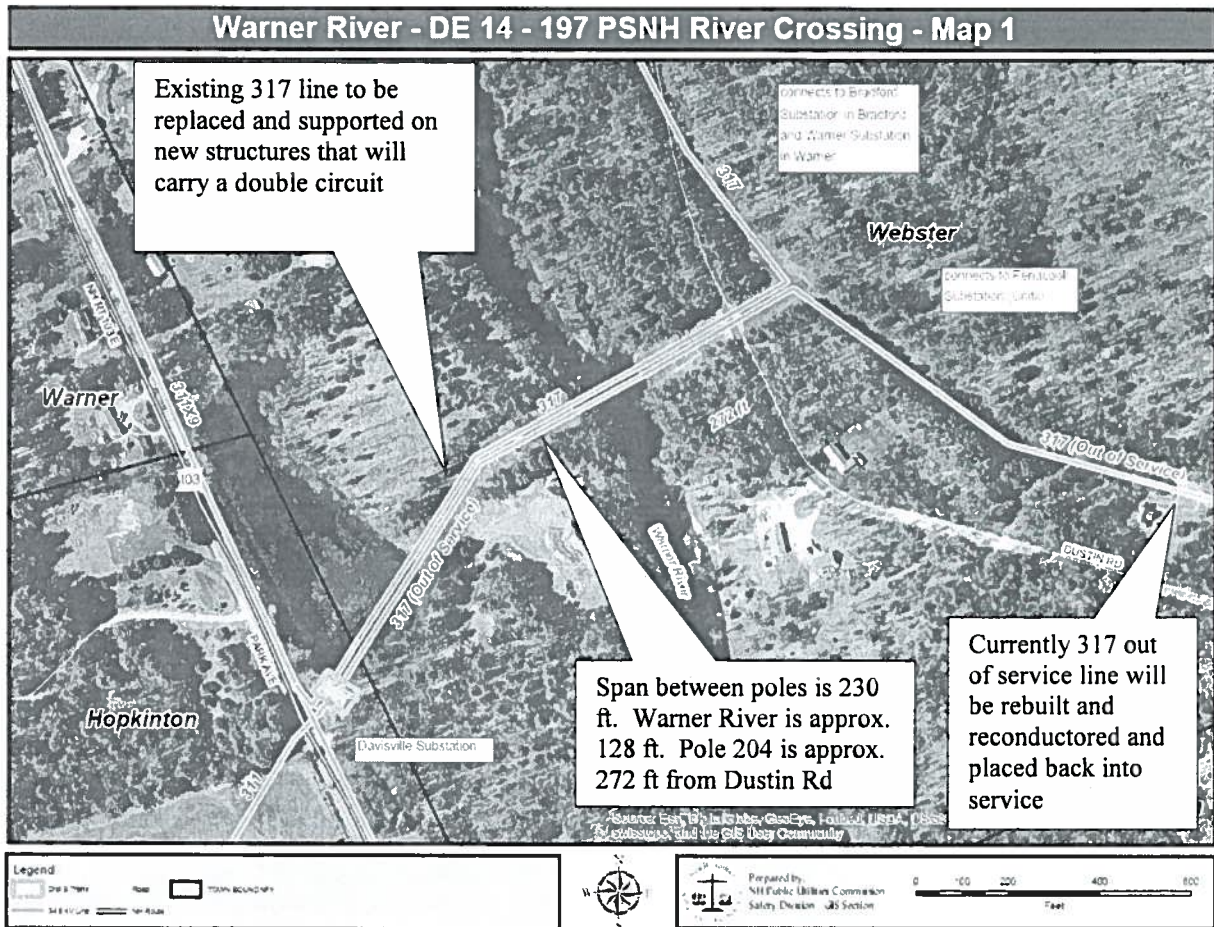


Figure 1.

Overall View of Warner River Crossing Webster, NH. Clearance above the Warner River 10 year Flood Levels is assumed to be between 42.3 ft as the Hendrix configuration has the neutral cable at the same height as the conductors. The crossing is being designed to accommodate a 35.2 ft clearance level of a future communication line.

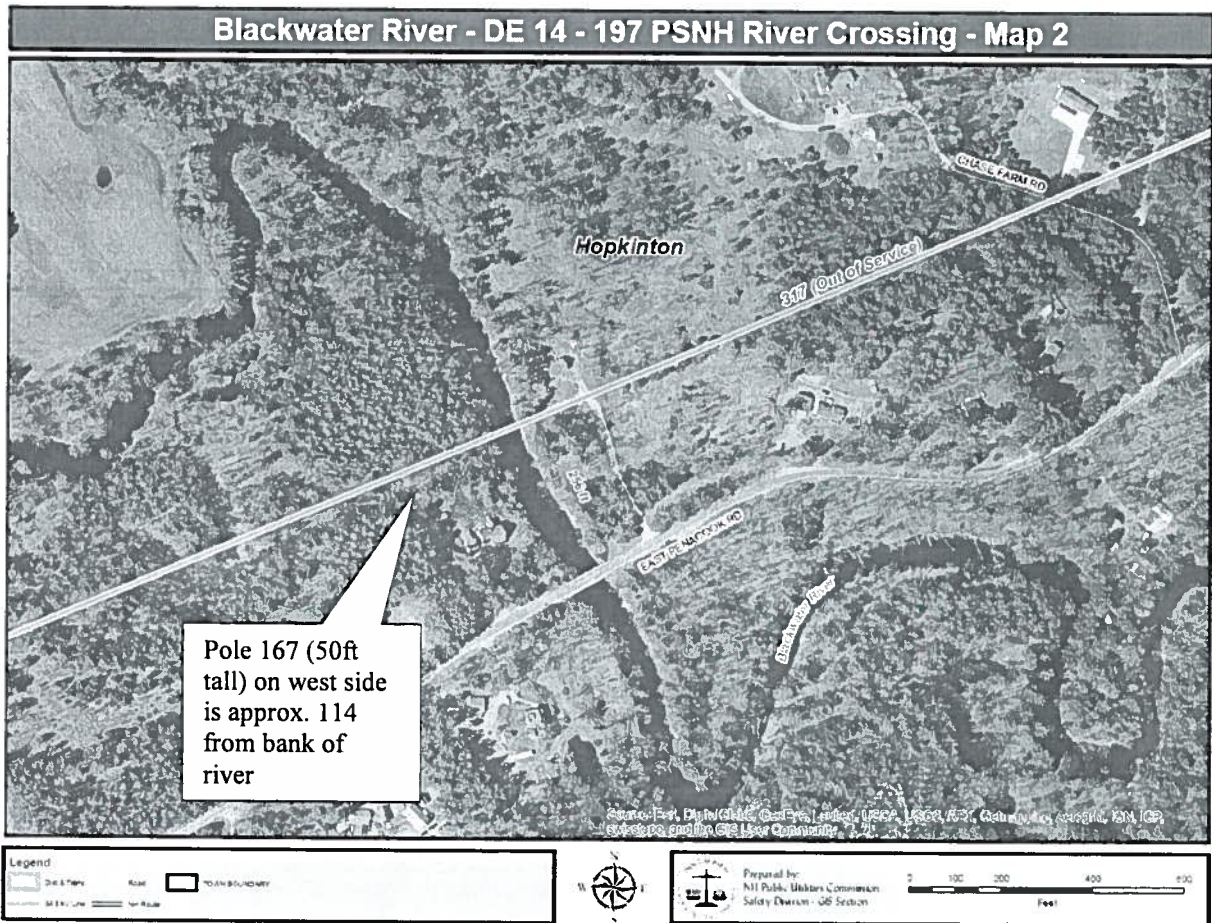


Figure 2.

View of Blackwater River Crossing, Hopkinton, NH. Note span for Line 317 is approximately 232 feet and river width (without 10 yr flood level) is approximately 83 feet. Clearance above the Blackwater River 10 year Flood Levels is 29.1 ft for the neutral and is being designed to accommodate a 26 ft clearance level of a future communication line.

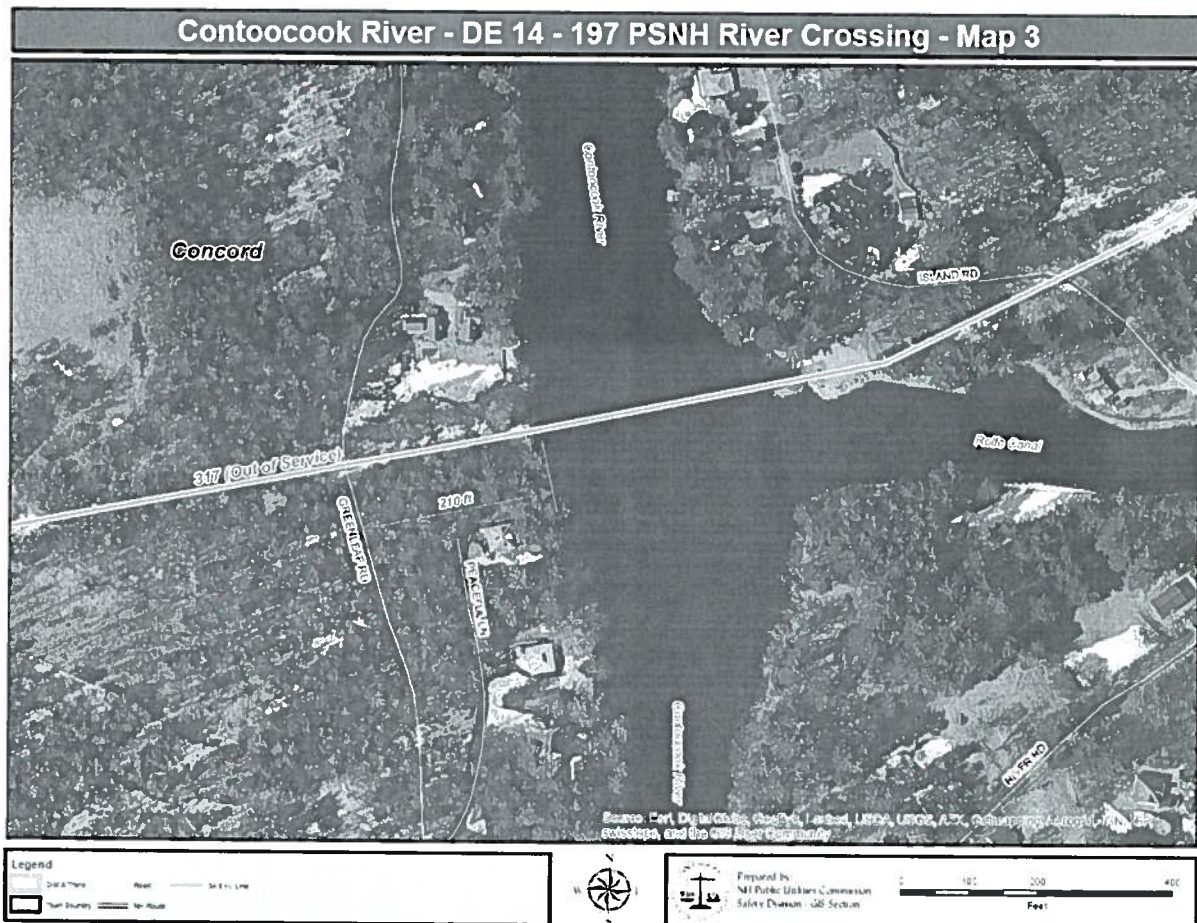


Figure 3.

Divergence of Contoocook River Crossing and Rolfe Canal, Concord, NH. Note span for Line 317 is approximately 572 feet and river width (without 10 yr flood level) is approximately 398 feet. Clearance above the Contoocook River 10 year Flood Levels is 30.1 ft for the lowest line (neutral). The crossing is being designed to accommodate a 26.4 ft clearance level of a future communication line.

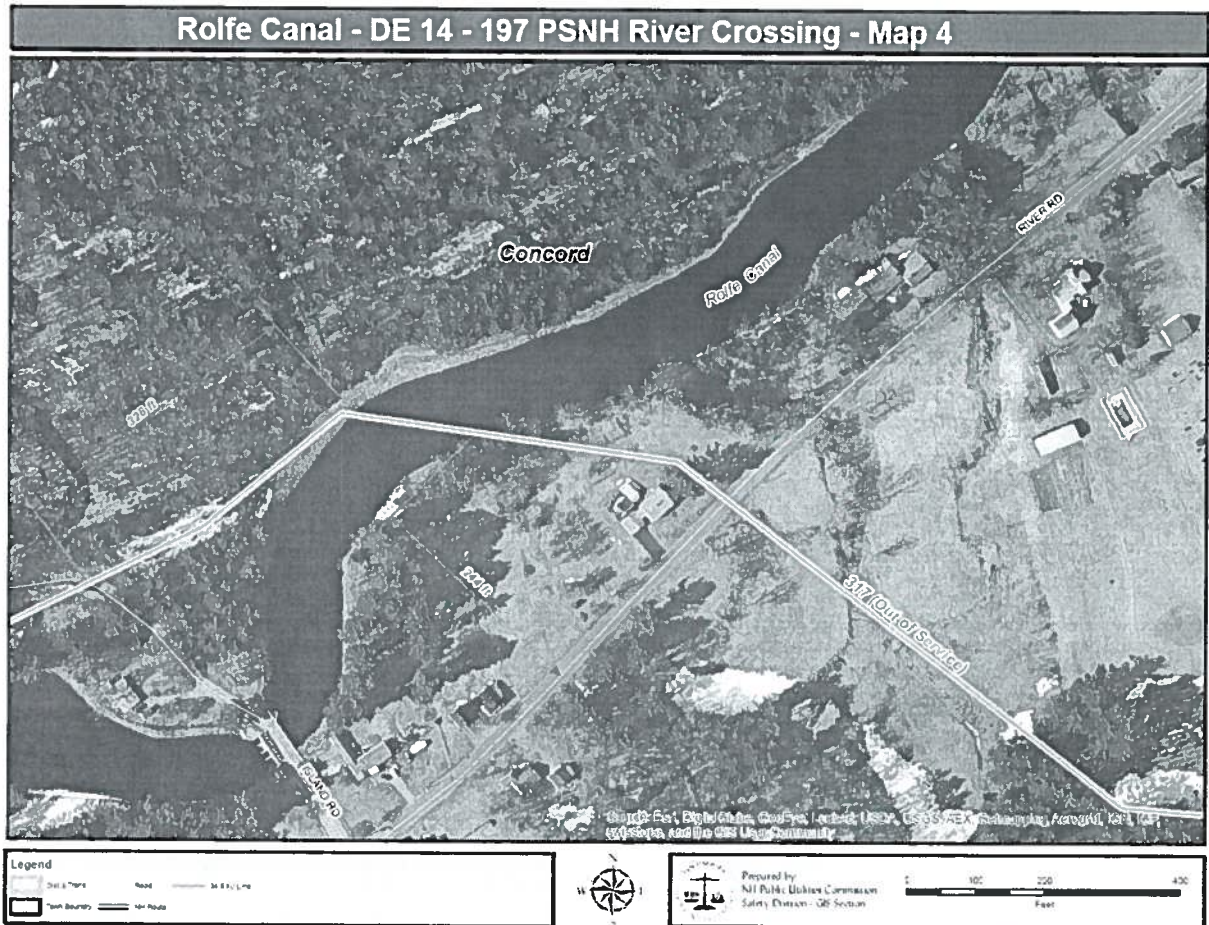


Figure 4.

Rolfe Canal (east branch of Contoocook River), Concord, NH. Note span for Line 317 is approximately 308 feet and river width (without 10 yr flood level) is approximately 205 feet. Clearance above the Rolfe Canal 10 year Flood Levels is 33.3 ft based on the lowest height of the neutral wire. The crossing is being designed to accommodate a 30.1 ft clearance level of a future communication line.

SERVICE LIST - EMAIL ADDRESSES - DOCKET RELATED

Pursuant to N.H. Admin Rule Puc 203.11 (a) (1): Serve an electronic copy on each person identified on the service list.

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Docket #: 14-197-1 Printed: October 08, 2014

FILING INSTRUCTIONS:

- a) Pursuant to N.H. Admin Rule Puc 203.02 (a), with the exception of Discovery, file 7 copies, as well as an electronic copy, of all documents including cover letter with:**

DEBRA A HOWLAND
EXECUTIVE DIRECTOR
NHPUC
21 S. FRUIT ST, SUITE 10
CONCORD NH 03301-2429

- b) Serve an electronic copy with each person identified on the Commission's service list and with the Office of Consumer Advocate.**
- c) Serve a written copy on each person on the service list not able to receive electronic mail.**