

**THE STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION**

Docket DE 10-224

PETITION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE FOR LICENSE TO CONSTRUCT AND MAINTAIN ELECTRIC LINES AND FIBER OPTIC CABLE OVER AND ACROSS THE COCHECO RIVER IN THE CITY OF DOVER, NEW HAMPSHIRE.

TO THE PUBLIC UTILITIES COMMISSION:

Public Service Company of New Hampshire (“PSNH”), a public utility engaged in the generation, transmission, distribution and sale of electricity in the State of New Hampshire, hereby petitions the Public Utilities Commission (“Commission”), pursuant to RSA 371:17, for a license to construct and maintain electric lines and fiber optic cable at one location over and across the Cocheco River in the City of Dover, New Hampshire, and in support of its Petition states as follows:

1. In order to meet the reasonable requirements of service to the public, PSNH has previously constructed and currently operates and maintains a 115 kV transmission line, designated as line M-183. The M-183 line runs between PSNH’s Madbury Substation in Madbury, New Hampshire, and PSNH’s Cocheco Street Substation, in Dover, New Hampshire, and is an integral part of the PSNH transmission system and the overall New England transmission grid. The M-183 line, as presently constructed, crosses the public waters of the Cocheco River at one location in the City of Dover, New Hampshire. The existing overhead transmission line crossing of the M-183 line has been previously licensed by the Commission in Docket 76-22, Order No. 12,219, dated April 21, 1976 (reference Appendix 14, Exhibit 14-B-2). PSNH has also installed and currently maintains an underbuilt all-dielectric self-supporting (ADSS) fiber optic cable at the same crossing on the existing M-183 transmission line structures, which cable crossing has been previously licensed by the Commission in Docket DE 96-370, Order No. 22,454, dated December 11, 1996.

2. In order to continue to meet the reasonable requirements of service to the public, PSNH has determined it necessary to uprate the M-183 line conductors to increase the power transfer capability of the line. This need is a result of load growth in the seacoast area of New Hampshire. A portion of the M-183 line, from Madbury Substation to Structure 13 and from Structure 55 to Cocheco Street Substation, is 795 ACSR 36/1 conductor currently designed to operate at 212°F (100°C). This project will raise structures in certain locations to allow the 795 ACSR 36/1 conductor to operate at a full rating of 285°F (140°C) and maintain all required clearances. Uprating this portion of the M-183 line will allow PSNH to continue to provide reliable electric service to its customers in this area of the State. PSNH has established an “in-service” date of

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November 12, 2010, for this uprate project. An M-183 line construction outage for the project is scheduled to commence on October 30, 2010.

3. The necessary conductor uprate of the M-183 line will utilize the existing centerline and remain within the right-of-way corridor that it presently occupies. Uprating the M-183 line will require the modification of the existing M-183 Cocheco River crossing. The existing M-183 line structures on the North and South sides of the crossing (Structures 87 and 88) use H-Frame type construction. Structure 88 will remain and is capable of handling all required loads. This was determined through both field measurements of the poles and testing to check for structural soundness. Structure 87 will be replaced with a new taller structure to meet clearance requirements. The design of these structures has been based on NESC Grade B construction requirements. Once reconfiguration of these structures is completed, the M-183 line conductors, static wire and fiber optic cable will be re-installed at the crossing.

4. The general location of the M-183 line Cocheco River crossing is shown on the U.S. Geologic Survey location plan attached hereto and marked as Exhibit 1.

5. The design and proposed construction of the crossing is shown on the attached Northeast Utilities Transmission Business plan and profile drawing entitled "M183 LINE (115 KV) BETWEEN STRUCTURES 87 & 88 COCHECO RIVER WATER CROSSING, DOVER, NEW HAMPSHIRE", marked as Exhibit 2. The required clearance calculations for the new crossing are attached to this Petition as Appendix A

6. The required technical information provided in this petition is based on the 2007 National Electrical Safety Code (NESC) C2-2007.

7. The Cocheco River will be spanned using two round wood pole structures (Structures 87 and 88). Structure 88 is an existing Type E structure that will remain in place. Structure 87 is currently a Type C running angle structure. This structure will be replaced with a new Type DA, deadend structure. A detail design specification for the Type E and Type DA structures are attached to this Petition as FIGURE 1 and FIGURE 2, respectively. As shown on FIGURE 1 and FIGURE 2, the three phase wires have a separation of 14' horizontally. On the existing Type E structure the static wire is attached directly to the structure by a support bracket attached to the top of each pole, with the wire approximately 14" below the top of the structure. On the new Type DA structure the static wire is supported by a crossarm 12" from the top of the pole. The ADSS fiber optic cable will be underbuilt on each of these structures. It will be attached directly to the furthest East pole of each structure.

8. Flood water elevations for the crossings were based on information contained in flood insurance rate maps obtained from FEMA. The flood elevation for this portion of the river is given on FEMA Map #33017C0330D, Panel 330 of 405, effective date May 17, 2005. The specific elevation was chosen from FEMA Flood Insurance Study 33017CV000A Table 8, page 21, cross-section A. Table 232-1, note 18

of the NESC states that the minimum clearance over a water body must be based on a 10-yr flood elevation. For the purpose of the design of this crossing, the 100-yr flood elevation was used. It should be noted that the 100-year elevation would be well above the 10-year flood elevation. All elevations are based on NAVD 88 datum.

9. Based on Table 232-1.7 of the NESC, for open supply conductors 750 V to 22 kV to ground, the minimum clearance to the water surface during normal flood level (100-yr flood for the purpose of this Petition) for rivers suitable for sail boating is 40.5' (for waters over 2000 acres). NESC Rule 232.C.1.a states that an additional clearance of 1.6-ft or $[(69.7 \text{ kV}-22 \text{ kV}) \times 0.4]$ is needed for 115 kV, which brings the total required minimum clearance to 42.1', respectively. For overhead shield/surge protection wires and dielectric fiber optic cables that meet NESC Rule 230.E.1, and NESC Rule 230.F.1.b, respectively, the minimum clearance to the water surface at the normal flood level is 37.5' for waters over 2000 acres. As the static wires are located above the phase wires at this crossing, this NESC minimum clearance requirement will always be met. Based on Table 232-1.2 of the NESC, for open supply conductors 750 V to 22 kV to ground, the minimum clearance to roads subject to truck traffic is 18.5'. With the additional 1.6' of clearance required for 115 kV, the total required clearance is 20.1'. The minimum clearance to roads subject to truck traffic for dielectric fiber optic cables is 15.5'.

10. A total of three phase wires, two static wires and one fiber optic cable will span the water body. All three 795 ACSR 36/1 phase conductors, two 7#8 alumoweld shield wires, and the single 64 Fiber ADSS cable will be sagged using the NESC Heavy Loading (0 degrees F., 4 pounds per square foot wind loading, 1/2-inch radial ice) sag charts upon installation in the field. The 795 ACSR conductors will be sagged using a maximum tension of 5,000 pounds. The 7#8 shield wire will be sagged using a maximum tension of 3,600 pounds and the 64 Fiber ADSS will be sagged using a maximum tension of 2,700 pounds. These tensions have been chosen to match the existing tensions of the wires and cables. The sags and clearances to the water surface of the proposed crossing wires and cables are provided in the attached Appendix A.

11. There will be no new crossing structures that need to be set inside of jurisdictional wetlands or other areas that require New Hampshire Department of Environmental Services (NHDES) permitting at the location of the crossing.

12. Replacement of Structure #87 will occur within the protected shoreland of the Cochecho River as defined by RSA 483-B. While RSA 483-B:5-b(1)a requires a shoreland permit for construction, excavation or filling activities within the protected shoreland, Administrative Rule Env-Wq 1406.04(d)(7) exempts from these permitting requirements the replacement of utility poles and guy wires using mechanized equipment, provided that appropriate siltation and erosion controls are used and all temporary impacts are restored. PSNH will comply with this Administrative Rule in the installation of replacement Structure #87.

13. As this section of the Cocheco River is considered a federal channel, PSNH has consulted with the U.S. Army Corps of Engineers and has been advised that, since wire and cable clearances at the location of the crossing will be increased over those presently in place, no Army Corps permit modifications are required.

14. The proposed crossings will be maintained and operated by PSNH in accordance with the applicable requirements of the NESC.

15. PSNH owns permanent easements, not less than 135' wide, for its lines and facilities on the South side of the Cocheco River, and owns the property in fee on the North side of the River, at the proposed crossing location. This project will be constructed within the limits of those easements and the PSNH-owned land.

16. PSNH submits that the license petitioned for herein may be exercised without substantially affecting the rights of the public in the public waters of the Cocheco River. Minimum safe line clearances above all water surfaces and affected shorelines will be maintained at all times. The use and enjoyment by the public of the public waters of the Cocheco River will not be diminished in any material respect as a result of the overhead line and cable crossings.

WHEREFORE, PSNH respectfully requests that the Commission:

- a. Find that the license petitioned for herein may be exercised without substantially affecting the public rights in the public waters which are the subject of this Petition;
- b. Grant PSNH a license to construct and maintain electric lines and fiber optic cable over and across the public waters of the Cocheco River as specified in the Petition; and
- c. Issue an Order Nisi and orders for its publication.

Dated at Manchester this 23rd day of SEPTEMBER, 2010.

Respectfully submitted,
PUBLIC SERVICE COMPANY OF NEW
HAMPSHIRE
By Its Attorney



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APPENDIX A
M-183
COCHECO RIVER
DOVER, NH

1. Line M-183 will cross the Cocheco River on one, two pole 60' wood deadend structure(North) and one, three pole 75' deadend Structure (South) with a span of 501'. A detail of these structures have been provided with the petition as FIGURE 1 and FIGURE 2 respectively. As shown on FIGURE 1, the phase wires are spaced 14' horizontally. The static wire is carried on the structures above the phase wires by support bolts approximately 4'-10" above and 7' laterally from the phase wires. The ADSS attachment point on the structure is 7' horizontally and 9' vertically from the closest phase wire. As shown on FIGURE 2, the phase wires are spaced 14' horizontally. The static wire is carried on the structures above the phase wires by a crossarm approximately 7'-6" above and 7' laterally from the top phase wire. The ADSS cable is attached to the pole a distance of 13.5' directly below the phase wire. The ADSS will attach to the furthest East pole of each structure. Minimum distances to ground for truck traffic for 115kV is 20.1' per the NESC and has been met as 46.7' of clearance is provided. Minimum distances to ground for truck traffic for dielectric fiber optic cable is 15.5' and has been met as 36.7' of clearance is provided.

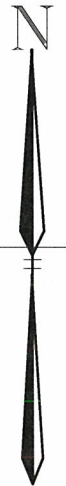
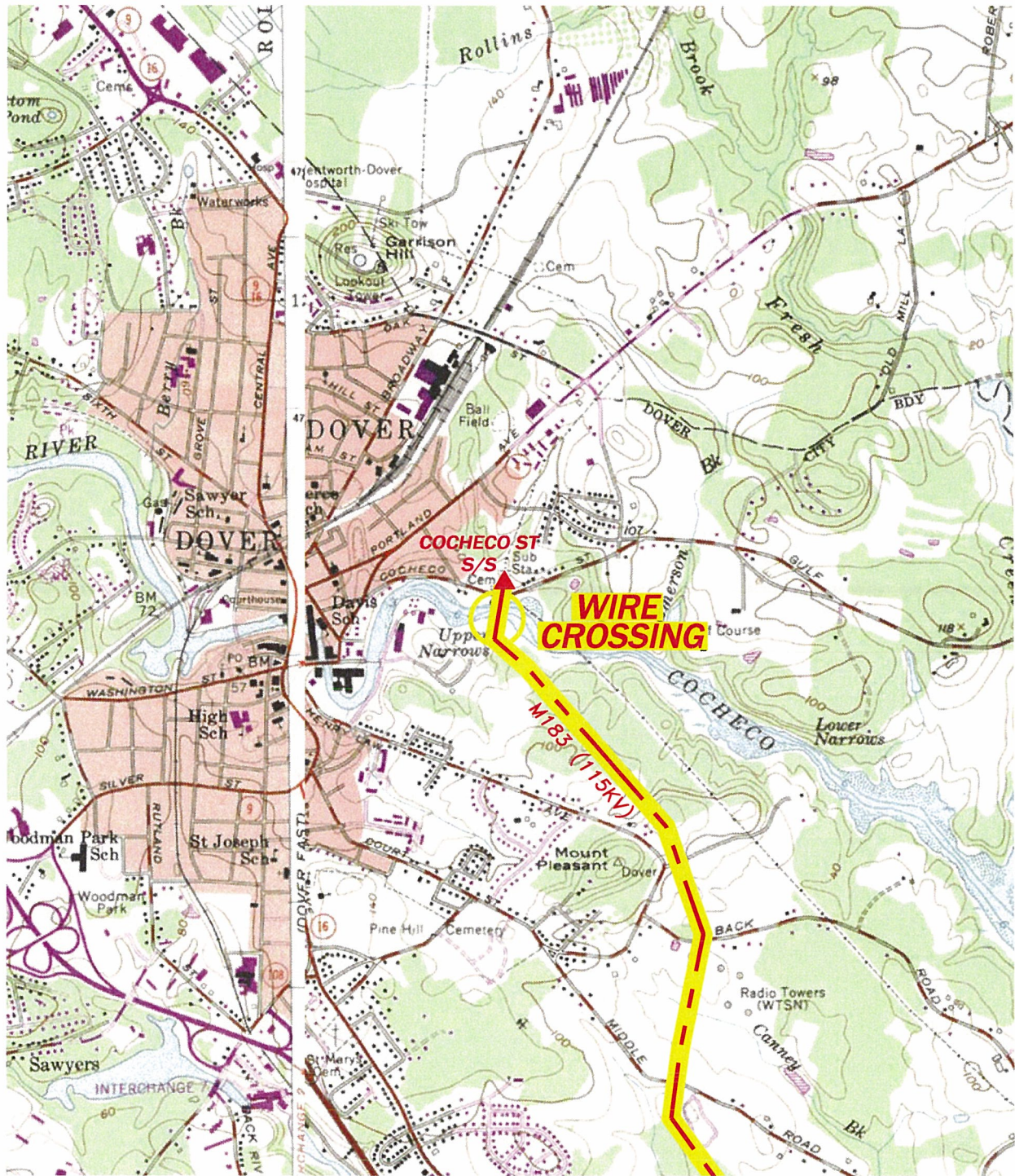
2. Flood water elevations for the Cocheco River were based on information contained in flood insurance rate map number 33017C0330D, panel 330 of 405 and Flood Insurance Study 33017CV000A Table 8, page 21 for Strafford County, New Hampshire dated May 17, 2005 provided by FEMA. The 100-year flood elevation for this portion of the River is approximately 10.3'. No information was available for the 10-year flood elevation for this portion of the River. However, it should be noted that the 100-year elevation, which these lines were designed to safely exceed, would be well above the 10-year flood elevation. The area of the crossing, as required by the NESC (Table 232-1.7, Note 19), is approximately 74 acres. This is based on the total area of the River for a 1-mile stretch in either direction of the crossing (608' x 5,280')/43,560 sf/ac = 74 ac). According to NESC Table 232-1, Note 19, "The clearance over a canal, river, or stream normally used to provide access for sailboats to a larger body of water shall be the same as that required for the larger body of water." The Cocheco River at this location is used to provide access to the Piscataqua River which leads to the Atlantic Ocean, therefore the highest required clearance has been used for this crossing. As stated in paragraph 9 of the Petition, the minimum required 115 kV conductor clearances for water surface area over 2000 acres is 42.1'. The required minimum clearance to dielectric fiber optic cable is 37.5'.

3. The sags and clearances to the water surface during a 100-year flood event for this crossing are as follows;

- PSNH investigated a multitude of weather and loading conditions for its design. The conditions investigated include ANSI C2-2007 Heavy Load Conditions, minus 20 degrees F ambient temperature for the phase conductors, static wires and ADSS cable, 120 degrees F ambient temperature for the static wires and ADSS cable, and 285 degrees F for the phase conductors. PSNH used these design conditions and combinations thereof to determine the minimum clearance of all conductors to the water and land surfaces, between the phase conductors and static wires and between the phase conductors and the ADSS cable. PSNH has determined that the weather cases and combinations listed below result in the minimum clearances and control over all other weather conditions and combinations.
- Static wire – Due to the fact that the 7#8 alumoweld static wire is located above the phase wires, its clearance to the water surface will always exceed the minimum required NESC distance.
- 120 degrees F, ADSS- Maximum sag conditions for the ADSS fiber optic cable occur when the cable is heated to 120°F. At this condition the sag will be 16.4' with a clearance to the water surface of 38.2'. This design will exceed the minimum clearance requirement of 37.5' by 0.7' under temporary conditions during a 100-yr storm event.
- NESC Heavy Loading, ADSS- The maximum conductor sag for this weather case will be 13.0' with a clearance to the water surface of 41.0'.
- -20 degrees F, ADSS- The maximum conductor sag for this weather case will be 15.9' with a clearance to the water surface of 38.7'.
- NESC Heavy Loading, Phase Wires - The maximum conductor sag for this weather case will be 13.9' with a clearance to the water surface of 50.5'.
- 30 degrees F, Phase Wires - The maximum conductor sag for this weather case will be 13.9' with a clearance to the water surface of 50.5'.
- 285 degrees F, Max operating temperature (Phase wires) based on PSNH transmission standards - The maximum conductor sag for this weather case will be 21.5' with a clearance to the water surface of

43'. This condition produces the greatest sag in the phase wires and therefore the minimum clearance to the water surface. This design will exceed the minimum clearance requirement of 42.1' by 0.9' under temporary emergency conditions during a 100-yr storm event.

- Minimum phase to static wire clearance – The weather case that would produce the minimum clearance between the phase wires and the static wire would be a combination of winter weather factors. First, the phase wires would have to be at 30 deg. F just after an ice storm and would have just dropped their ice. The static wire would also be at 30 deg. F and would still be iced with 1" of radial ice. Under these conditions the clearance would be 7.0' vertically and 6.0' horizontally from the shield wires to the closest phase wire. Based on Section 235.C.2.a.1 and Table 235-6 section 2.a of the NESC, the minimum clearance required is 57.4", or approximately 4.78' [29" + (121 kV-50 kV) x 0.4"].
- Minimum phase to ADSS clearance – The weather case that would produce the minimum clearance between the phase wires and the ADSS cable occurs when the conductor is operating under its maximum operating temperature during a cold period. First, the phase wires would have to be at 285 deg. F. The ADSS cable would be at -20 deg. F. Under these conditions the clearance would be 4.3' vertically and 4.5' horizontally from the ADSS cable to the closest phase wire. This results in a clearance of 6.22' diagonally. According to NESC Rule F1b shall meet the requirements of Rule 230E1. Based on Section 235.C.2.a.1 and Table 235-6 section 2.a of the NESC, the minimum clearance required in any direction is 57.4", or approximately 4.78' [29" + (121 kV-50 kV) x 0.4"]. This clearance would be exceeded by 1.44'.

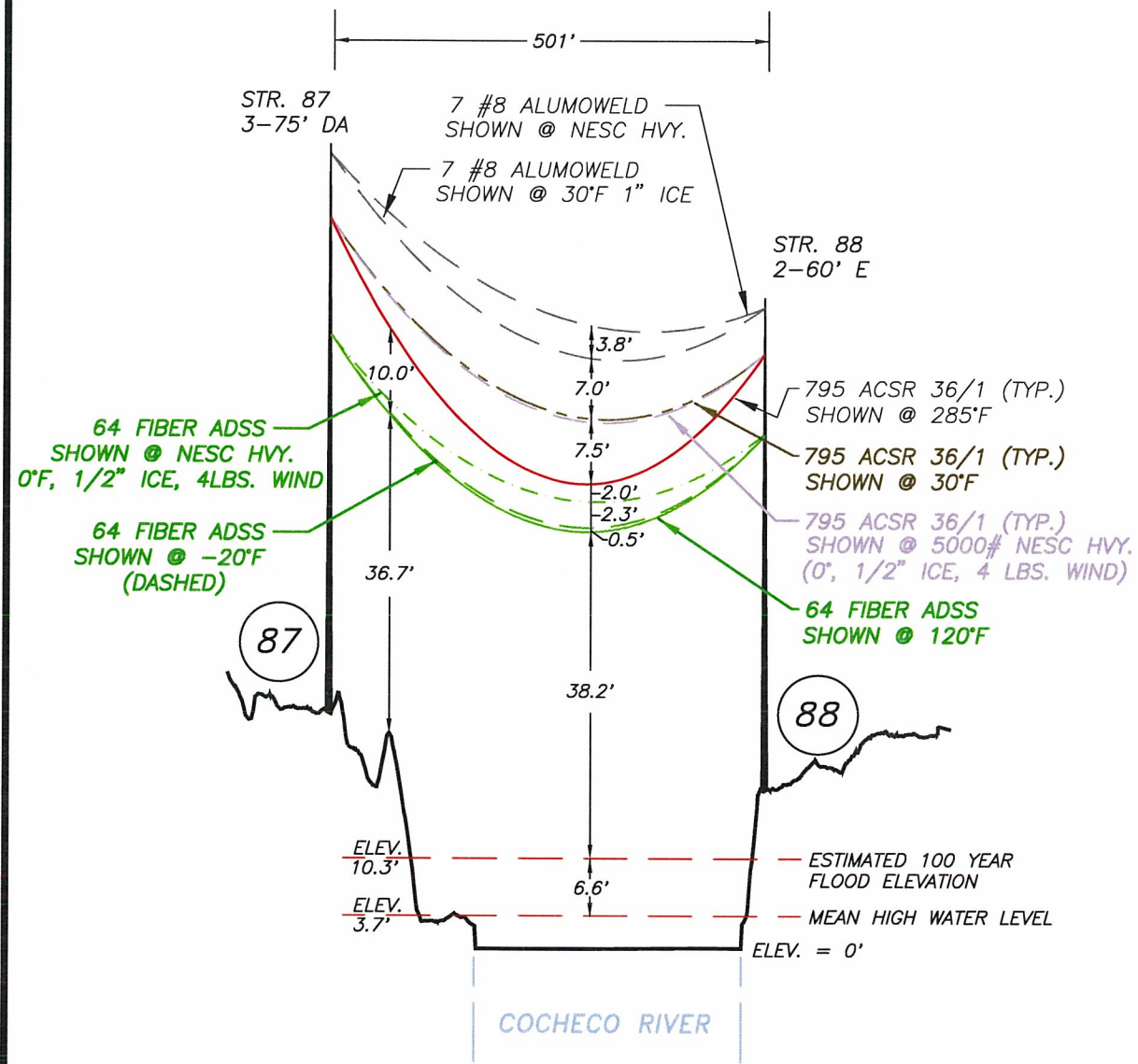


GRAPHIC SCALE
1" = 2000'

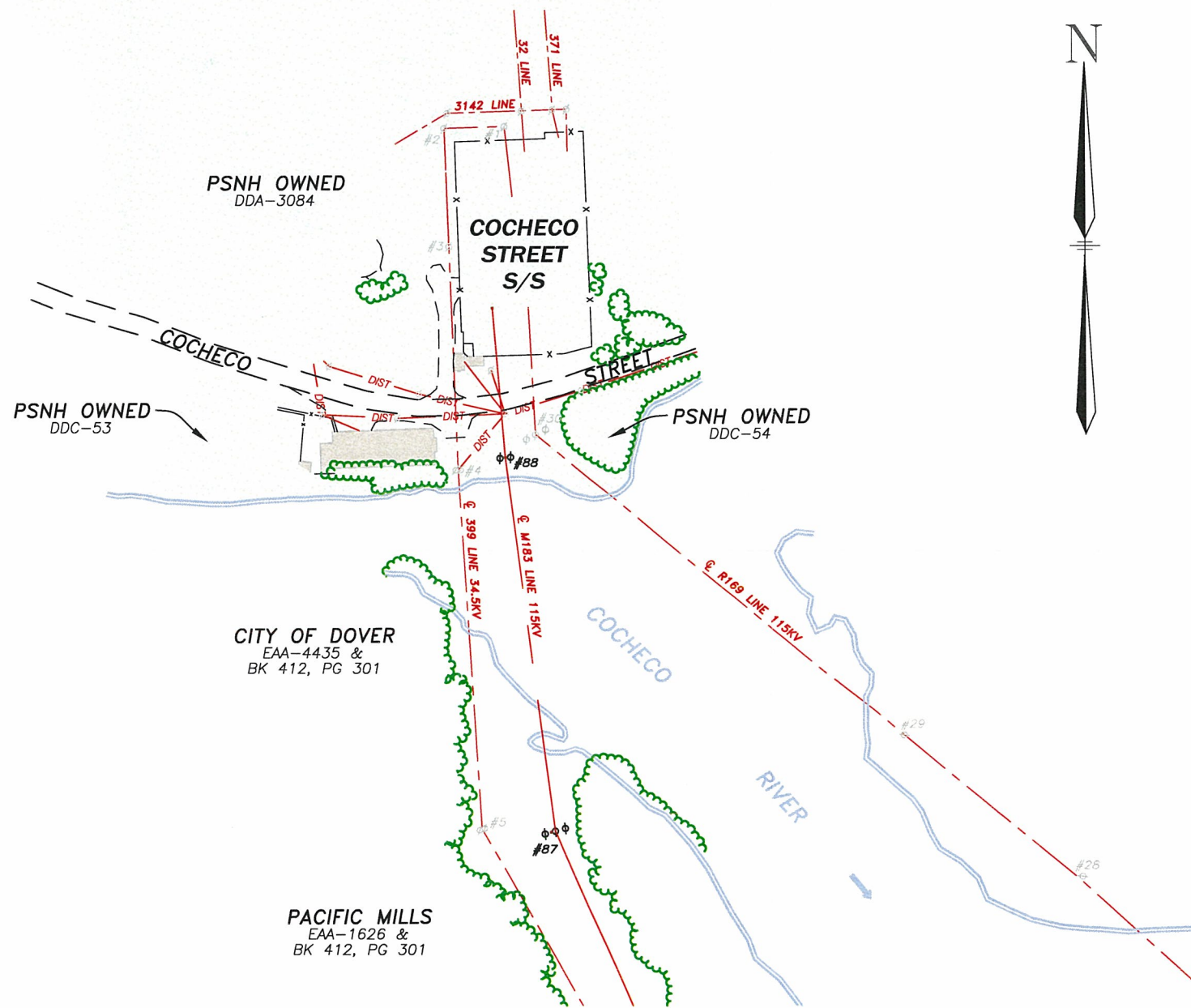
EXHIBIT 1 Revised 09/23/10

NO.	REVISION	DATE	DRWN	CHCK	APPR

DRAWN JWH	Northeast Utilities	Transmission Business
DESIGNED JRS		
CHECKED JRS	LOCATION PLAN M183 LINE (115 KV) COCHECO RIVER WATER CROSSING DOVER, NEW HAMPSHIRE	
APPROVED DSD	SCALE 1" = 2000'	DATE 7/22/2010
	SHEET 1 OF 2	DRAWING NO. D-7649-178A



PROFILE
SCALE: 1"=200' HORIZ.
20' VERT.



PLAN VIEW
SCALE: 1"=200'

NOTE:
1.) ALL ELEVATIONS BASED ON NAVD88 DATUM

LEGEND:
[Hatched Box] DENOTES APPROX. FEE PROPERTY

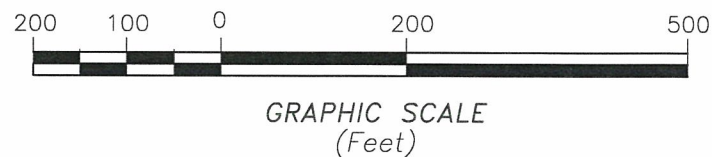


EXHIBIT 2 Revised 09/23/10

NO.	REVISION	DATE	DRWN	CHK	APPR
1	REVISION 1	9/2010			

Northeast Utilities		Transmission Business	
M183 LINE (115 KV) BETWEEN STRUCTURES 87 & 88 COCHECO RIVER WATER CROSSING DOVER, NEW HAMPSHIRE			
DRAWN JWH DESIGNED JRS CHECKED JRS APPROVED DSD	SCALE AS SHOWN	DATE 7/22/2010	SHEET 2 OF 2 DRAWING NO. D-7649-178