

Appendix Q

NHPUC Petition for Licenses



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

DE 15-____

New England Power Company d/b/a National Grid

**Verified Petition for License to Construct and Maintain Electric Lines and Shield Wire
Over and Across State Waters and State Land
in the Town of Windham, New Hampshire**

New England Power Company d/b/a National Grid (“NEP”), a public utility engaged in the transmission of electricity in the State of New Hampshire, hereby petitions the Public Utilities Commission (the “Commission”) pursuant to RSA 371:17 for a license to construct and maintain electric transmission lines and associated shield wires above and across (1) Beaver Brook, a non-navigable waterway located in Windham, New Hampshire, and (2) a parcel of land owned by the State of New Hampshire Department of Transportation (“NH DOT”) also located in Windham, New Hampshire. In support of its petition, NEP states as follows:

1. NEP and Public Service Company of New Hampshire d/b/a Eversource Energy (“PSNH”) have submitted a joint application to the New Hampshire Site Evaluation Committee (“SEC”) for a Certificate of Site and Facility for authority to construct and operate a new 345 kV transmission line (denominated the 3124 Line) from PSNH’s Scobie Pond Substation in Londonderry, New Hampshire to the Massachusetts state border (the “Project”).

2. The Project is a component of the larger Merrimack Valley Reliability Project (“MVRP”), which includes the Massachusetts portion of the 3124 Line that continues from the state border to National Grid’s Tewksbury #22A substation in Tewksbury as well as associated substation upgrades. The Independent System Operator – New England (“ISO-NE”) determined

that the MVRP is needed to address reliability concerns in the Southern New Hampshire and northern Massachusetts region. ISO-NE concluded that, based on forecasted load growth, aging infrastructure and market forces, additional transmission capacity is needed to support the reliable delivery of electric power to meet the region's current demand and future increased demand.

3. The total length of the MVRP will be approximately 24.4 miles. In New Hampshire, the Project will run approximately 17.9 miles within existing NEP and PSNH power line rights-of-way ("ROWS"). These existing ROWs traverse portions of the Towns of Londonderry, Hudson, Windham and Pelham. Attachment 1 to this Petition is a figure showing the general route of the Project superimposed over a map of the relevant area.

4. The portion of the ROW at issue here currently contains three NEP-owned transmission lines: the N-214 (230 kV); the Y-151 (115 kV); and the O-215 (230 kV), from east to west, respectively. Each of the three existing lines currently crosses Beaver Brook. The Project will involve relocating the Y-151 to the western edge of the ROW and constructing the new 3124 Line in its place.

5. The relocated Y-151 Line will cross Beaver Brook and the new 3124 Line will cross both Beaver Brook and the NH DOT parcel. Installation of the cables across Beaver Brook will not require any dredging or use of heavy equipment in the brook, and at no time will the flow of the brook be diverted or altered for the Project. Beaver Brook is not designated as a navigable waterway under the NH Programmatic General Permit. NEP has applied to the New Hampshire Department of Environmental Services for a Shoreland Permit for the Beaver Brook crossings.

6. The Project has been designed in accordance with the 2012 National Electrical Safety Code (“NESC”) C2-202 to ensure sufficient structure strength and the required minimum clearances above water and ground levels. These clearances are described below and depicted on the associated plans attached hereto.

Beaver Brook – Y-151 Crossing

7. As noted, the centerline of the Y-151 line will be relocated to 28.5 feet from the western edge of the ROW. The length of the span crossing Beaver Brook will be approximately 703 feet and the conductor and shield wire will be supported by Structures 82 and 83, which will be approximately 85-foot and 74.5-foot tall steel monopoles with davit arms, respectively. A cross-section, aerial view and pole details are included in the plan entitled “Merrimack Valley Reliability Project 115kV Y151 Transmission Line Beaver Brook Crossing Span 82-83,” last dated 05-08-15 and provided as Attachment 2 to this Petition.

8. At the location of this crossing, the main stem of Beaver Brook channel is approximately 55-feet wide within the ROW and Structures 82 and 83 will not be located within the banks of Beaver Brook. The FEMA base flood elevation at the crossing is approximately 177 feet according to the Flood Insurance Rate Map (PANEL 0536E), dated May 17, 2005, and no structure will be located within the 100-year floodplain of Beaver Brook.

9. The closest distance from the proposed Y-151 line Structure 82 to the top of bank is approximately 206 feet and is located on the opposite side of Haverhill Road from the brook. Proposed Structure 83 is approximately 442 feet from the top of bank. Existing Y-151 Structures 81 and 82 will be removed.

10. The Y-151 line will consist of three “Drake” 795 kcmil 26/7 ACSS HS285 conductors that will have a minimum clearance of 25 feet above the water level of Beaver Brook.

A single OPGW shield wire will be installed to continue service for existing communications and to provide lightening protection a minimum of seven feet above the conductors, meaning that it will at all times have a greater clearance above Beaver Brook than the conductor.

Beaver Brook – 3124 Crossing

11. As noted, the proposed new 345 kV 3124 Line will be located in the same centerline alignment as the existing Y-151 line and, therefore, the 3124 Line will cross Beaver Brook at the same location as the existing Y-151 line. This crossing will be approximately 919 feet long and supported by Structures 144 and 145 on either side. Structure 144 will be an approximately 75-foot tall weathered steel H-frame dead-end structure, and Structure 145 will be an approximately 70-foot-tall weathered steel H-frame suspension structure with cross bracing. A cross-section, aerial view and pole details are included in the plan entitled “Merrimack Valley Reliability Project 345kV 3124 Transmission Line Beaver Brook Crossing Span 144-145”, last dated 05-08-15, and provided as Attachment 3 to this Petition.

12. The closest distance from the proposed 3124 Line Structure 144 to the top of bank is approximately 257 feet with Haverhill Road (Route 111) located between the structure and the brook. The closest distance from the proposed 3124 Line Structure 145 to the top of bank is approximately 488 feet.

13. The 3124 Line will consist of two “Falcon” 1590 kcmil 54/19 ACSR conductors per phase that will have a minimum clearance of 30 feet above the water level of Beaver Brook. A single OPGW shield wire will be installed to allow for communications between terminal substations and to provide lightening protection a minimum of 12 feet above the conductors, meaning that it will at all times have a greater clearance above Beaver Brook than the conductor. A second 3/8” EHS Steel shield wire will also serve as lightning protection on the line.

NH DOT-owned Parcel – 3124 Line

14. The Project will also involve the installation of the new 345 kV 3124 Line over an NH DOT-owned parcel (identified as Lot 14-A-300A). This is a 0.33-acre vacant parcel located immediately adjacent to Route 111 (Haverhill Road). NEP and PSNH have consulted with NH DOT and will obtain all necessary permits for work on and over Route 111. A cross-section, aerial view and pole details are included in the plan entitled “Merrimack Valley Reliability Project Line 3124 345kV Transmission NH DOT Crossing Permit Drawing Route 111 Crossing” dated 6-16-15, and provided as Attachment 4 to this Petition.

15. The Y-151 line currently crosses the NH DOT-owned parcel. As noted above, the Y-151 will be relocated and the 3124 Line will be constructed in the same centerline alignment as the existing the Y-151. Accordingly, the 3124 Line will cross the NH DOT parcel at the same location as the existing Y-151 line that it will replace.

16. This crossing will be approximately 919 feet long and supported by Structures 144 and 145 on either side of the crossing. Structure 144 will be located on the opposite side of the 150-foot wide Route 111 from the NH DOT parcel and Structure 145 will be located on the opposite side of Beaver Brook from the NH DOT parcel. Structure 144 will be a 75-foot tall weathered steel H-frame dead-end structure, and Structure 145 will be a 70-foot-tall weathered steel H-frame suspension structure with cross bracing. No supporting structures or other facilities will be located on the subject parcel.

17. The 3124 line will consist of two “Falcon” 1590 kcmil 54/19 ACSR conductors per phase that will exceed the minimum required clearance of 24.8 feet above ground level under all operating conditions. The design clearance of the span is 30 feet above the paved surface under all operating conditions. A single OPGW shield wire will be installed to allow for

communications between terminal substations and to provide lightening protection a minimum of 12 feet above the conductors, meaning that it will at all times have a greater clearance above ground than the conductor. A second 3/8" EHS steel shield wire will also serve as lightning protection on the line.

18. NEP owns permanent easements for the entire width of the ROW at the crossing locations. The crossings will occur within the limits of those easements. Thus, all of the property rights necessary to construct and maintain the transmission lines above Beaver Brook and the NH DOT property have been obtained, and no taking of private property or acquisition of other property rights is required for this purpose.

19. NEP submits that the rights granted by the license sought in this petition may be exercised by NEP without affecting the rights of the public to use the waters or the property of the State, and the use and enjoyment by the public of Beaver Brook and the NH DOT property will not be diminished.

WHEREFORE, NEP respectfully requests that the Commission:

A. Find that the licenses petitioned for herein may be exercised without substantially affecting the public rights in the public waters and public lands of the State of New Hampshire which are the subject of this petition;

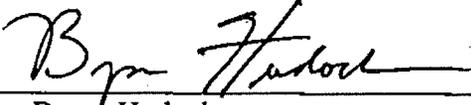
B. Grant NEP a license to cross Beaver Brook and the NH DOT-owned parcel in the locations and for the purposes described above; and

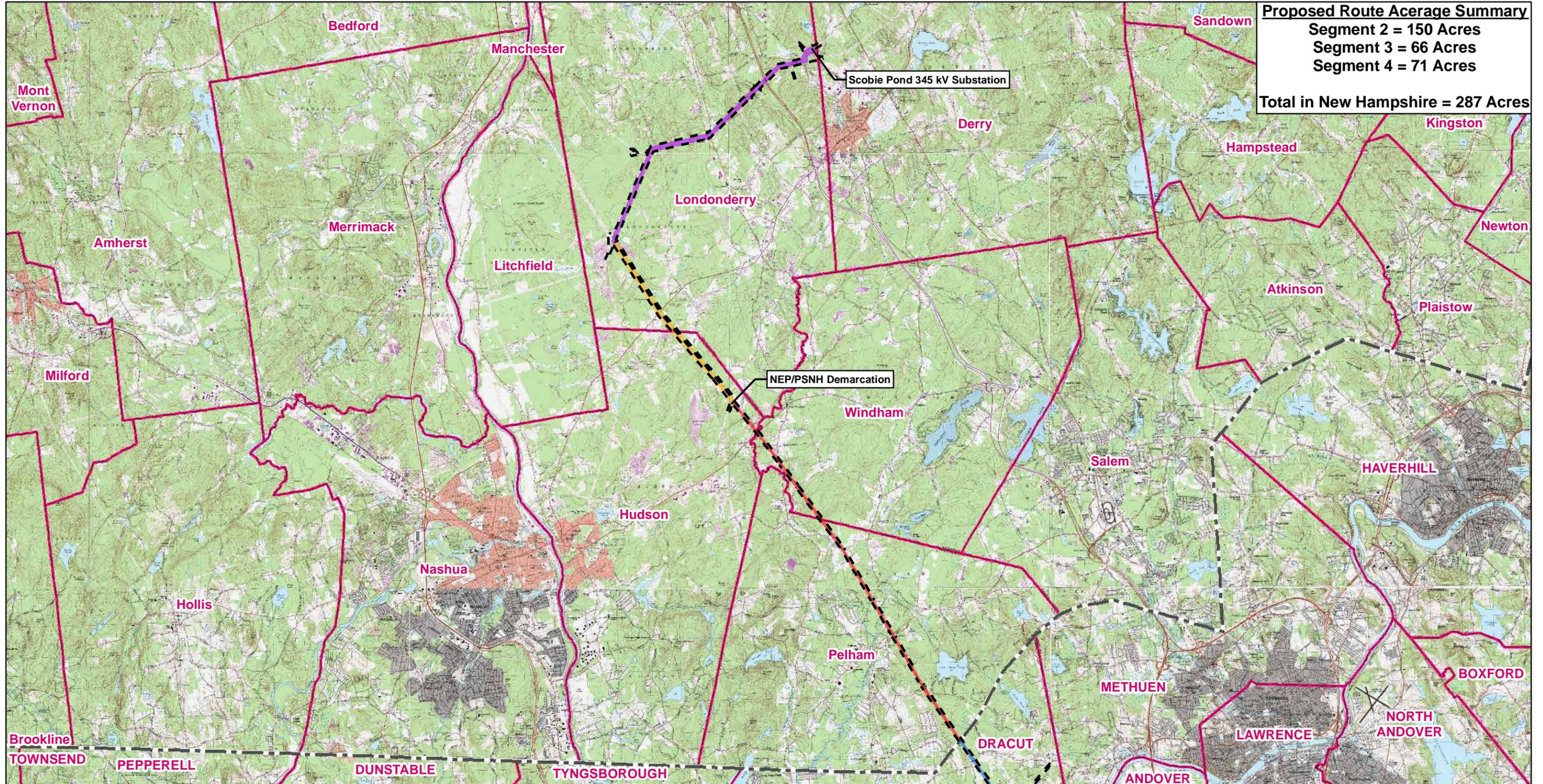
C. Grant such other and further relief as the Commission may determine to be just and reasonable and consistent with the public interest.

Respectfully submitted,

NEW ENGLAND POWER COMPANY
d/b/a NATIONAL GRID

July 14, 2015

By: 
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Lead Project Manager
National Grid USA Service Company, Inc.
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Waltham, MA 02451
Telephone (781) 907 - 3131
Email: bryan.hudock@nationalgrid.com



Proposed Route Acreage Summary
 Segment 2 = 150 Acres
 Segment 3 = 66 Acres
 Segment 4 = 71 Acres
Total in New Hampshire = 287 Acres



- Surveyed ROW Boundary
- State Boundary
- Town Boundary
- Segment 1
- Segment 2
- Segment 3
- Segment 4

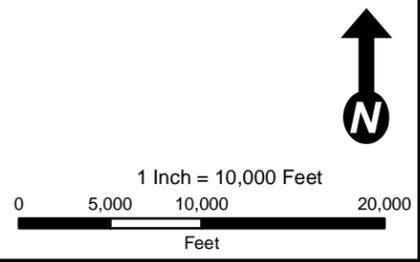


Figure 2 - NH USGS Project Overview
 Merrimack Valley Reliability Project
 Tewksbury 22A Substation MA to
 Scobie Pond 345 kV Substation NH

Source:
 NGRID, Black & Veatch, VHB
 Beals & Thomas, EVERSOURCE, Normandeau

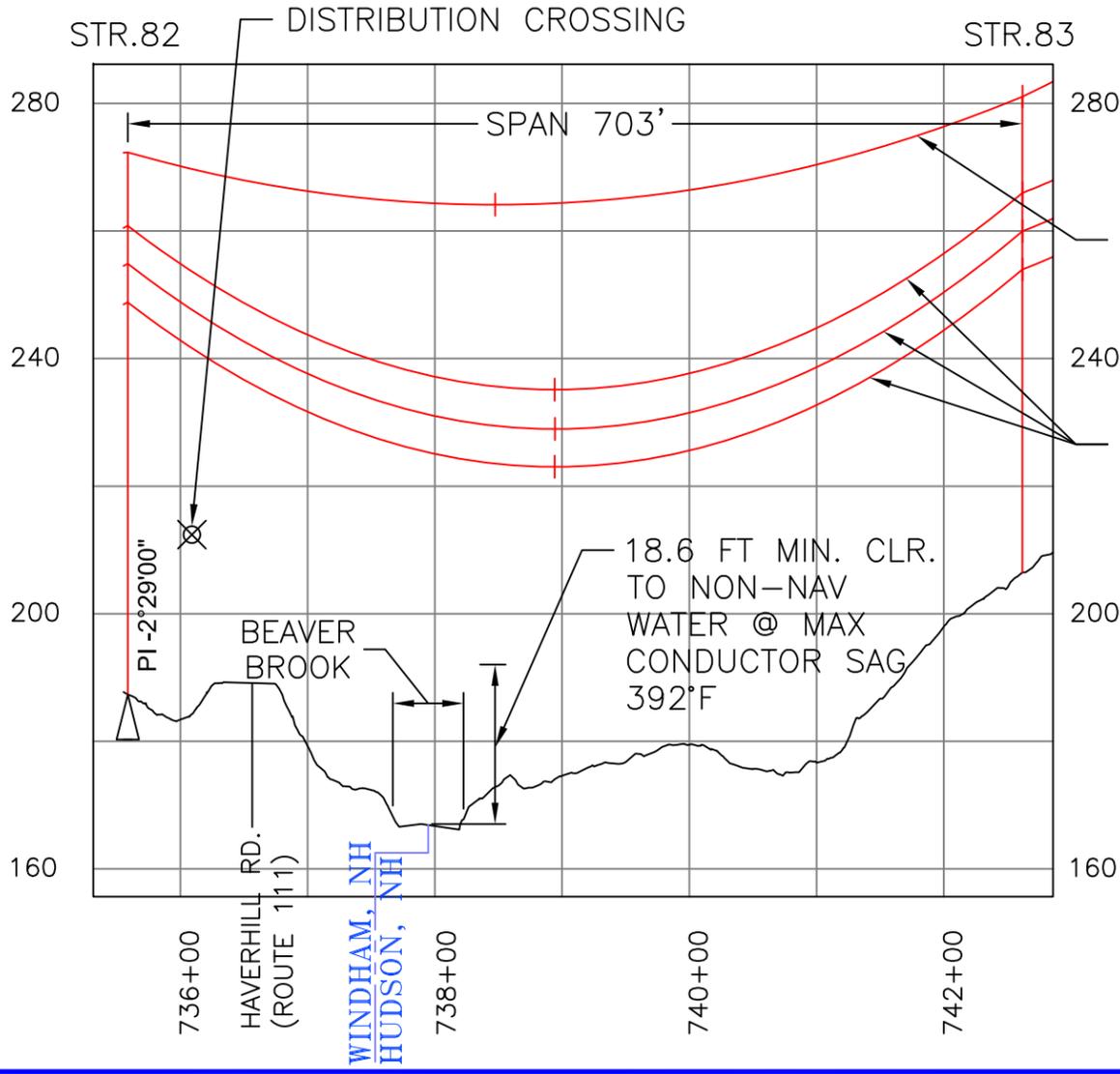
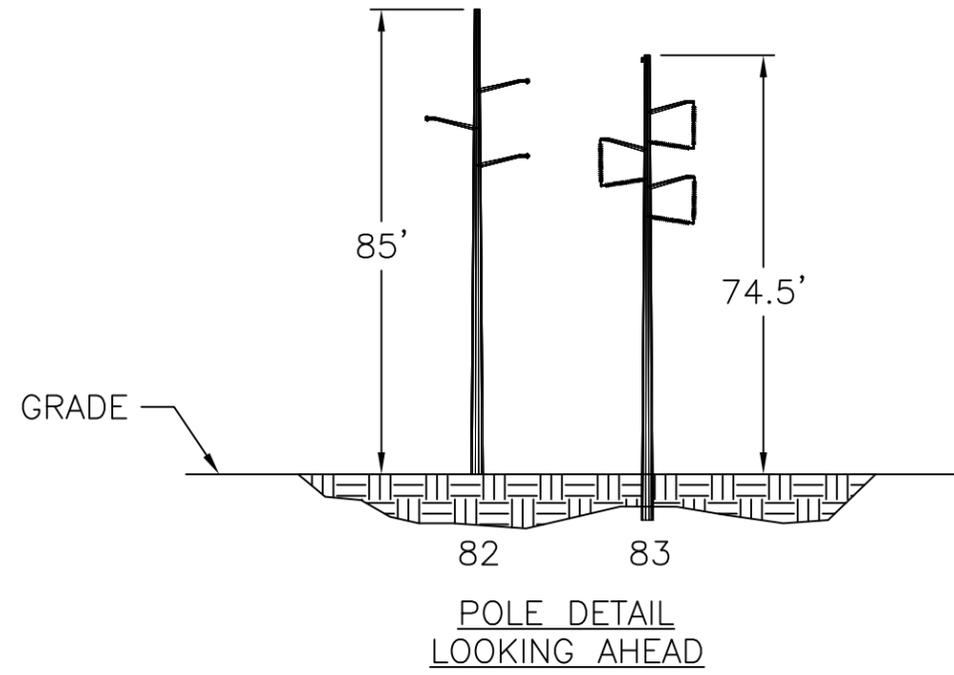
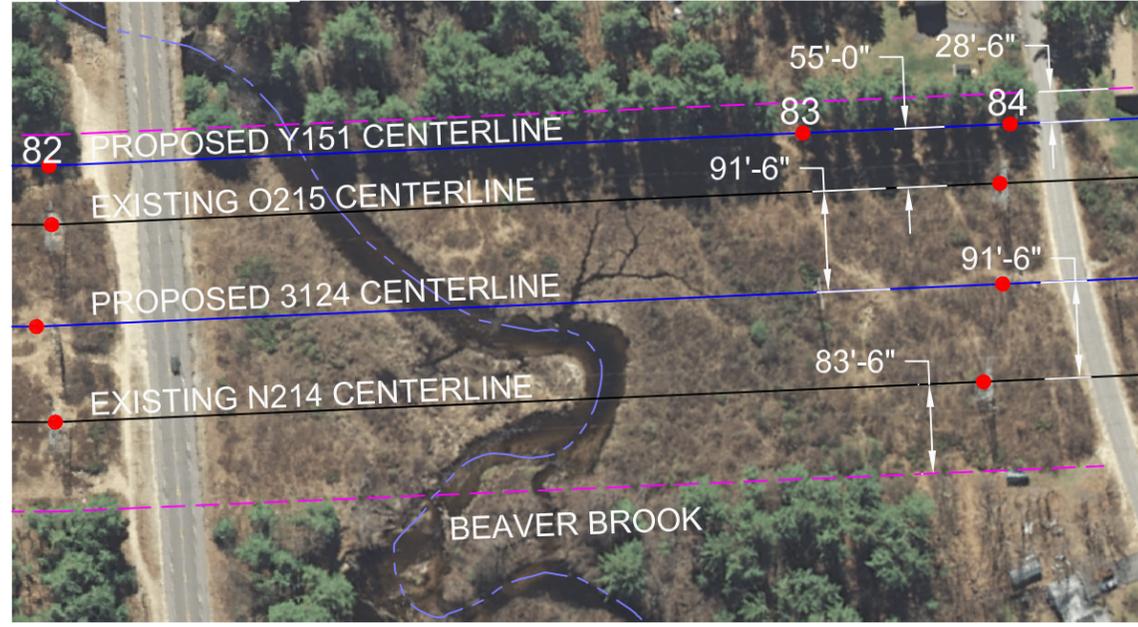
Date: 6/4/2015



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400298-C-L-02

VER	DATE	VERSION DESCRIPTION	PREPARED	REVIEWED	APPROVED	VERSION
1	05/08/15	ISSUED FOR PERMITTING	RAM	FTX	NPA	1
2						
3						
4						



NOTES:
1. DESIGN CLEARANCE 115KV = 25FT

OPGW (TO BE DETERMINED)
DISPLAYED AT 60°F, MAX. SAG
DESIGNED AT 4,000 LBS NESC HEAVY

DRAKE 795 KCMIL 26/7 ACSR HS285
DISPLAYED AT 392°F, MAX. SAG
DESIGNED AT 8,000 LBS NESC HEAVY

INCHES ON ORIGINAL

400298-C-L-02

MERRIMACK VALLEY RELIABILITY PROJECT
115KV Y151 TRANSMISSION LINE
BEAVER BROOK
CROSSING SPAN STR.82-83

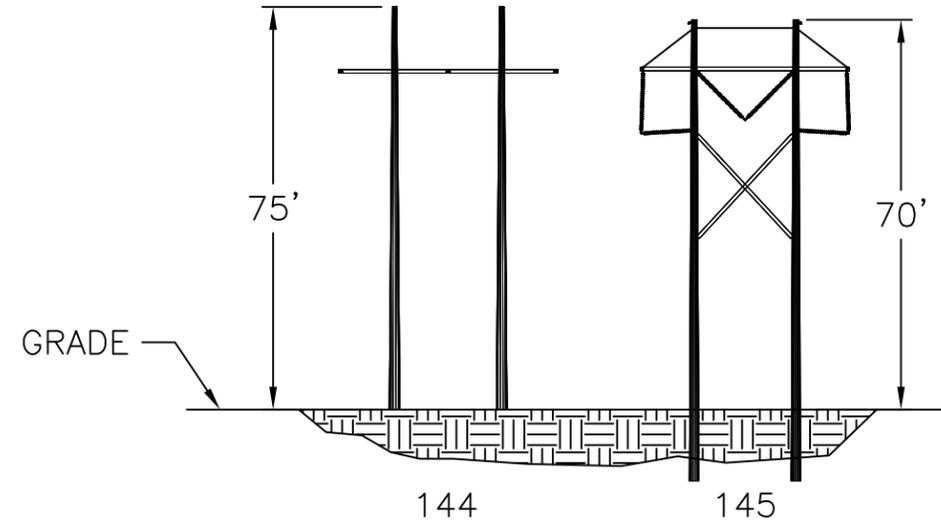
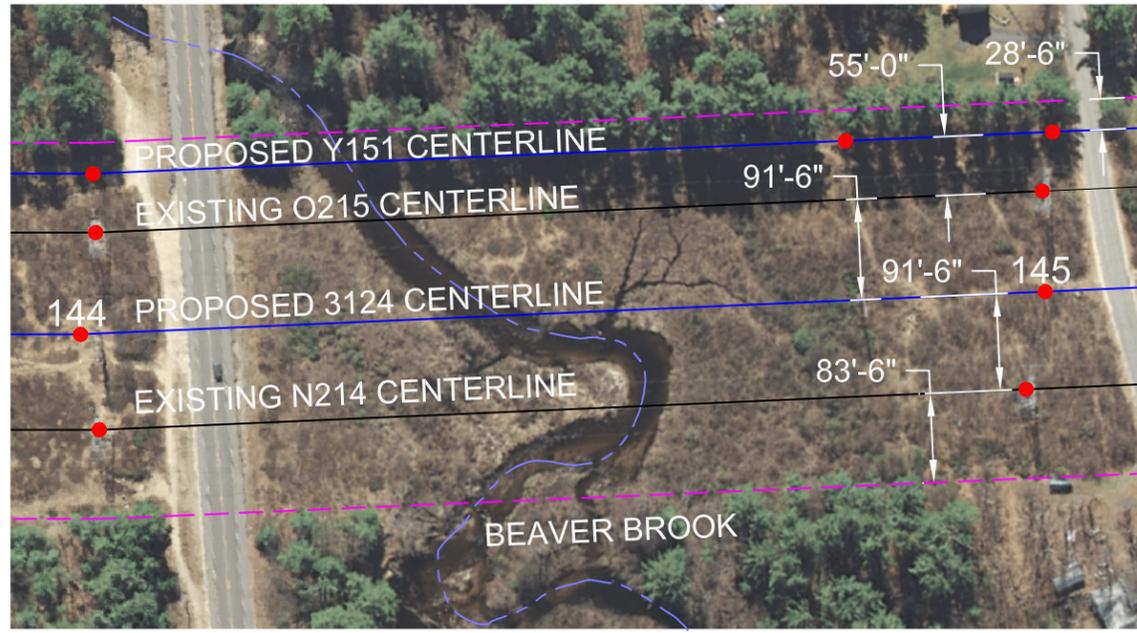
PREPARED BY	RAM	05/08/15
REVIEWED BY	FTX	05/08/15
APPROVED BY	NPA	05/08/15
SCALE	N.T.S.	
SHEET	1	OF 1
INDEX	400298	

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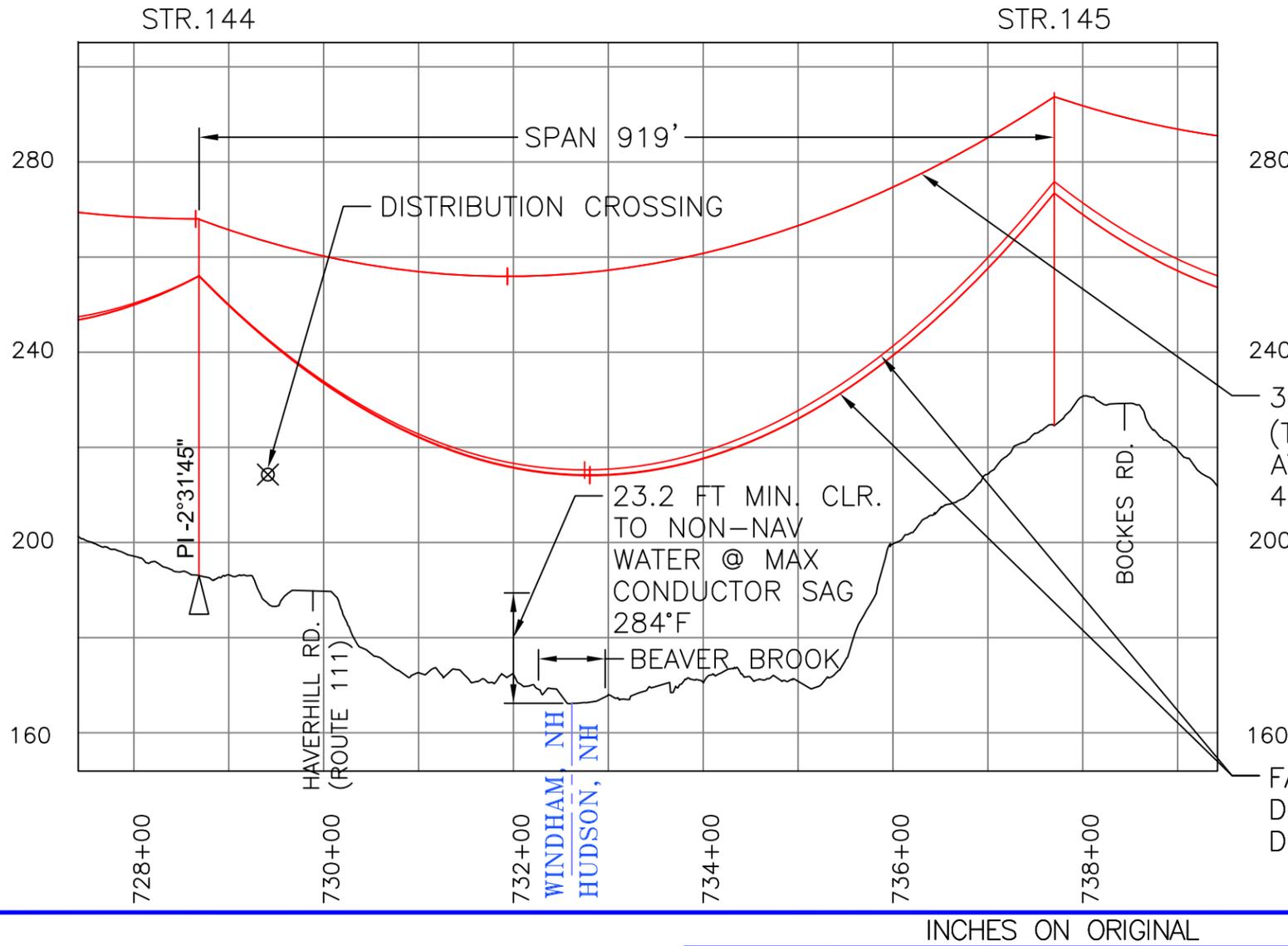
400298-C-L-01

VER	DATE	VERSION DESCRIPTION	PREPARED	REVIEWED	APPROVED	VERSION
1	05/08/15	ISSUED FOR PERMITTING	RAM	FTX	NPA	1
2						
3						
4						



POLE DETAIL
LOOKING AHEAD

NOTES:
1. DESIGN CLEARANCE 345KV = 30FT



3/8"-7 STRAND E.H.S. OPGW
(TO BE DETERMINED) DISPLAYED
AT 60°F, MAX. SAG DESIGNED AT
4,000 LBS NESC HEAVY

FALCON 1590 KCMIL 54/19 ACSR
DISPLAYED AT 284°F, MAX. SAG
DESIGNED AT 10,000 LBS NESC HEAVY

MERRIMACK VALLEY RELIABILITY PROJECT
345KV 3124 TRANSMISSION LINE
BEAVER BROOK
CROSSING SPAN STR.144-145

PREPARED BY	RAM	05/08/15
REVIEWED BY	FTX	05/08/15
APPROVED BY	NPA	05/08/15
SCALE	N.T.S.	
SHEET	1	OF 1
INDEX	400298	

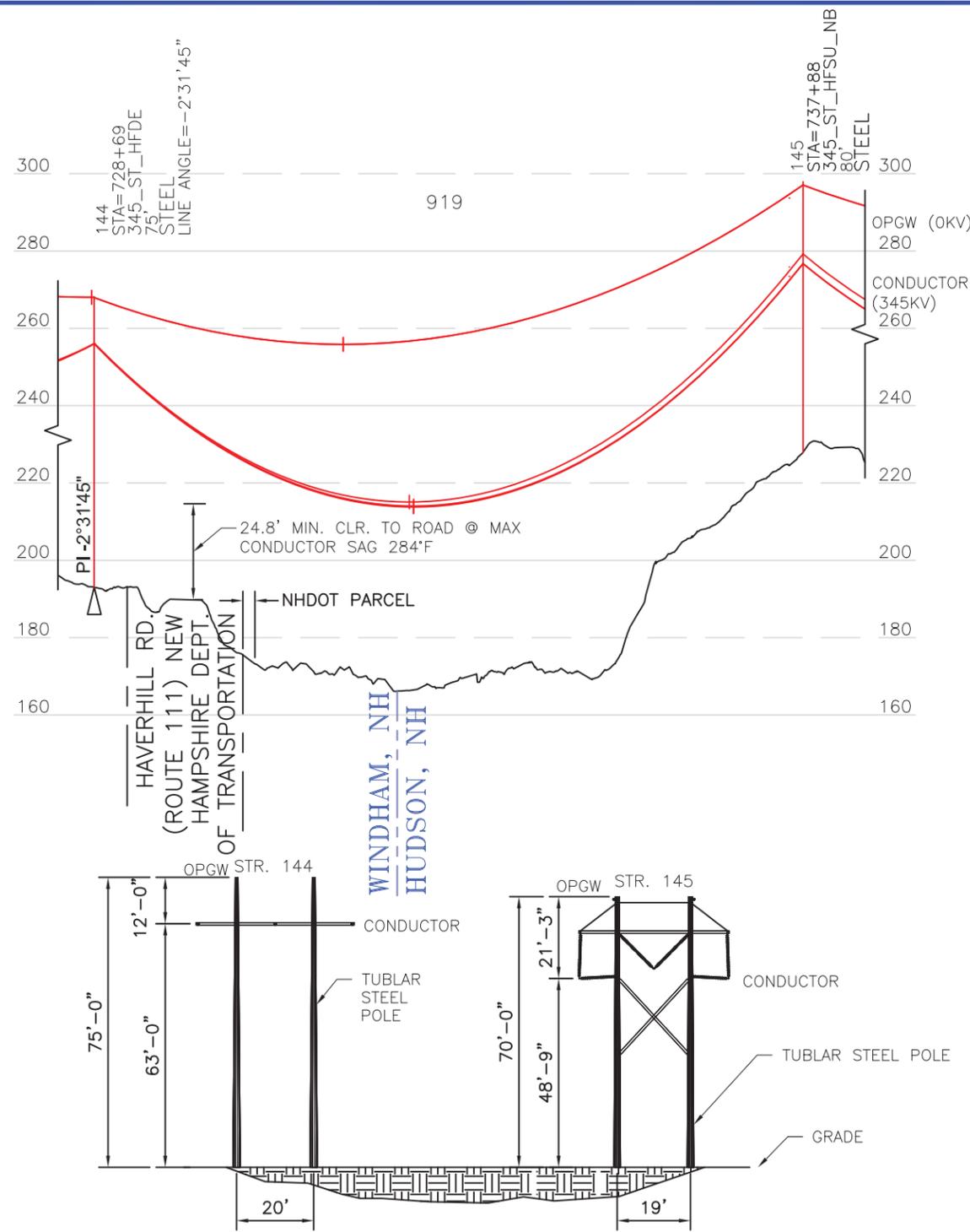
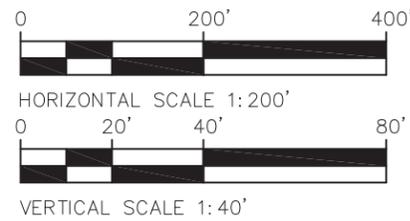
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400298-C-L-10

VER	DATE	VERSION DESCRIPTION	PREPARED	REVIEWED	APPROVED	VERSION
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2						
3						
4						

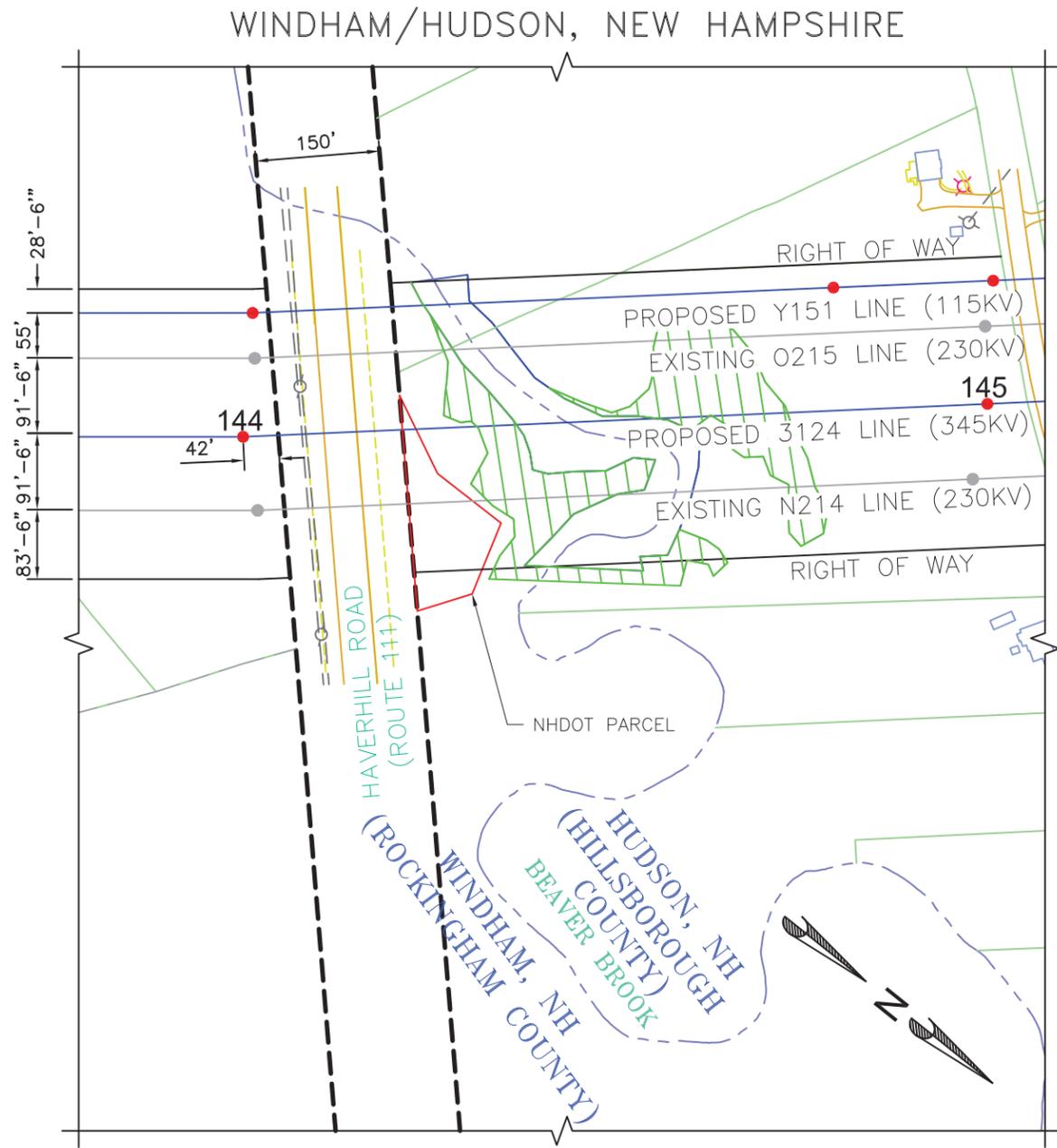


STRUCTURE LOCATION:		
STR. 144	LATITUDE	42°47'39.621"N
STR. 144	LONGITUDE	71°21'46.737"W
STR. 145	LATITUDE	42°47'46.699"N
STR. 145	LONGITUDE	71°21'54.444"W

NOTES:

- DESIGN CLEARANCE 345KV = 30FT
- OPGW AND SHIELD WIRE SHOWN AT NESC HEAVY, 4000 LBS, 60°F MAX SAG
- CONDUCTOR SHOWN AT NESC HEAVY, 10000 LBS 284°F MAX SAG

CABLE SCHEDULE:						
LINE	WIRE	# OF CABLES	TYPE	DIA. (IN.)	WEIGHT/ 1000 FT	CABLE STRENGTH (LBS.)
3124	NEW OPGW	1	TO BE DETERMINED	-	-	-
	NEW SHIELD WIRE	1	3/8"-7 STRAND EHS	0.360	273	15,400
	NEW CONDUCTOR	6	FALCON 1590 KCMIL 54/19 ACSR	1.545	2044	54,500



INCHES ON ORIGINAL

400298-C-L-10

MERRIMACK VALLEY RELIABILITY PROJECT
LINE 3124 345KV TRANSMISSION
NH DOT CROSSING PERMIT DRAWING
ROUTE 111 CROSSING

PREPARED BY	DD	06/16/15
REVIEWED BY	FTX	06/16/15
APPROVED BY	NPA	06/16/15
SCALE		-
SHEET	1	OF 1
INDEX		400298

nationalgrid

THE STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION

PETITION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE D/B/A
EVERSOURCE ENERGY FOR LICENSES TO CONSTRUCT AND MAINTAIN ELECTRIC
LINES AND OPTICAL GROUND WIRE OVER AND ACROSS PUBLIC LANDS OWNED
BY THE STATE OF NEW HAMPSHIRE IN THE TOWN OF LONDONDERRY, NEW
HAMPSHIRE

TO THE PUBLIC UTILITIES COMMISSION:

Public Service Company of New Hampshire d/b/a Eversource Energy (“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 licenses to construct and maintain a 345 kV electric transmission line and optical ground wire cable at three locations over and across public lands owned by the State of New Hampshire in the Town of Londonderry, New Hampshire. In support of its petition, PSNH states as follows:

1. In order to meet the reasonable requirements of service to the public, PSNH has determined that it is necessary to construct a new 345 kV transmission line to be known as the “3124 Line”. The 3124 Line is a project, referred to as the “Merrimack Valley Reliability Project”, or “MVRP”, being jointly proposed by PSNH and New England Power Company d/b/a National Grid (“NEP”). The 3124 Line will extend from NEP’s Tewksbury 22A Substation in Tewksbury, Massachusetts to PSNH’s Scobie Pond 345 kV Substation in Londonderry, New Hampshire. The portion of MVRP, referred to herein as the “Project”, located within New Hampshire is approximately 17.9 miles in length and extends from the Massachusetts border in Pelham, New Hampshire to the Scobie Pond 345 kV Substation.

2. The MVRP is a new 345 kV transmission line between southern New Hampshire and northeastern Massachusetts that resolves regional reliability problems previously identified by ISO-NE in the Greater Boston Area Updated Transmission Needs Assessment issued in 2014. The MVRP is specifically designed to address reliability needs associated with the transmission tie lines connecting northeastern Massachusetts and southern New Hampshire. The existing transmission system cannot under certain operation conditions reliably serve southern New Hampshire and northeastern Massachusetts either at peak or off-peak load.

3. The proposed route for the 3124 Line includes crossings of properties now owned by the State of New Hampshire (hereinafter referred to as the “public lands” or “public land”) at three locations in the Town of Londonderry. The first aerial crossing involves the 3124 Line span between Structure 277 and 278 that crosses public land located west of the Interstate 93 right-of-way (“ROW”). The second crossing involves the placement of Structure 278 on public lands located east of the Interstate 93 ROW and an aerial crossing of those public lands by portions of the 3124 Line span between Structures 277 and 278 and Structures 278 and 279. The third aerial crossing involves the 3124 Line span between Structures 285 and 286 that crosses over a former railroad corridor now owned by the State of New Hampshire. The crossings are listed in Table 1 attached to this Petition.

4. At each of these crossings, PSNH intends to install three twin bundled overhead phase conductors and two optical ground wire (“OPGW”) static wires. The energized conductors will be twin bundled 1590 kcmil Aluminum Conductor Steel Reinforced (“ACSR”) “Falcon” (54/19) conductor. Due to the bundled nature of the energized conductors, 18 inch spacers will be utilized in the crossing spans and in the jumper loops to keep each of the conductors associated with a single phase the appropriate distance apart. In order to improve and

enhance the reliability and capacity of the communications system used in its electric system operations, and thereby meet the reasonable requirements of service to the public, PSNH will also install and maintain OPGW cable on its new overhead 3124 Line structures, which will cross the same public lands at the same locations as the 3124 overhead crossings. In addition to communications capabilities, the OPGW will provide lightning protection over the conductors in the overhead configurations. OPGW static wires will be a minimum of 48 count OPGW.

5. The general location of the 3124 Line crossings that are the subject of this Petition are shown on the U.S. Geologic Survey location plans attached and marked as Exhibit 1 to Appendix A, Exhibit 3 to Appendix A, and Exhibit 4 to Appendix B of this Petition, respectively.

6. The clearances of conductors to public lands for each of the proposed crossings are provided in Table 2 and on the plan and profile drawings attached as Exhibit 2 to Appendix A and Exhibit 5 to Appendix B of this Petition.

7. The required technical information provided in this Petition is based on the 2012 National Electrical Safety Code (“NESC”) C2-2012 which meets and/or exceeds the requirements of the 2007 NESC. The proposed crossings have been designed and will be constructed, maintained and operated by PSNH in accordance with the applicable requirements of the NESC.

For the Span between Structure 277 - 278 (Appendix A)

8. The 3124 Line aerially crosses public lands located west of Interstate 93 for a length of 70 feet within a total span of 548 feet. No crossing structures are to be located on the public land located west of Interstate 93 ROW. Structure 278 will be located on the public land located east of the Interstate 93 ROW. In addition, the span between Structure 277 and 278

includes an aerial crossing of public lands located east of the Interstate 93 ROW for a length of 21 feet within the total span of 548 feet. The design and detail of the proposed construction of the 3124 Line crossing at this location is shown on the attached plan and profile drawing entitled "Line 3124 345 kV Transmission, NHDOT Crossing License Drawing, Merrimack Valley Reliability Project" dated November 21, 2014, revised June 15, 2015 marked as Exhibit 2 to Appendix A.

9. PSNH owns the land in fee west of the public land crossing that is west of the Interstate 93 ROW and holds a 535-foot wide permanent easement across State-owned lands. The aerial crossing will be constructed within the limits of PSNH's permanent easement. Structure 277 will be constructed on PSNH-owned land.

10. The minimum required clearances above the ground surface are stipulated in the NESC, specifically, Table 232-1. The NESC requires 24.7 feet of minimum design clearance above the ground surface to allow for vehicular access below a 345 kV transmission line. A number of weather conditions were analyzed and the one that produced the maximum conductor sag for the NESC Heavy Loading weather case was the 285°F condition maximum operating temperature (phase wires). The twin-bundled conductor cables between Structures 277 and 278 were designed to have a minimum clearance of 54 feet above the ground surface under the 285°F condition maximum operating temperature, which exceeds the minimum clearance requirement of 24.7 feet. Due to the fact that the static wires are located above the phase wires, their clearances to the ground surface will always exceed the minimum required NESC distance. The location, design and construction of the proposed phase wire crossings and associated structures are shown on Exhibit 2 attached to and made part of the attached Appendix A.

For the Span between 278 – 279 (Appendix A)

11. The 3124 Line aerially crosses the public lands located east of the Interstate 93 ROW for a length of 451 feet within a total span of 458 feet. Structure 278 will be located on the public land located east of the Interstate 93 ROW. In addition, the span between Structure 277 and 278 includes an aerial crossing of public lands located east of the Interstate 93 ROW for a length of 21 feet within the total span of 548 feet. The design and detail of the proposed construction of the 3124 Line crossing at this location is shown on the attached plan and profile drawing entitled “Line 3124 345 kV Transmission, NHDOT Crossing License Drawing, Merrimack Valley Reliability Project” dated November 21, 2014, revised June 15, 2015 marked as Exhibit 2 to Appendix A.

12. PSNH owns the land in fee east of the public land crossing that is east of the Interstate 93 ROW and holds a 535-foot wide permanent easement across the public land in this location. The aerial crossing will be constructed within the limits of PSNH’s permanent easement. Structure 279 will be constructed on PSNH-owned land.

13. Structure 278 will be steel with a weathering finish, and will likely utilize a direct embed foundation. For all direct embed foundations the steel poles will be placed within corrugated steel culverts then backfilled with select backfill and compacted in lifts. The use of alternate foundation types may become necessary depending upon soil conditions. Alternatives include, but are not limited to, concrete caisson and helical/battered pile foundations.

14. The minimum required clearances above the ground surface are stipulated in the NESC, specifically, Table 232-1. The NESC requires 24.7 feet of minimum design clearance above the ground surface to allow for vehicular access below a 345 kV transmission line. A number of weather conditions were analyzed and the one that produced the maximum conductor

sag for the NESC Heavy Loading weather case was the 285°F condition maximum operating temperature (phase wires). The twin-bundled conductor cables between Structures 278 and 279 were designed to have a minimum clearance of 56 feet above the ground surface under the 285°F condition maximum operating temperature, which exceeds the minimum clearance requirement of 24.7 feet. Due to the fact that the static wires are located above the phase wires, their clearances to the ground surface will always exceed the minimum required NESC distance. The location, design and construction of the proposed phase wire crossings and associated structures are shown on Exhibit 2 attached to and made part of the attached Appendix A.

For the Span between Structures 285 - 286 (Appendix B)

15. The 3124 Line crosses one former railroad corridor now owned by the State of New Hampshire, and administered by the New Hampshire Department of Transportation (“NHDOT”). The 3124 Line aerially crosses the former railroad corridor for a length of 82.5 feet within a total span of 719 feet. Structures 285 and Structure 286 are not located on public land. The design and detail of the proposed construction of the 3124 Line crossing at this location is shown on the attached plan and profile drawing entitled “Line 3124 345 kV Transmission, NHDOT Crossing License Drawing, Merrimack Valley Reliability Project” dated November 21, 2014, revised June 15, 2015 marked as Exhibit 5 to Appendix B.

16. PSNH owns the land in fee east and west of the former railroad crossing and holds a 535-foot wide permanent easement across the public land in this location. The aerial crossing will be constructed within the limits of PSNH’s permanent easement. Structures 285 and 286 will be constructed on PSNH-owned land.

17. The minimum required clearances above the ground surface are stipulated in the NESC, specifically, Table 232-1. The NESC requires 32.7 feet of minimum design clearance

above the ground surface for a railroad below a 345 kV transmission line. A number of weather conditions were analyzed and the one that produced the maximum conductor sag for the NESC Heavy Loading weather case was the 285°F condition maximum operating temperature (phase wires). The twin-bundled conductor cables between Structures 285 and 286 were designed to have a minimum clearance of 39.9 feet above the ground surface under the 285°F condition maximum operating temperature, which exceeds the minimum clearance requirement of 32.7 feet. Due to the fact that the static wires are located above the phase wires, their clearances to the ground surface will always exceed the minimum required NESC distance. The location, design and construction of the proposed phase wire crossings and associated structures are shown on Exhibit 5 attached to and made part of the attached Appendix B.

18. PSNH submits that the licenses petitioned for herein may be exercised by PSNH without affecting the rights of the public on the public lands which are the subject of this Petition. Minimum safe line clearances above affected public lands will be maintained at all times and the use and enjoyment by the public of said lands will not be diminished in any material respect as a result of the overhead line and cable crossings. All of the property rights necessary to construct and maintain the crossings have been obtained, and therefore no other acquisition of property rights is required for this purpose.

19. A wetland permit from the New Hampshire Department of Environmental Services (“NHDES”) and the U.S. Army Corps of Engineers (“USACE”) is required for the installation of Structure 286 and for access during construction. The appropriate wetland permits will be applied for and obtained by PSNH prior to the installation of any new structures that will impact wetlands, in conjunction with PSNH’s siting application.

20. Aerial crossings of Interstate 93 and the railroad corridor are required. The appropriate NHDOT permission agreements will be applied for and obtained by PSNH prior to the installation of any new structures that will impact NHDOT jurisdictional areas, in conjunction with PSNH's siting application.

21. Project Structures 277, 278, 279, 285 and 286 will need an air obstruction determination from the Federal Aviation Administration ("FAA") under Federal Aviation Regulation Part 77.9(b). Determinations will be requested and appropriate measures will be taken by PSNH prior to the installation of any new structures that will impact FAA jurisdictional areas.

WHEREFORE, PSNH respectfully requests that the Commission:

A. Find that the licenses petitioned for herein may be exercised without substantially affecting the public rights in the public lands of the State of New Hampshire which are the subject of this Petition;

B. Grant PSNH a license to construct and maintain a 345 kV electric transmission line and OPGW shield wire over and across the public lands of the State of New Hampshire as specified in the Petition; and

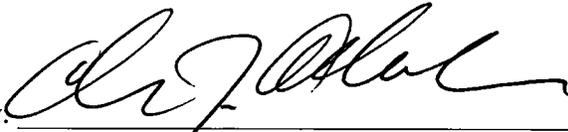
C. Grant such other and further relief as the Commission may determine to be just and reasonable and consistent with the public interest.

Respectfully submitted,

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE
d/b/a Eversource Energy

By its Attorney,

July 10, 2015

By: 

Christopher J. Allwarden
Senior Counsel, Legal Department
Eversource Energy Service Company
780 North Commercial Street
Manchester, NH 03101
Telephone: (603) 634-2459

TABLE 1
Crossing Licenses for Proposed 3124 Line

Public Land	NHPUC Order Number	NHPUC Docket Number	Address	Tax Map	Lot No.	Pole Structures	Current Petition Appendix
State of New Hampshire; Department of Public Works & Highways	Not Previously Licensed		106 Rear Hovey Road, Londonderry	13	14	277-278	A
State of New Hampshire; Department of Public Works & Highways	Not Previously Licensed		71 Rockingham Road, Londonderry	13	57	278-279	A
New Hampshire Department of Transportation	Not Previously Licensed		Railroad Rockingham Road, Londonderry	13	143	285-286	B

TABLE 2
Summary of Clearances at Crossings

Location	Structure - West	Height (ft)	Structure - East	Height (ft)	Span (ft)	Clearance at 285 °F (ft)
1	#277 - SEA - HF	115	#278 - SEA - HF	115	548	54
2	#278 - SEA - HF	115	#279 - SEA - HF	105	458	56
3	#285 - SEA - HF	105	#286 - SED - 2	90	719	39.9

APPENDIX A

3124 Line Spans 277-278 and 278-279 – I-93 Crossing Londonderry, NH

1. The design and proposed construction location of the structures regarding this crossing are shown on the attached PSNH Transmission Business Drawing, Exhibit 2.
2. The 3124 Line will cross the public land adjacent to Interstate 93 on 2-pole, direct embed steel tangent horizontally configured h-frame type structures. Briefly described, Structures 277 and 278 have 115 foot poles with 13.5 feet embedded in the ground (101.5 feet Above Ground Line “AGL”). Structure 279 has 105 foot poles with 12.5 feet embedded in the ground (92.5 feet AGL). The static wires for the 3124 Line are two OPGWs located approximately 24’ above the phase conductors and serve as communication cables for the remote end substations as well as lightening protection for the phase conductors. The phase conductors for the 3124 are 1590 kcmil ACSR conductor, code named “Falcon” by conductor manufacturers. The conductor is suspended from a horizontal crossarm between the two poles, bundled two conductors per each of the three phases. Additional details of these structures are shown in Exhibit 2.
3. Information for the mapping of property, physical features, adjacent transmission lines and ROW boundaries were collected from various sources as detailed below:
 - The property lines are based on information from tax maps.
 - The physical features such as the location of the highway were digitized from geo-referenced aerial imagery of the project area, dated 2012.
 - The adjacent transmission line locations are based on survey information from PSNH dated 2011.

- The existing and future limits of DOT ROW are based on geo-referenced information received from NHDOT in January 2015.

4. Through the design and modeling process a multitude of weather and service conditions were examined to verify that proper NESC and PSNH required clearances will be maintained. The NESC clearance verifications, combined with PSNH standard conductor and shield wire clearance and spacing requirements, ensure minimum clearances will be maintained under all service conditions. The applicable clearances mandated by the NESC and internal PSNH standards are identified and summarized below:

Required Vertical Clearances for 345 kV Phase Conductors

Vertical Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
Ground - Pedestrian-Access Only	20.7	24
Ground - Vehicle/Horse Accessible	24.7	29
Roadway	24.7	48*

* Additional clearance for roadway crossings is driven by clearance to existing or future distribution lines along the roadway.

Required Horizontal Clearances for 345 kV Phase Conductors

Horizontal Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
Phase-to-Phase (on same circuit)	11.2	26*
Phase-to-Structure (on same circuit)	7.8**	8.1**
Phase-to-Phase (on adj. circuit)	11.2	17
Phase-to-Structure (on adj. circuit)	8.2**	12**

* Based on the H-Frame structure type being used for this line

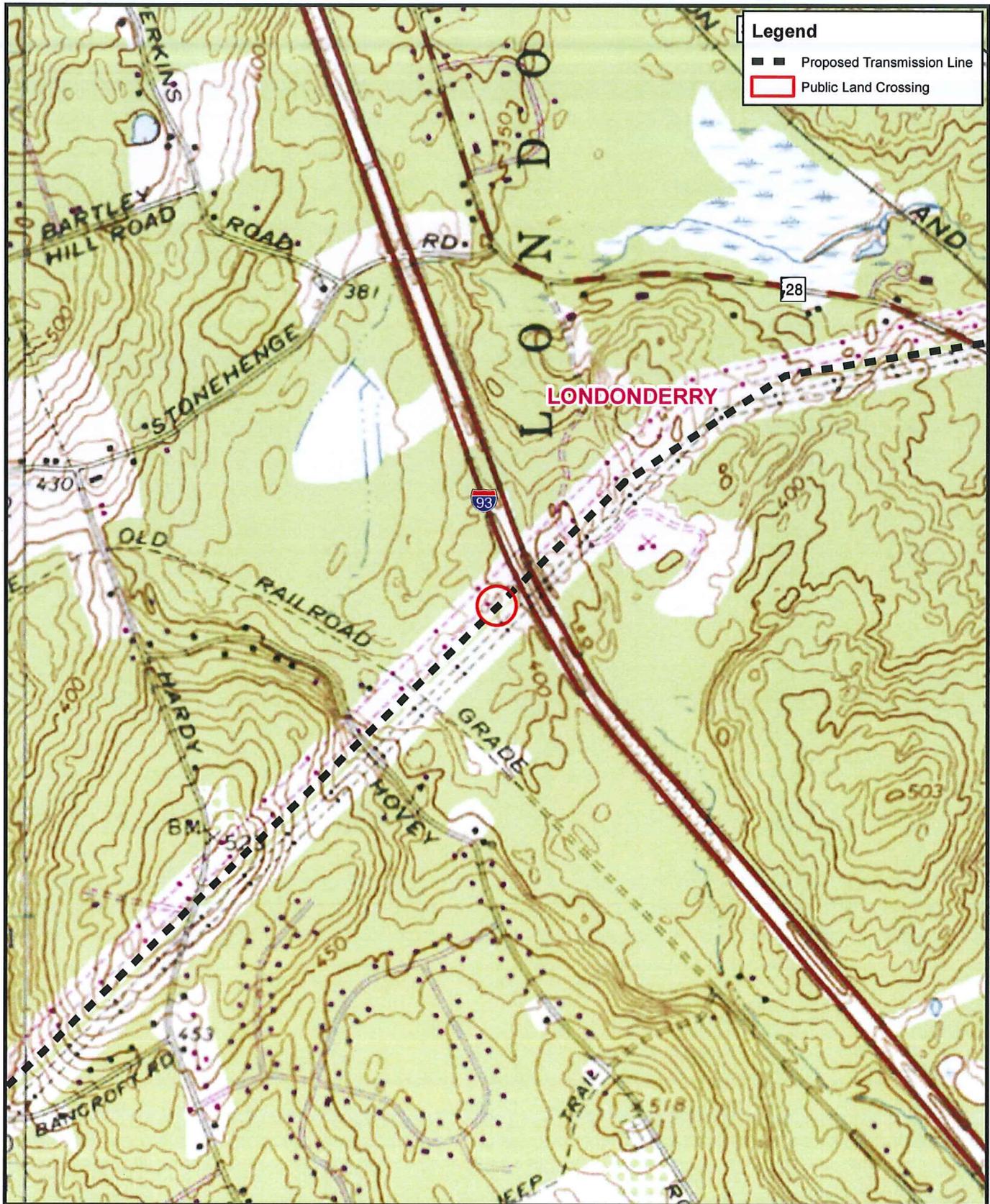
** Clearance may be reduced by 25% if insulated guy rods are used

Required Vertical Clearances for OPGW (0 kV)

OPGW Weather Case	345 kV Conductor Weather Case	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
Any weather case	Same as OPGW	8.5	13
30 Deg F, 0.5" Ice	30 Deg F, 0" Ice	N/A	8
30 Deg F, 1.0" Ice	30 Deg F, 0" Ice	N/A	5

Note: The OPGW is located above the 345 kV conductors in all locations; therefore the OPGW to conductor clearance will control in all cases rather than OPGW to ground or other objects.

5. The sags and clearances to the requirements above have been met or exceeded as follows:
- 345 kV Phase Conductors Vertical Clearance - The 285°F weather condition for the maximum operating temperature of the phase conductors produces the greatest sag in the phase wires and therefore the minimum clearance to the ground. As noted in paragraphs 10 and 14 of the Petition and Table 2, the phase conductors between Structures 277 and 278 as well as Structures 278 and 279 have been designed to have a minimum above ground clearance of 54 feet and 56 feet respectively under the 285°F weather case. These clearances exceed the vertical clearance requirements for 345 kV phase conductors over roadways and ground accessible by vehicles stated above.
 - 345 kV Phase Conductors Horizontal Clearance – PSNH standard centerline spacing is based upon the geometric configuration of the structures along a line assuming a maximum 1000 foot span length under a 6 pounds per square foot (“psf”) sustained transverse wind. The 3124 Line is spaced apart from adjacent lines as specified by PSNH standard and no span along the PSNH portion of the 3124 Line exceeds a 1000 foot length. Furthermore, a span by span verification was completed assuming a 9psf sustained transverse wind to ensure the horizontal clearances above were exceeded.
 - 0 kV OPGW Vertical Clearance – The design tension of the OPGW cable along the 3124 Line was selected such that the OPGW sags less than the twin-bundled 1590 ACSR “Falcon” conductor. Per PSNH standard, span by span verifications were also completed assuming the specified weather conditions above to ensure the required vertical clearance was maintained. The particular tensioning of the cables and follow-up verifications listed above ensure the required vertical clearances were exceeded.



Legend

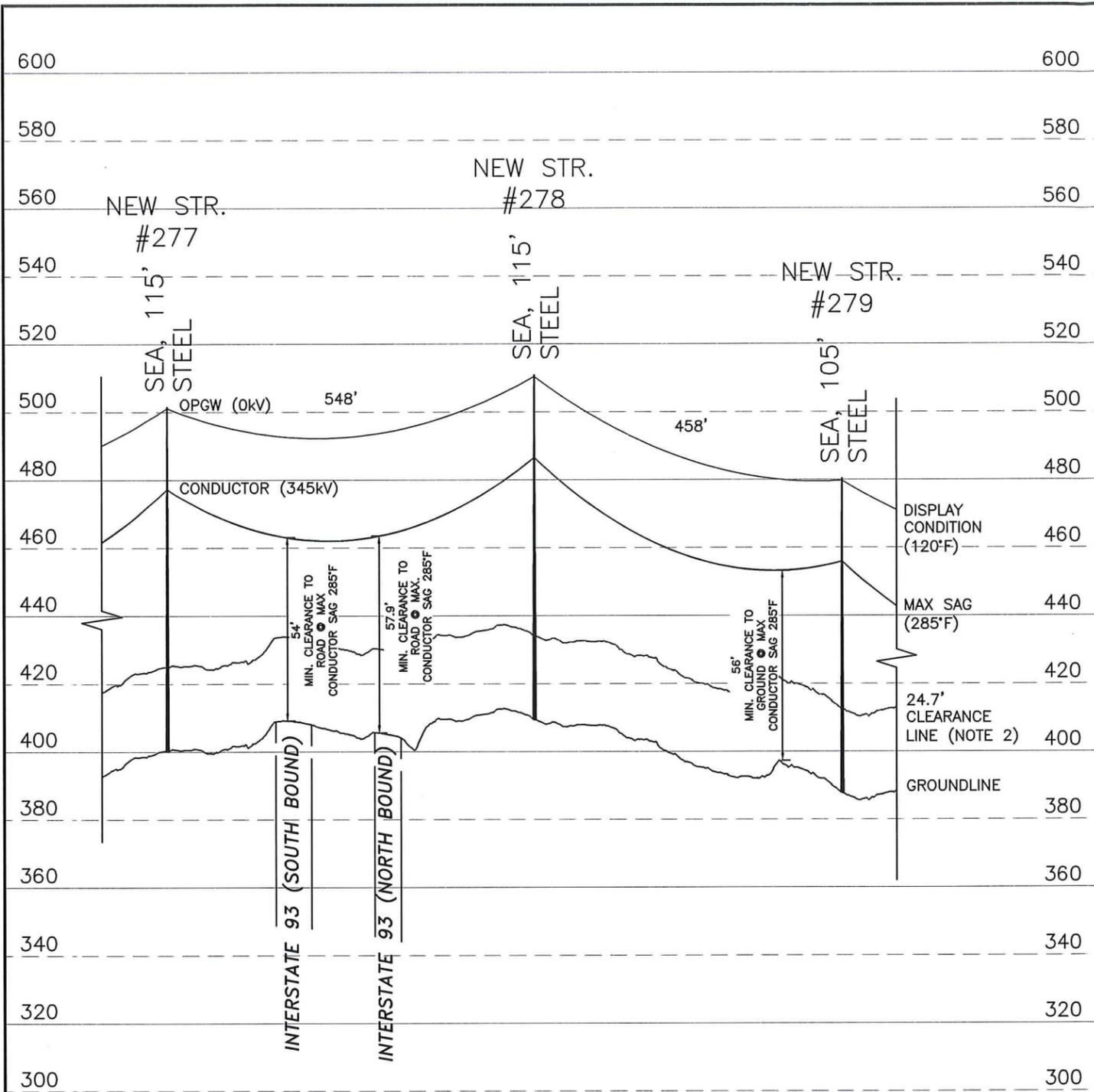
- ■ Proposed Transmission Line
- Public Land Crossing

Scale:
1:12,000
1 inch = 1,000 feet

MERRIMACK VALLEY RELIABILITY PROJECT

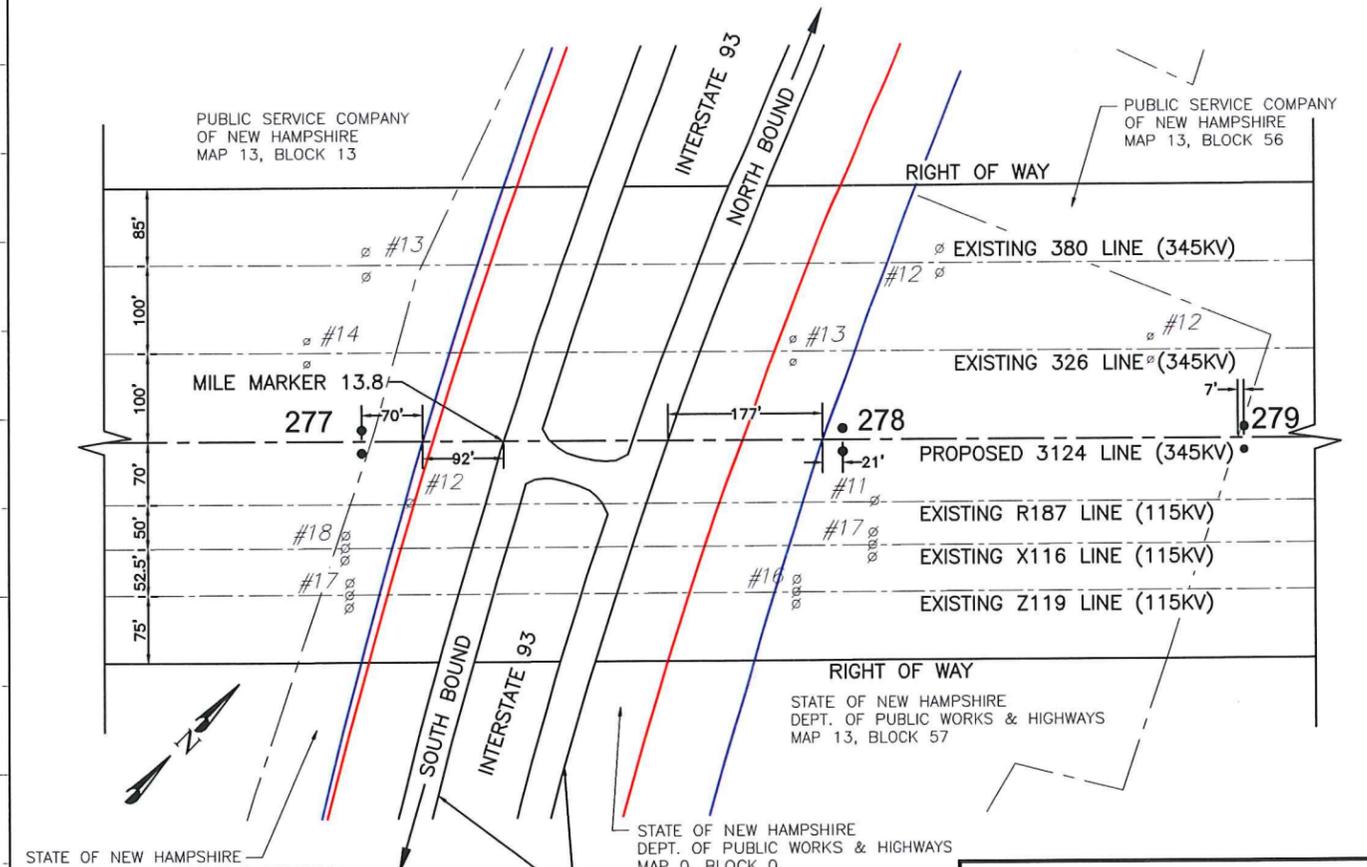
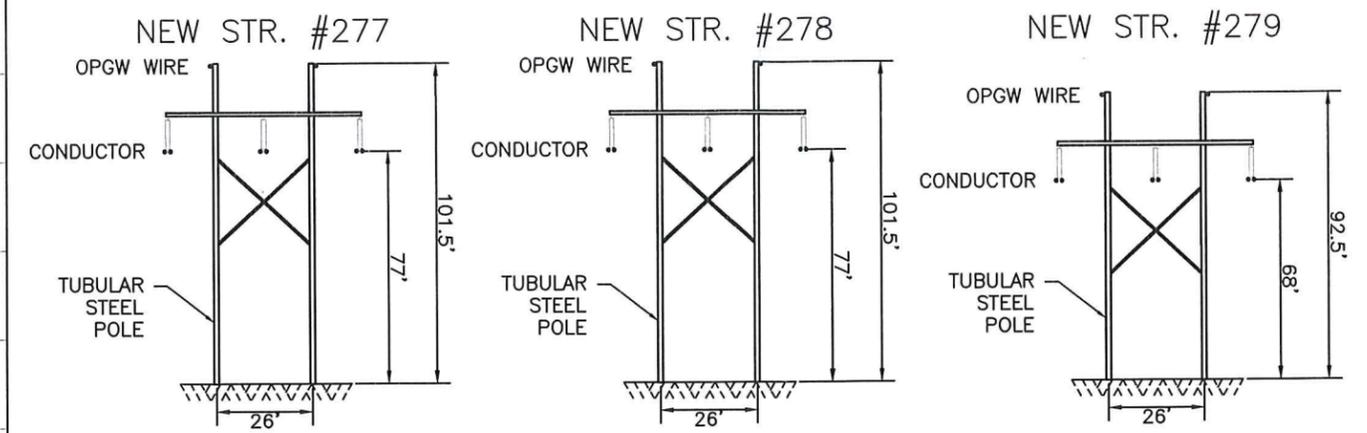
Exhibit 1- Location Plan
Merrimack Valley Reliability Project 3124 Line (345 KV)
Public Land Crossings
Londonderry, New Hampshire





- NOTES:
1. VERTICAL DATUM IS NAVD88 IN FEET.
 2. NESC MINIMUM GROUND CLEARANCE OF VEHICLE ACCESSIBLE AREA FOR 345 kV CONDUCTORS IS 24.7'. EVERSOURCE STANDARD DESIGN GROUND CLEARANCE FOR 345 kV CONDUCTORS IS 29'. EVERSOURCE STANDARD DESIGN ROAD CLEARANCE FOR 345 kV CONDUCTORS IS 48'.

TOWN OF LONDONDERRY



LEGEND

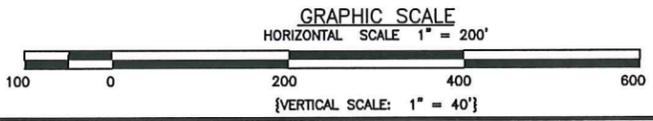
- DOT EXISTING ROW
- DOT FUTURE EXPANDED ROW
- - - PROPERTY LINE

STRUCTURE LOCATION:

- STR. #277 - LAT.= 42°53'43.886"N
LONG.= 71°21'38.976"W
- STR. #278 - LAT.= 42°53'47.672"N
LONG.= 71°21'33.724"W
- STR. #279 - LAT.= 42d53'50.841"N
LONG.= 71d21'29.328"W

CABLE SCHEDULE:

WIRE	# OF CABLES	TYPE	DIA. (IN.)	WEIGHT/1000 FT	CABLE STRENGTH (LBS.)
NEW OPGW	2	BRUGG 48 FIBERS	0.650	407	17,618
NEW CONDUCTOR	6	1590 KCM 54/19 ACSR	1.545	2042.1	54,500



TRC
249 WESTERN AVENUE
AUGUSTA, ME 04330
PROJECT NO: 223027

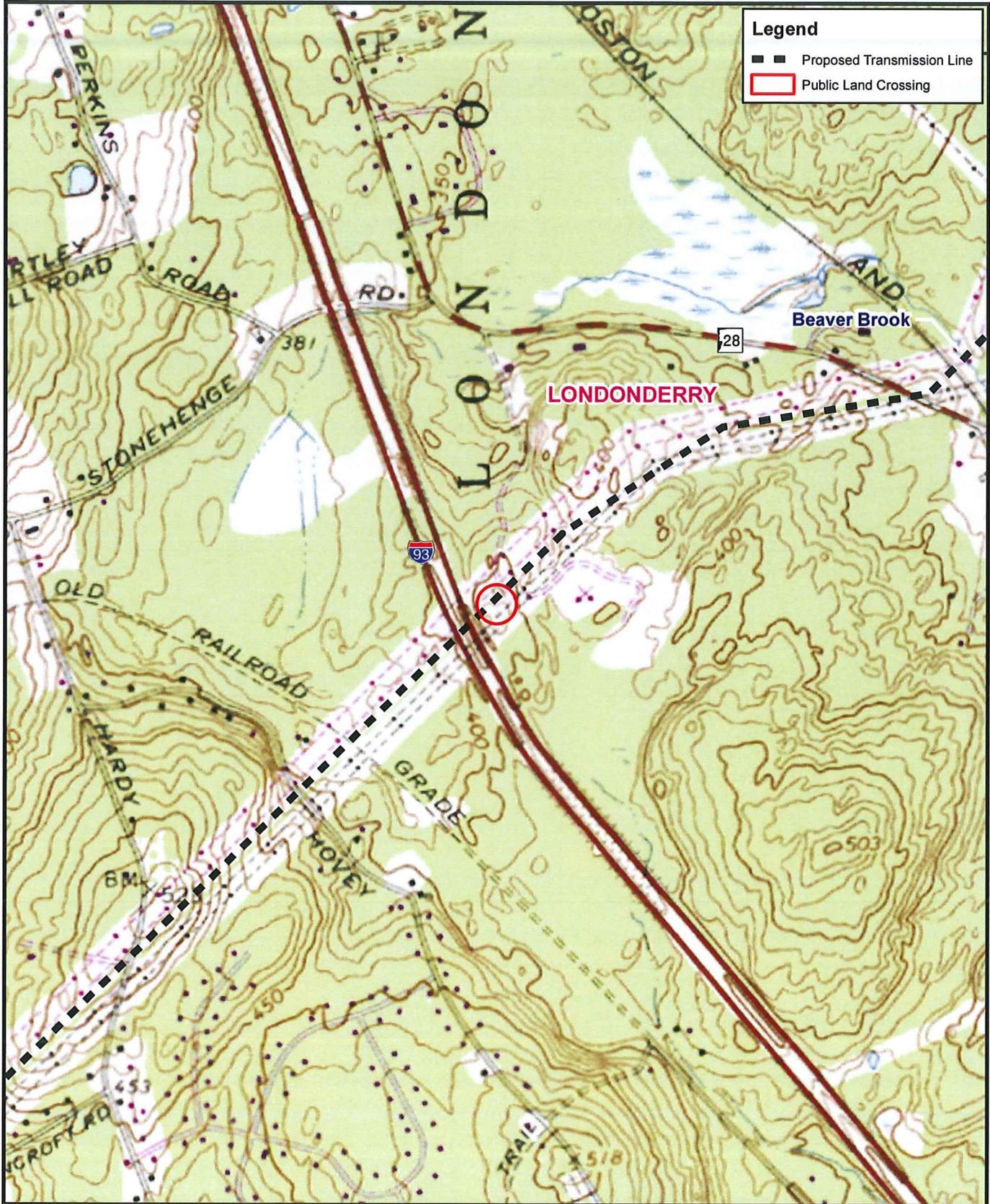
CONTRACT SERVICES	DESCRIPTION	ENG/PE#	DATE	DRN	CHKD	APPR
E	ISSUED FOR LICENSING		6/15/15	JUD	CRP	GEL
D	RE-ISSUED FOR PERMITTING		6/1/15	RDW	CRP	GEL
C	ISSUED FOR PERMITTING		5/19/15	RDW	CRP	GEL
B	RE-ISSUED FOR REVIEW		3/8/15	JUD	CRP	GEL
A	ISSUED FOR REVIEW		11/21/14	JUD	CRP	GEL
REV	DESCRIPTION	ENG/PE#	DATE	DRN	CHKD	APPR

EVERSOURCE ENERGY

LINE 3124 345kV TRANSMISSION
NHDOT CROSSING LICENSE DRAWING
EXHIBIT 2
MERRIMACK VALLEY RELIABILITY PROJECT

DATE: 11/21/14

FILE: S3124-P0007 SH1.DWG
DRAWING NO: S3124-P0007 SH.1



Scale:
1:12,000
1 inch = 1,000 feet



MERRIMACK VALLEY RELIABILITY PROJECT

Exhibit 3- Location Plan
Merrimack Valley Reliability Project 3124 Line (345 KV)
Public Land Crossings
Londonderry, New Hampshire

EVERSOURCE
ENERGY

APPENDIX B

3124 Line Span 285-286 – Granite State Rail Trail Crossing Londonderry, NH

1. The design and proposed construction location of the structures regarding this crossing are shown on the attached PSNH Transmission Business Drawing, Exhibit 5.
2. The 3124 Line will cross the public land over the Granite State Rail Trail using one 2-pole structure (Str 285) and one 3-pole structure (Str 286). Both structures will be direct embed steel horizontally configured h-frame type structures. Briefly described, Structure 285 has two 105 foot poles with 12.5 feet embedded in the ground (92.5 feet Above Ground Line “AGL”). Structure 286 has three 90 foot poles with 11.0 feet embedded in the ground (79 feet AGL). The static wires for the 3124 Line are two OPGWs located approximately 24’ above the phase conductors and serve as communication cables for the remote end substations as well as lightning protection for the phase conductors. The phase conductors for the 3124 are 1590 kcmil ACSR conductor, code named “Falcon” by conductor manufacturers. The conductors are twin-bundled with two conductors per phase. Additional details of these structures are shown in Exhibit 5.
3. Information for the mapping of property, physical features, adjacent transmission lines and ROW boundaries were collected from various sources as detailed below:
 - The property lines and boundaries of the Granite State Rail Trail are based on information from tax maps.
 - The physical features such as the location of Rockingham Rd (Route 28) were digitized from geo-referenced aerial imagery of the project area, dated 2012.

- The adjacent transmission line locations are based on survey information from PSNH dated 2011.

4. Through the design and modeling process a multitude of weather and service conditions were examined to verify that proper NESC and PSNH required clearances will be maintained. The NESC clearance verifications, combined with PSNH standard conductor and shield wire clearance and spacing requirements, ensure minimum clearances will be maintained under all service conditions. The applicable clearances mandated by the NESC and internal PSNH standards are identified and summarized below:

Required Vertical Clearances for 345 kV Phase Conductors

Vertical Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
Ground - Pedestrian-Access Only	20.7	24
Ground - Vehicle/Horse Accessible	24.7	29
Railroad	32.7	37

Required Horizontal Clearances for 345 kV Phase Conductors

Horizontal Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
Phase-to-Phase (on same circuit)	11.2	26*
Phase-to-Structure (on same circuit)	7.8**	8.1**
Phase-to-Phase (on adj. circuit)	11.2	17
Phase-to-Structure (on adj. circuit)	8.2**	12**

* Based on the H-Frame structure type being used for this line

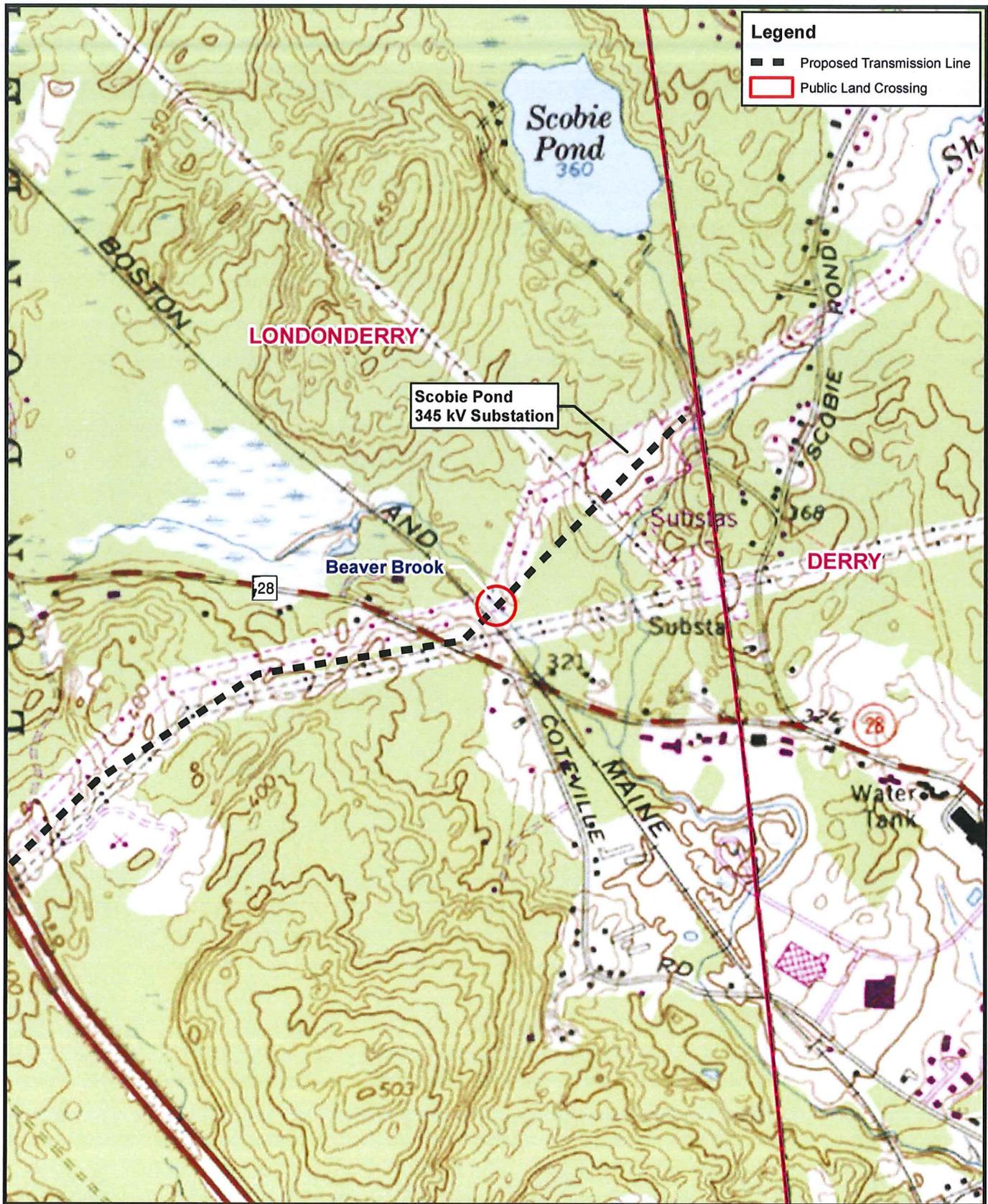
** Clearance may be reduced by 25% if insulated guy rods are used

Required Vertical Clearances for OPGW (0 kV)

OPGW Weather Case	345 kV Conductor Weather Case	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
Any weather case	Same as OPGW	8.5	13
30 Deg F, 0.5" Ice	30 Deg F, 0" Ice	N/A	8
30 Deg F, 1.0" Ice	30 Deg F, 0" Ice	N/A	5

Note: The OPGW is located above the 345 kV conductors in all locations; therefore the OPGW to conductor clearance will control in all cases rather than OPGW to ground or other objects.

5. The sags and clearances to the requirements above have been met or exceeded as follows:
- 345 kV Phase Conductors Vertical Clearance - The 285°F weather condition for the maximum operating temperature of the phase conductors produces the greatest sag in the phase wires and therefore the minimum clearance to the ground. As noted in paragraph 17 of the Petition and Table 2, the phase conductors between Structures 285 and 286 have been designed to have a minimum above ground clearance of 39.9 feet under the weather case for the 285°F condition maximum operating temperature, which exceeds the vertical clearance requirements for 345 kV phase conductors summarized above.
 - 345 kV Phase Conductors Horizontal Clearance – PSNH standard centerline spacing is based upon the geometric configuration of the structures along a line assuming a maximum 1000 foot span length under a 6psf sustained transverse wind. The 3124 Line is spaced apart from adjacent lines as specified by PSNH standard and no span along the PSNH portion of the 3124 Line exceeds a 1000 foot length. Furthermore a span by span verification was completed assuming a 9psf sustained transverse wind to ensure the horizontal clearances above were exceeded.
 - 0 kV OPGW Vertical Clearance – The design tension of the OPGW cable and conductor along the 3124 Line was selected such that the OPGW sags less than the twin-bundled 1590 ACSR “Falcon” conductor. Per PSNH standard, follow-up span by span verifications were also completed assuming the specified weather conditions above to ensure the required vertical clearance was maintained. The particular tensioning of the cables and follow-up verifications listed above ensure the required vertical clearances were exceeded.

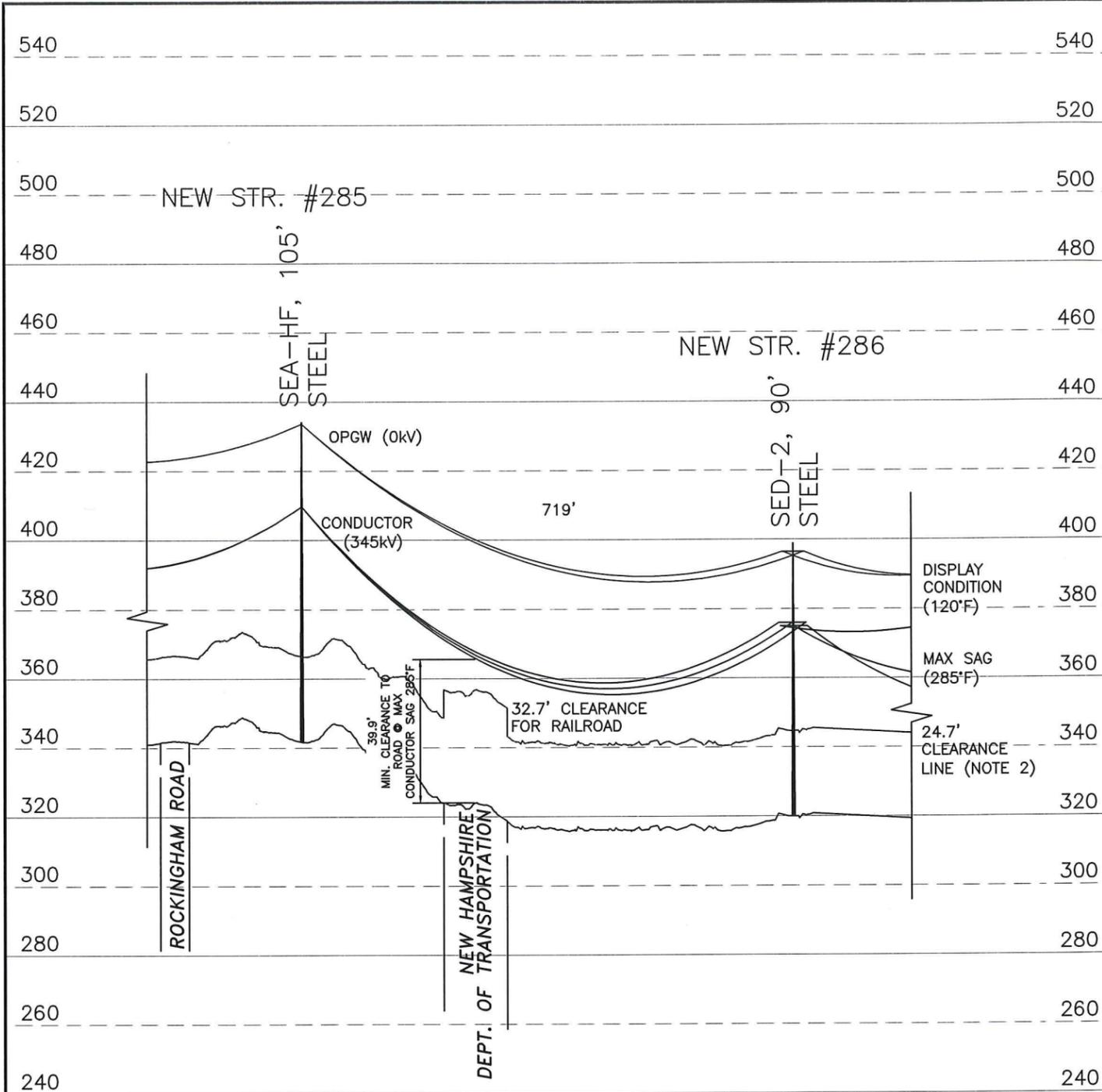


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Scale:
1:12,000
1 inch = 1,000 feet

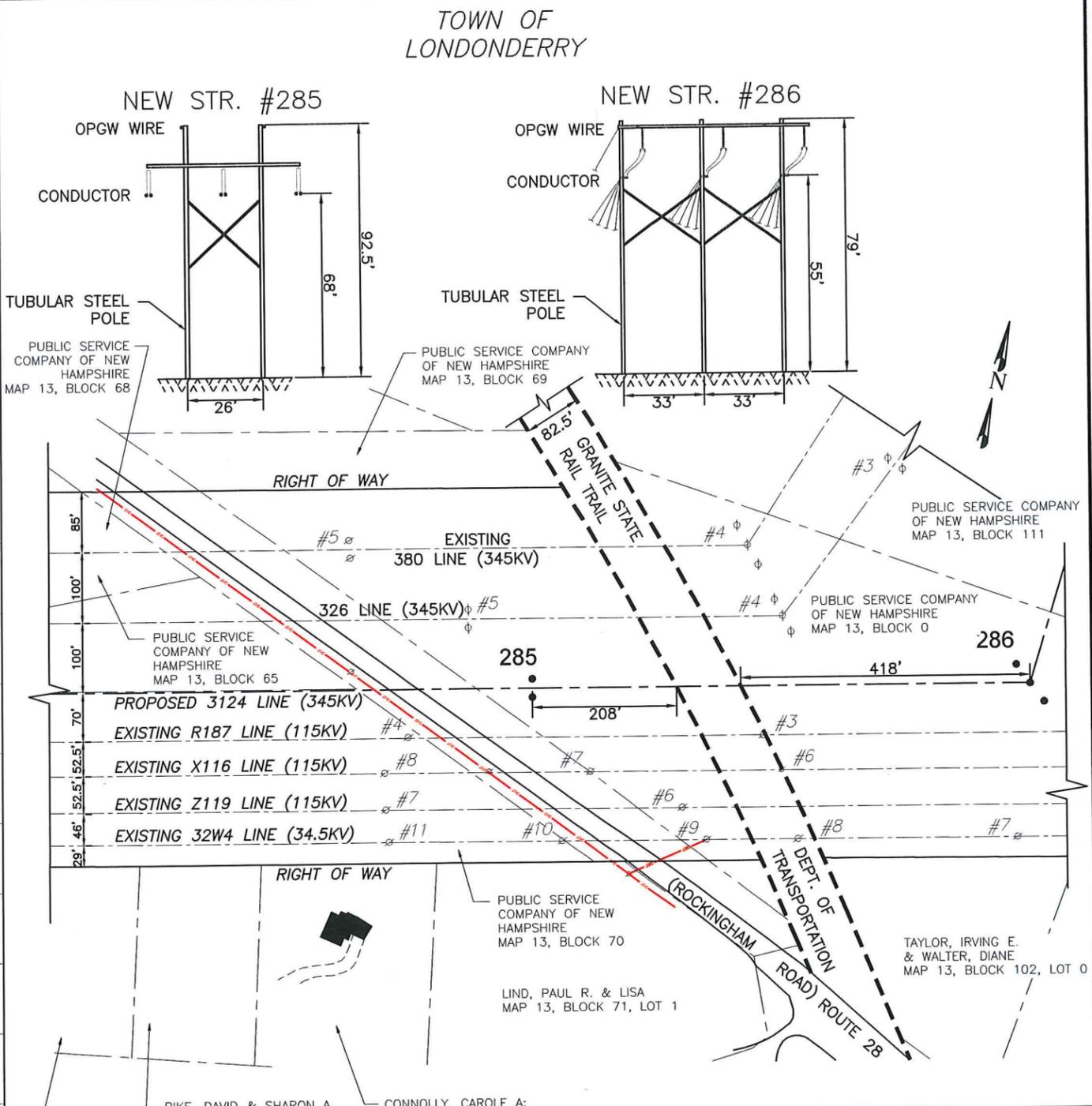
MERRIMACK VALLEY RELIABILITY PROJECT

Exhibit 4- Location Plan
Merrimack Valley Reliability Project 3124 Line (345 KV)
Public Land Crossings
Londonderry, New Hampshire





- NOTES:
1. VERTICAL DATUM IS NAVD88 IN FEET.
 2. NESC MINIMUM RAILROAD CLEARANCE FOR 345 kV CONDUCTORS IS 32.7'.
NESC MINIMUM GROUND CLEARANCE OF VEHICLE ACCESSIBLE AREA FOR 345 kV CONDUCTORS IS 24.7'.
EVERSOURCE STANDARD DESIGN GROUND CLEARANCE FOR 345 kV CONDUCTORS IS 29'.
EVERSOURCE STANDARD DESIGN RAILROAD CLEARANCE FOR 345 kV CONDUCTORS IS 37'.



LEGEND

- RAILROAD ROW
- - - PROPERTY LINE

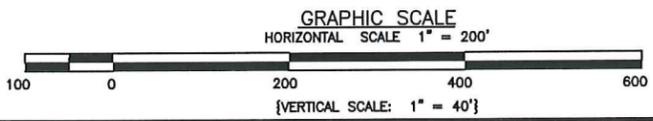
STRUCTURE LOCATION:

STR. #285 - LAT. = 42°54'03.943"N
LONG. = 71°20'49.215"W

STR. #286 - LAT. = 42°54'05.571"N
LONG. = 71°20'39.813"W

CABLE SCHEDULE:

WIRE	# OF CABLES	TYPE	DIA. (IN.)	WEIGHT/1000 FT	CABLE STRENGTH (LBS.)
NEW OPGW	2	BRUGG 48 FIBERS	0.650	407	17,618
NEW CONDUCTOR	6	1590 KCM 54/19 ACSR	1.545	2042.1	54,500



TRC 249 WESTERN AVENUE
AUGUSTA, ME 04330
PROJECT NO: 223027

CONTRACT SERVICES	DESCRIPTION	ENG/PE#	DATE	DRN	CHKD	APPR
A	ISSUED FOR LICENSING		8/15/15	JJD	CRP	GEL
B	RE-ISSUED FOR REVIEW		5/7/15	RDW	CRP	GEL
C	ISSUED FOR REVIEW		3/8/15	JJD	CRP	GEL
REV						

EVERSOURCE ENERGY

LINE 3124 345kV TRANSMISSION
NHDOT CROSSING LICENSE DRAWING
EXHIBIT 5
MERRIMACK VALLEY RELIABILITY PROJECT

SCALE: N.T.S. FILE: S3124-P0007 SH.7.DWG
DRAWING NO: S3124-P0007 SH.7

X	#
	DRAWN JJD/TRC
	ENGINEER GEL/TRC
	CHECKED CRP/TRC
	APPROVED GEL/TRC
	DATE 11/21/14