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MCLANE
MIDDLETON

Via Electronic Mail & Hand Delivery

February 7, 2017

New Hampshire Site Evaluation Committee
Pamela G. Monroe, Administrator
21 South Fruit Street, Suite 10
Concord, NH 03301

Re: NH SEC Docket No. 2015-04: Public Service Company of New Hampshire d/b/a Eversource Energy ("PSNH" or the "Applicant") for a New 115 kV Transmission Line from Madbury Substation to Portsmouth Substation.

NH PUC Docket DE 16-441, DE 16-442: Revisions to PSNH's Petitions for Licenses to Construct and Maintain Electric Lines, Neutral Wire and Fiber Optic Cable Over and Across Public Waters and Public Lands of New Hampshire

Dear Ms. Monroe:

Enclosed for filing in the above-captioned docket, please find an original paper copy and one thumb drive of the Applicant's Revisions to PSNH's Petitions for Licenses to Construct and Maintain Electric Lines, Neutral Wire and Fiber Optic Cable Over and Across Public Waters and Public Lands of the State. The revisions should be appended to the SEC Application at Appendix 19(a). The Applicant is simultaneously providing an original, six paper copies, and an electronic copy to the New Hampshire Public Utilities Commission.

Since filing its Application for a Certificate of Site and Facility before the NH SEC and the Petitions for Licenses before the NH PUC, PSNH has made several engineering design changes to accommodate concerns of abutters along the project corridor as well as to further refine the design to align with Eversource standard structure configurations. This results in minor changes to the engineering crossing drawings and petition appendices as originally submitted. The crossings still meet or exceed all NESC requirements.

Please contact me directly should you have any questions.

Sincerely,

Adam Dumville

Adam M. Dumville

AMD:slb
Enclosure

cc: SEC Distribution List
PUC Distribution List
NH PUC, Randall Knepper, Director, Safety & Security
NH PUC, Robert Wyatt, Assistant Director, Safety & Security

Application of Public Service Company of New Hampshire
d/b/a Eversource Energy
for Certificate of Site and Facility
for the Construction of a New 115 kV Electrical Transmission Line
from Madbury Substation to Portsmouth Substation

APPENDIX 19(a)

Revisions to the
NHPUC Public Water and Public Land Crossing
License Applications

NH PUC Docket DE 16-441:

Petition of PSNH d/b/a Eversource Energy to Construct and Maintain Electric Lines, Neutral Wire and Fiber Optic Cable Over/Across the Public Waters of the Oyster River and Little Bay in the Town of Durham, Pickering Brook and Little Bay in the Town of Newington

SUMMARY
Revisions between Originally Submitted Petition
And Revised Engineering Design

PETITION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE D/B/A EVERSOURCE ENERGY FOR LICENSES TO CONSTRUCT AND MAINTAIN ELECTRIC LINES, NEUTRAL WIRE AND FIBER OPTIC CABLE OVER AND ACROSS THE PUBLIC WATERS OF THE OYSTER RIVER AND LITTLE BAY IN THE TOWN OF DURHAM, NEW HAMPSHIRE AND PICKERING BROOK AND LITTLE BAY IN THE TOWN OF NEWINGTON, NEW HAMPSHIRE.

Reasons for revision

The original petition of Public Service Company of New Hampshire D/B/A Eversource Energy for licenses to construct and maintain electric lines, neutral wire and fiber optic cable over and across the public waters of the Oyster River and Little Bay in the Town of Durham, New Hampshire and Pickering Brooke and Little Bay in the Town of Newington, New Hampshire was originally submitted on April 12, 2016 as part of the Application for Certificate of Site and Facility for the Seacoast Reliability Project. Following that submittal, several engineering design changes have occurred to accommodate concerns of abutters to the project corridor as well as refine the design to align with Eversource standard structure configurations. This results in minor changes to the engineering crossing drawings and petition appendices as originally submitted, as listed below. The crossings still meet or exceed all NESC requirements.

Changes to Original Petition

There are no changes to the Petition filed.

Changes to Appendix A

1. Paragraph #1- Revised Drawing number F10740901 (Exhibit 1) has been supplied. There are no changes to the location plan labeled as Drawing number F10740902 (Exhibit 2).
2. Paragraph #1- **Change** "PSNH" **to** "Eversource Energy"
3. Paragraph #3- **Change** "As shown on Exhibit 1…approximate separation at the structure of 7 - 15 feet vertically … neutral wire is carried… approximately seven feet down below the 34.5kV phase wires." **to** "As shown on Exhibit 1…approximate separation at the structure of 6 - 13 feet vertically…neutral wire is carried… approximately 12 feet down below the 34.5kV phase wires."
4. Paragraph #5 Bullet 3- **Change** "…a clearance to the water surface of 57.1 feet. … exceed the minimum clearance requirement of 30.1 feet by 27 feet under temporary emergency conditions during a 10-yr storm event." **to** "…a clearance to the water surface of 58.4 feet. … exceed the minimum clearance

requirement of 30.1 feet by 28.3 feet under temporary emergency conditions during a 10-yr storm event."

5. Paragraph #5 Bullet 4- **Change** "… the clearance would be 12 feet vertically …" **to** "… the clearance would be 12.5 feet vertically …"
6. Paragraph #5 Bullet 5- **Change** "…clearance would be 8.7 feet vertically and 1 foot horizontally from the shield wires to the closest phase wire…exceed the vertical requirement by 5.8 feet under worst case conditions." **to** "…clearance would be 13.3 feet vertically and 1 foot horizontally from the shield wires to the closest phase wire…exceed the vertical requirement by 9.9 feet under worst case conditions."
7. Paragraph #5 Bullet 6- **Change** "…clearance to the water surface of 36.7feet … exceed the minimum clearance requirement of 28.5 feet by 8 feet under temporary emergency conditions during a 10-yr storm event." **to** "…clearance to the water surface of 37.2 feet … exceed the minimum clearance requirement of 28.5 feet by 8.7 feet under temporary emergency conditions during a 10-yr storm event."
8. Paragraph #5 Bullet 7- **Change** "…clearance to the water surface of 30.3 feet. …exceed the minimum clearance requirement of 25.5 feet by 4.8 feet under temporary emergency conditions during a 10-yr storm event." **to** "…clearance to the water surface of 31.1 feet. …exceed the minimum clearance requirement of 25.5 feet by 5.6 feet under temporary emergency conditions during a 10-yr storm event."
9. Paragraph #5 Bullet 8- **Change** "…clearance of the closest 34.5kV line would be 1.5 feet vertically and 0 feet horizontally … exceed the vertical requirement by 0.2 feet under worst case conditions." **to** "…clearance of the closest 34.5kV line would be 2.5 feet vertically and 0 feet horizontally … exceed the vertical requirement by 1.2 feet under worst case conditions."

Changes to Appendix B

1. Paragraph #1- Revised Drawing numbers F10740903 (Exhibit 3) and 385040901 (Exhibit 5) have been supplied. There are no changes to the location plans labeled as Drawing numbers F10740904 (Exhibit 4) and 385040902 (Exhibit 6).
2. Paragraph #1- **Change** "PSNH" **to** "Eversource Energy"
3. Paragraph #3- **Change** "As shown on Exhibit 3…separation at the structure of 8 -15 feet vertically" **to** "As shown on Exhibit 3…separation at the structure of 6 -12.5 feet vertically"
4. Paragraph #3- **Change** "A clearance of 26.2 feet…NESC required clearance of 20.1 feet by 6.1 feet." **to** "A clearance of 27.2 feet…NESC required clearance of 20.1 feet by 7.1feet."
5. Paragraph #4- **Change** "…1-pole, direct embed, 60 foot pole (eight feet embedded), wood deadend structure (western side)…" **to** "…1-pole, direct embed, 65 foot pole (8.5 feet embedded), wood deadend structure (western side)…"

6. Paragraph #4- **Change** "…separation at the structure of five feet vertically and 0-9 feet horizontally in a horizontal configuration." **to** "…separation at the structure of five feet vertically and 0 feet horizontally in a vertical configuration."
7. Paragraph #4- **Change** "for Structure 5…approximately five feet…." **to** "for Structure 5…approximately seven feet…."
8. Paragraph #4- **Change** "A clearance of 21 feet between…NESC required clearance of 15.5 feet by 5.5 feet." **to** "A clearance of 19.2 feet between…NESC required clearance of 15.5 feet by 3.7 feet."
9. Paragraph #6, Bullet 3- **Change** "…a clearance to the water surface of 34.1 feet…. exceed the minimum clearance requirement of 22.1 feet by 12 feet under temporary emergency conditions during a 10-yr storm event." **to** "…a clearance to the water surface of 34.6 feet…. exceed the minimum clearance requirement of 22.1 feet by 12.5 feet under temporary emergency conditions during a 10-yr storm event."
10. Paragraph #6, Bullet 4- **Change** "Under these conditions the clearance would be 13.5 feet vertically…" **to** "Under these conditions the clearance would be 12.5 feet vertically…"
11. Paragraph #6, Bullet 5- **Change** "…a clearance to the water surface of 31.9 feet. …exceed the minimum clearance requirement of 20.5 feet by 11.4 feet under temporary emergency conditions…" **to** "…a clearance to the water surface of 29.2 feet. …exceed the minimum clearance requirement of 20.5 feet by 8.7feet under temporary emergency conditions…"
12. Paragraph #6, Bullet 6- **Change** "…a clearance to the water surface of 23.5 feet. … exceed the minimum clearance requirement of 17.5 feet by 6 feet under temporary emergency conditions during a 10-yr storm event." **to** "…a clearance to the water surface of 21.8 feet. exceed the minimum clearance requirement of 17.5 feet by 4.3 feet under temporary emergency conditions during a 10-yr storm event."
13. Paragraph #6, Bullet 7- **Change** "…clearance of the closest 34.5kV line would be 2.4 feet vertically and 0 feet horizontally from the neutral wire … will exceed the vertical requirement by 1.1 feet under worst case conditions." **to** "…clearance of the closest 34.5kV line would be 4.4 feet vertically and 0 feet horizontally from the neutral wire … will exceed the vertical requirement by 3.1 feet under worst case conditions."

Changes to Appendix C

1. Paragraph #1- Revised Drawing number F10740905 (Exhibit 7) has been supplied.
2. Paragraph #1- **Change** "PSNH" **to** "Eversource Energy"
3. Paragraph #3- **Change** "80 feet" **to** "70 feet"
4. Paragraph #3- **Change** "6 to 12 feet" **to** "7.5 to 15 feet"
5. Paragraph #3- **Clarification**- Davit arms on steel structure are approximately 10 feet long.

REVISED
APPENDIX A

F107 & 380 Lines
OYSTER RIVER
DURHAM, NH

1. The design and proposed construction of this crossing is shown on the attached Eversource Energy Transmission Business Drawing entitled "DOUBLE CKT F107 & 380 BETWEEN STR. 28 & 29 OYSTER RIVER, DURHAM, NEW HAMPSHIRE" (Drawing No. F10740901) marked as Exhibit 1.

2. The location of the double circuit F107 and 380 crossing is shown on the attached Location Plan marked as Exhibit 2.

3. Line F107 and 380 will cross the Oyster River on a 1-pole, direct embed, 110 foot pole (16.5 feet embedded), steel tangent suspension structure (northern side) and on a 1-pole, 100 foot, steel deadend strain structure on concrete foundation (southern side). Details of these structures are shown on Exhibit 1. As shown on Exhibit 1, for Structure 28 the 115kV phase wires have an approximate separation at the structure of 6-13 feet vertically and 0-13 feet horizontally in a delta configuration. The static wire is carried on the structure by a support bracket approximately nine inches down from the top of the structure. The 34.5kV phase wires are arranged horizontally approximately 15 feet below the lowest 115kV conductor and have an approximate separation at the structure of 0-5 feet vertically and 3-6 feet horizontally. The neutral wire is carried on the structure by a support bracket approximately 12 feet down below the 34.5kV phase wires. As shown on Exhibit 1, for Structure 29 the 115kV phase wires have an approximate separation at the structure of 7 -15 feet vertically and 3-20 feet horizontally in a delta configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. The 34.5kV phase wires are arranged horizontally approximately 16 feet below the lowest 115kV conductor and have an approximate separation at the structure of zero feet vertically and five feet horizontally. The neutral wire is carried on the structure by a support bracket approximately seven feet down below the 34.5kV phase wires. All NESC clearances at the structure, as described in paragraph 11 of the petition, have been met by exceeding the horizontal and/or vertical clearances required. Land along the shoreline between the structures of this crossing and the river is not traversable by vehicles. However, minimum distances to ground per the NESC have been met. A clearance of 24 feet between the neutral and the closest ground point has been provided. This exceeds the NESC required clearance of 15.5 feet by 8.5 feet. As all other phase wires are above this elevation they will always exceed the NESC required clearance.

4. Flood water elevations for the Oyster River were based on information contained in flood insurance rate maps provided by FEMA. Flood elevations are based on FEMA FIRM Map 33017C0314D Panel 314 or 405 dated May 17, 2005 and FEMA FIS Study 33015CV001A Dated May 17, 2005. The 10-year flood elevation for this portion

of the river is approximately 33.3 feet. The area of the crossing, as required by the NESC (Section 232), is approximately 38.1 acres (314ft x5280ft/43560sf/acre). As stated in paragraph 10 of the petition, the minimum required 115 kV conductor clearance for water surface areas between 20-200 acres is 30.1 feet for 115 kV and 28.5 feet for 34.5 kV.

5. The sags and clearances to the water surface during a 10-year flood event for this crossing are as follows;

- PSNH has investigated a multitude of weather and loading conditions for its design. 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 OPGW cable and neutral conductors. PSNH has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations.

- Shield wires – Due to the fact that the OPGW wire is located above the phase wires, its clearance to the water surface will always exceed the minimum required NESC distance.

- F107 (115 kV): 285 degrees F – Max operating temperature (Phase wires) based on PSNH transmission standards - The maximum conductor sag for this weather case will be 22 feet with a clearance to the water surface of 58.4 feet. 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 30.1 feet by 28.3 feet under temporary emergency conditions during a 10-yr storm event.

- F107 (115 kV): Minimum phase to shield wire(s) clearance – The weather case that would produce the minimum clearance between the phase wires and the shield wires 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 shield wires would be at 32 deg. F and would still be iced with 1/2" of radial ice. Under these conditions the clearance would be 12.5 feet vertically and 6 feet horizontally from the shield wires to the closest phase wire. As described in Paragraph 11 of the petition, 64.7 inches (5.4 feet) of horizontal and/or 32.3 inches (2.7 feet) of vertical clearance is required between 115kV and 0kV conductors. The line would exceed both clearance requirements.

- F107 and 380 (115kV and 34.5kV): Minimum 115kV phase conductor to 34.5kV phase conductor clearance – The weather case that would produce the minimum clearance between the 115kV phase wires and the 34.5 kV phase wires would occur when the 34.5kV

conductor is at 30 deg. F with no ice and the 115kV phase wires are at their maximum operating temperatures of 285 degrees F. Under these conditions the clearance would be 8.7 feet vertically and 1 foot horizontally from the shield wires to the closest phase wire. As described in Paragraph 11 of the petition, 70.7 inches (5.9 feet) of horizontal and/or 40.7 inches (3.4 feet) of vertical clearance is required between 115kV and 34.5kV conductors. The line design will meet these requirements as the conductors will exceed the vertical requirement by 5.8 feet under worst case conditions.

- 380 (34.5 kV): 212 degrees F – Max operating temperature (Phase wires) based on PSNH distribution standards - The maximum conductor sag for this weather case will be 24 feet with a clearance to the water surface of 37.2 feet. 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 28.5 feet by 8.7 feet under temporary emergency conditions during a 10-yr storm event.

- 380 (Neutral): 120 degrees F – Max operating temperature (Phase wires) based on PSNH distribution standards - The maximum conductor sag for this weather case will be 21 feet with a clearance to the water surface of 31.1 feet. 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 25.5 feet by 5.6 feet under temporary emergency conditions during a 10-yr storm event.

- 380 (Neutral): Minimum phase to neutral clearance – Due to the fact that the 115kV phase conductors are located above the 34.5kV phase wires, its clearance to the neutral conductor will always exceed the minimum required NESC distance. The weather case that would produce the minimum clearance between the 34.5kV phase wires and the neutral wire would be a condition where the neutral conductor is at 80 deg. F and the 34.5kV conductors are at their maximum operating temperatures of 212 degrees F. Under these conditions the clearance of the closest 34.5kV line would be 2.5 feet vertically and 0 feet horizontally from the neutral wire to the closest phase wire. As described in Paragraph 11 of the petition, 59.8 inches (4.15 feet) of horizontal and/or 15.7 inches (1.3 feet) of vertical clearance is required between 34.5kV and 0kV conductors. The line design will meet these requirements as the conductors will exceed the vertical requirement by 1.2 feet under worst case conditions.

REVISED
APPENDIX B

F107 & 3850 Lines
PICKERING BROOK
NEWINGTON, NH

1. The design and proposed construction of these crossings is shown on the attached Eversource Energy Transmission Business Drawings entitled "SINGLE CKT F107 BETWEEN STR. 119 & 120 PICKERING BROOK, NEWINGTON, NEW HAMPSHIRE" (Drawing No. F10740903) marked as Exhibit 3 and "SINGLE CKT 3850 BETWEEN STR. 5 & 6 PICKERING BROOK, NEWINGTON, NEW HAMPSHIRE" (Drawing No. 385040901) marked as Exhibit 5.

2. The location of the single circuit F107 crossing is shown on the attached Location Plan marked as Exhibit 4. The location of the single circuit 3850 crossing is shown on the attached Location Plan marked as Exhibit 6.

3. Line F107 will cross the Pickering Brook on a 1-pole, direct embed, 100 foot pole (16 feet embedded), steel tangent suspension structure (eastern side) and on a 1-pole, 75 foot, steel deadend strain structure on concrete foundation (western side). Details of these structures are shown on Exhibit 3. As shown on Exhibit 3, for Structure 120 the 115kV phase wires have an approximate separation at the structure of 6-12.5 feet vertically and 0-13 feet horizontally (6.5 foot post insulators) in a delta configuration. The static wire is carried on the structure by a support bracket approximately nine inches down from the top of the structure. As shown on Exhibit 3, for Structure 119 the 115kV phase wires have an approximate separation at the structure of 7 -15 feet vertically and 2.5-20 feet horizontally in a delta configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. Land along the shoreline between the structures of this crossing and the river is not traversable by vehicles. However, minimum distances to ground per the NESC have been met. A clearance of 27.2 feet between the phase wire and the closest ground point has been provided. This exceeds the NESC required clearance of 20.1 feet by 7.1 feet. As all other phase wires are above this elevation they will always exceed the NESC required clearance.

4. Line 3850 will cross the Pickering Brook on a 1-pole, direct embed, 65 foot pole (8.5 feet embedded), wood deadend structure (western side) and on a 1-pole, direct embed 60 foot (eight feet embedded), wood tangent structure (eastern side). As shown on Exhibit 5, for Structure 5 the 34.5kV phase wires have an approximate separation at the structure of five feet vertically and 0 feet horizontally in a vertical configuration. The neutral wire is carried on the structure by a support bracket approximately seven feet down below the 34.5kV phase wires. As shown on Exhibit 5, for Structure 6 the 34.5kV phase wires have an approximate separation at the structure of four feet eight inches horizontally in a horizontal configuration. The neutral wire is carried on the structure by a support bracket approximately five feet down below the 34.5kV phase wires. All NESC clearances at the structure as described in paragraph 11 of the petition have been met by exceeding the horizontal and/or vertical clearances required. Land along the shoreline between the structures of this crossing and the river is not traversable by

vehicles. However, minimum distances to ground per the NESC have been met. A clearance of 19.2 feet between the neutral and the closest ground point has been provided. This exceeds the NESC required clearance of 15.5 feet by 3.7 feet. As all other phase wires are above this elevation they will always exceed the NESC required clearance.

5. Flood water elevations for the Pickering Brook were based on information contained in flood insurance rate maps provided by FEMA. There was no flood elevation provided on the FEMA Maps as this portion of Pickering Brook is in the Zone X section of Map 33015C0255E, dated May 17, 2005. Zone X locations indicate that under a 100 year flood event the flood depth would be less than 1 foot. For conservative design it was assumed that the water level would not exceed the top of bank during a 10 year flood. The 10-year flood elevation for this portion of the river was designed at approximately 27.7 feet. This far exceeds the 1 foot depth prescribed on the FEMA flood map. The area of the crossing, as required by the NESC (Section 232), is approximately 9.9 acres (82 feet x5280 feet/43560sf/acre). As stated in paragraph 10 of the petition, the minimum required 115 kV conductor clearance for water surface areas between under 20 acres is 22.1 feet for 115 kV and 20.5 feet for 34.5 kV.

6. The sags and clearances to the water surface during a 10-year flood event for this crossing are as follows;

- PSNH has investigated a multitude of weather and loading conditions for its design. 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 OPGW cable and neutral conductors. PSNH has determined that the weather cases and combinations listed below results in the minimum clearance and control over all other weather conditions and combinations.

- Shield wires – Due to the fact that the OPGW wire is located above the phase wires, its clearance to the water surface will always exceed the minimum required NESC distance.

- F107 (115 kV): 285 degrees F – Max operating temperature (Phase wires) based on PSNH transmission standards - The maximum conductor sag for this weather case will be 18.4 feet with a clearance to the water surface of 34.6 feet. 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 22.1 feet by 12.5 feet under temporary emergency conditions during a 10-yr storm event.

- F107 (115 kV): Minimum phase to shield wire(s) clearance – The weather case that would produce the minimum clearance between the phase wires and the shield wires 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 shield wires would be at 32 deg. F and would still be iced with 1/2" of radial ice. Under these conditions the

clearance would be 12.5 feet vertically and 6 feet horizontally from the shield wires to the closest phase wire. As described in Paragraph 11 of the petition 64.7 inches (5.4 feet) of horizontal and/or 32.3 inches (2.7 feet) of vertical clearance is required between 115kV and 0kV conductors. The line would exceed both clearance requirements.

- 380 (34.5 kV): 212 degrees F – Max operating temperature (Phase wires) based on PSNH distribution standards - The maximum conductor sag for this weather case will be 22.1 feet with a clearance to the water surface of 29.2 feet. 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 20.5 feet by 8.7 feet under temporary emergency conditions during a 10-yr storm event.

- 380 (Neutral): 120 degrees F – Max operating temperature (Phase wires) based on PSNH distribution standards - The maximum conductor sag for this weather case will be 19 feet with a clearance to the water surface of 21.8 feet. 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 17.5 feet by 4.3 feet under temporary emergency conditions during a 10-yr storm event.

- 380 (Neutral): Minimum phase to neutral clearance – The weather case that would produce the minimum clearance between the 34.5kV phase wires and the neutral wire would be a condition where the neutral conductor is at 80 deg. F and the 34.5kV conductors are at their maximum operating temperatures of 212 degrees F. Under these conditions the clearance of the closest 34.5kV line would be 4.4 feet vertically and 0 feet horizontally from the neutral wire to the closest phase wire. As described in Paragraph 11 of the petition, 49.8 inches (4.15 feet) of horizontal and/or 15.7 inches (1.3 feet) of vertical clearance is required between 34.5kV and 0kV conductors. The line design will meet these requirements as the conductors will exceed the vertical requirement by 3.1 feet under worst case conditions.

REVISED
APPENDIX C

F107 Line
Little Bay
Durham, NH and Newington, NH

1. The design and proposed construction of this crossing is shown on the attached Eversource Energy Transmission Business Drawing entitled "F107 LINE CROSSING, LITTLE BAY DURHAM AND NEWINGTON, NEW HAMPSHIRE" (Drawing No. F10740905) marked as Exhibit 7.

2. The location of the F107 crossing of Little Bay is also shown on Exhibit 7.

3. Line F107 will cross Little Bay using three underground submarine cables. The three cables will be buried using a water jet plow, driver hand jetting or mechanical trenching. The submarine cable will begin at F107 Structure 101 on the West shore of Little Bay. This structure will be a single pole, 70 foot, steel deadend strain structure on concrete foundation. The cable will then run underwater to an underground manhole on the East shore of Little Bay. Details of Structure 101 are provided with the petition on Exhibit 7. As shown on Exhibit 7, for Structure 101 the overhead 115kV phase wires have an approximate separation at the structure of 7.5 to 15 feet vertically and 0 to 20 feet horizontally with 10 feet long davit arms in a delta configuration. The static wire is carried on the structure by a support bracket approximately 9 inches down from the top of the structure on the left and right poles. The submarine cable will run down the pole at Structure 101 and be buried to a depth of 42 inches heading east for approximately 367 feet by open trenching or diver burial, one phase per pole, from the overhead conductor elevation. The cables will then proceed 1835 feet at 42 inch burial using a water jet plow. At that point the depth will be increased to 8 feet depth in the main channel for approximately 2431 feet. Continuing the Eastern path, the depth will decrease to 42 inches for the last 770 feet where the cable will come on shore and enter an underground splice vault. From that point the submarine cable will be spliced to a land based underground cable to connect to the above ground portion of the line at Structure 102. Details of the splice vault have been included on Exhibit 7. As shown on Exhibit 7 the cables will be installed 42 inches below finished grade and will be spaced a minimum of 18 inches apart vertically attached to the side of the manhole. All NESC clearances at the structure, as described in paragraph 11 of the petition, have been met by exceeding the horizontal and/or vertical clearances required. This crossing will be entirely underground or underwater so all overhead clearances described will not be applicable to this crossing.

4. The underwater crossing will consist of three 115kV rated, 1400 mm2 XLPE submarine cables. The cable will have a copper wire core surrounded by extruded XLPE insulation. A layer of copper armoring will be installed on the outside of the cable to provide mechanical protection. The overall cable diameter will be approximately 140.2 mm. The cables will be installed with a separation of approximately 30 feet in the main channel of Little Bay. As they approach land they will converge to within 5 feet

separation. Two ADSS fiber optic cables will be strapped to two separate cable (one ADSS cable per conductor cable) to continue the fiber optic path for the F107 line. These cables will follow the same route as the 115kV conductors. There are four existing cables in the corridor that have been abandoned. Some of these cables may be raised to the surface, cut, capped and reset on the bottom to move them out of the way of the new cable installation.

5. The submarine cable will be buried between 42 inches and 96 inches depending on the location within the Little Bay. This will meet or exceed the NESC clearance of 42 inches based on Table 352-1 of the NESC for underground direct bury cable over 50kV. Section 351.C.5 of the NESC also states that "Submarine crossings should be routed, installed, or both, so they will be protected from erosion by tidal action or currents. They should not be located where ships normally anchor." All three cables will be located in an existing cable crossing location as shown on the NOAA Navigational Chart for Little Bay and Great Bay attached to this petition as Exhibit 8. Per the NOAA Nautical Chart User's Manual dated 1997 this designation includes restrictions on anchoring in the cable area. This satisfies the requirement of the NESC. The cables will also be buried to protect them from tidal action as well as any inadvertent boat anchors.

6. The underground vault will comply with all requirements of the NESC. As described in NESC Section 323.A the underground vault will be designed for an HS-20 vehicle loading. Per NESC Section 323.B the underground vault will have a vertical dimension not less than 6 feet and a minimum of 3 feet of working space and shall be accessible by two manholes with a minimum diameter of 26 inches.

08/2012

F107 LINE
STR. 28
110' ST-1-UB

24 FIBER OPGW
SHOWN @ 1/2" ICE, 32°F

F107 LINE
STR. 29
100' SPDE-DAUB

1590 ACSR 45/7 (TYP.)
SHOWN @ 1/2" ICE, 32°F

1590 ACSR 45/7 (TYP.)
SHOWN @ 30°F

1590 ACSR 45/7 (TYP.)
SHOWN @ 285°F

795 ACSR 26/7 (TYP.)
SHOWN @ 1/2" ICE, 32°F

795 ACSR 26/7 (TYP.)
SHOWN @ 30°F

795 ACSR 26/7 (TYP.)
SHOWN @ 212°F

4/0 ACSR 6/1 (TYP.)
SHOWN @ 1/2" ICE, 32°F

4/0 ACSR 6/1 (TYP.)
SHOWN @ 80°F

4/0 ACSR 6/1 (TYP.)
SHOWN @ 120°F

12.5'
13.3'
24.0'
2.5'
58.4'
99.0'
31.1'
37.2'

▽ EL. 33.3'
@ 10 YEAR FLOOD

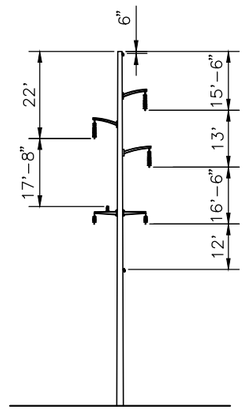
▽ EL. 29' ±
@ TIME OF SURVEY

Edge of River
OYSTER RIVER
Edge of River

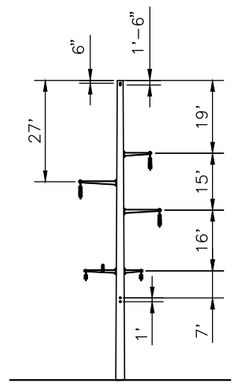
163' 314' 18'
SPAN = 495'

PROFILE

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



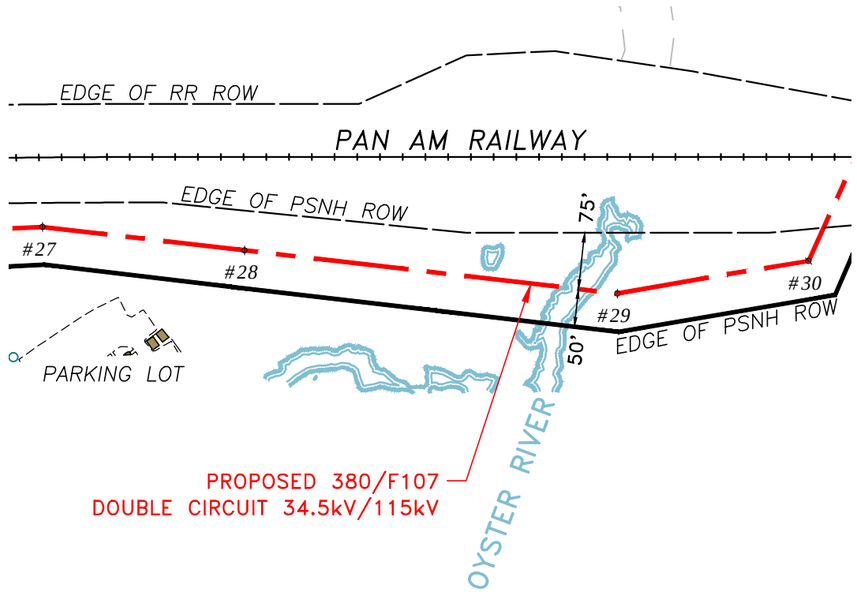
STRUCTURE 28
SINGLE POLE
TYPE ST-1-UB



STRUCTURE 29
SINGLE POLE
TYPE SPDE-DAUB

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE. RIGHT OF WAY LOCATION HAS BEEN SURVEYED AND PROVIDED BY DOUCET SURVEY INC.

D U R H A M, N. H.



PLAN VIEW

SCALE: 1"=200'

200 100 0 200 400 600

GRAPHIC SCALE
1" = 200'

EXHIBIT 1

24 FIBER OPGW INSTALLED @ 4,500 LBS. NESC HVY. INITIAL
1590 ACSR 45/7 INSTALLED @ 11,400 LBS. NESC HVY. INITIAL
795 ACSR 26/7 INSTALLED @ 4,500 LBS. NESC HVY. INITIAL
4/0 ACSR 6/1 INSTALLED @ 2,500 LBS. NESC HVY. INITIAL

NO.	REVISION	DATE	DRWN	CHKD	APPR
4	UPDATED SAGS	8/16	SCF	APJ	–
3	UPDATED F107 STRUCTURE NUMBERS	11/15	SCF	APJ	–

EVERSOURCE ENERGY | TRANSMISSION BUSINESS | 4 T

DRAWN SCF	DOUBLE CKT F107 & 380 BETWEEN STR. 28 & 29			
ENGINEER KMS	OYSTER RIVER, DURHAM, NEW HAMPSHIRE			
CHECKED APJ				
APPROVED –	SCALE AS NOTED	DATE 12/8/14	SHEET 1 OF 1	DRAWING NO. F10740901

8/22/2016 11:08 AM – SFISHER – F10740901.DWG – F10740901

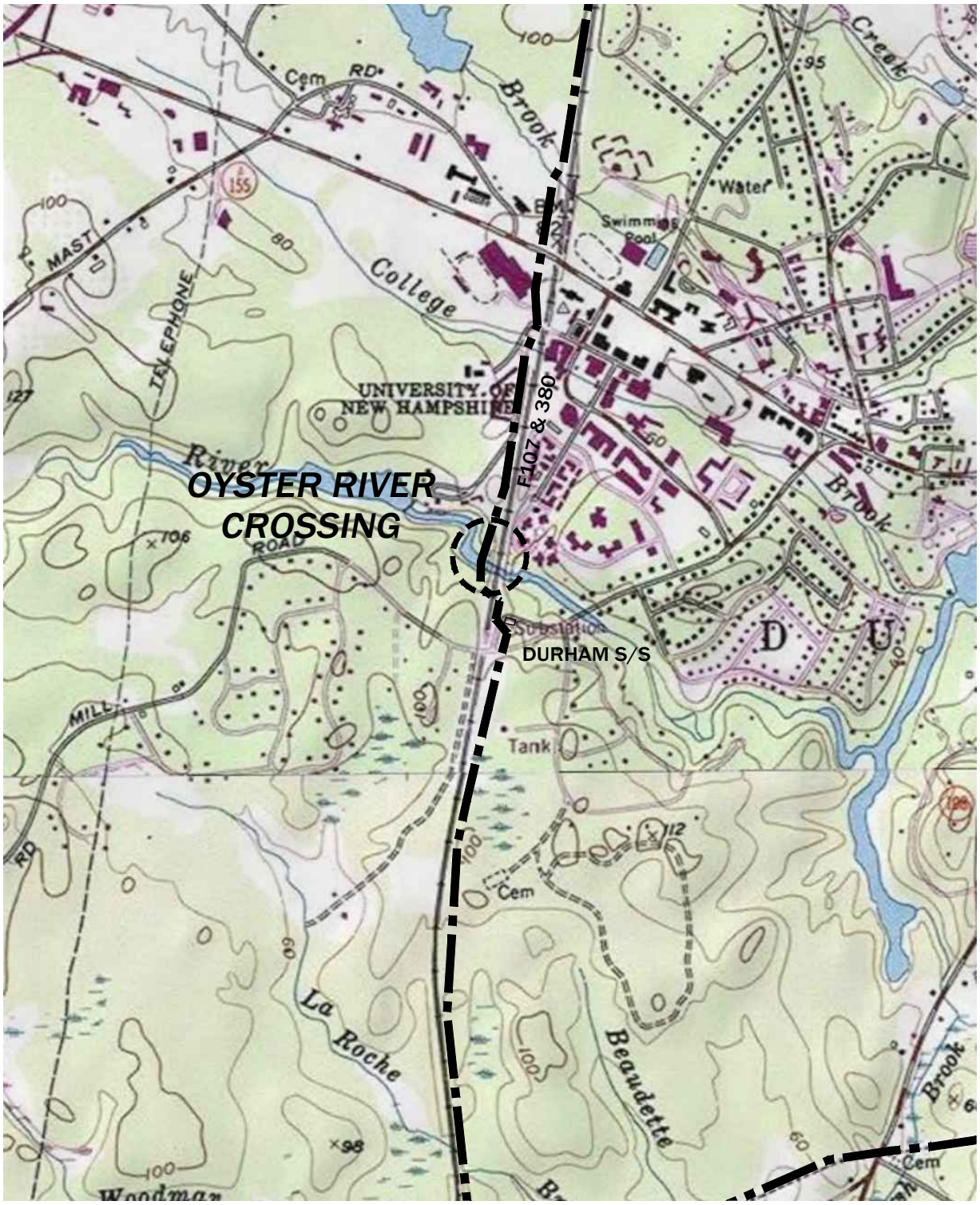


EXHIBIT 2

NO.	REVISION	DATE	DRWN	CHCK	APPR
1	UPDATED ALIGNMENT	8/7/15	SCF	APJ	
0	ISSUED FOR PERMITTING	4/10/15	SCF	APJ	

DRAWN: SCF

DESIGNED: KMS

CHECKED: APJ

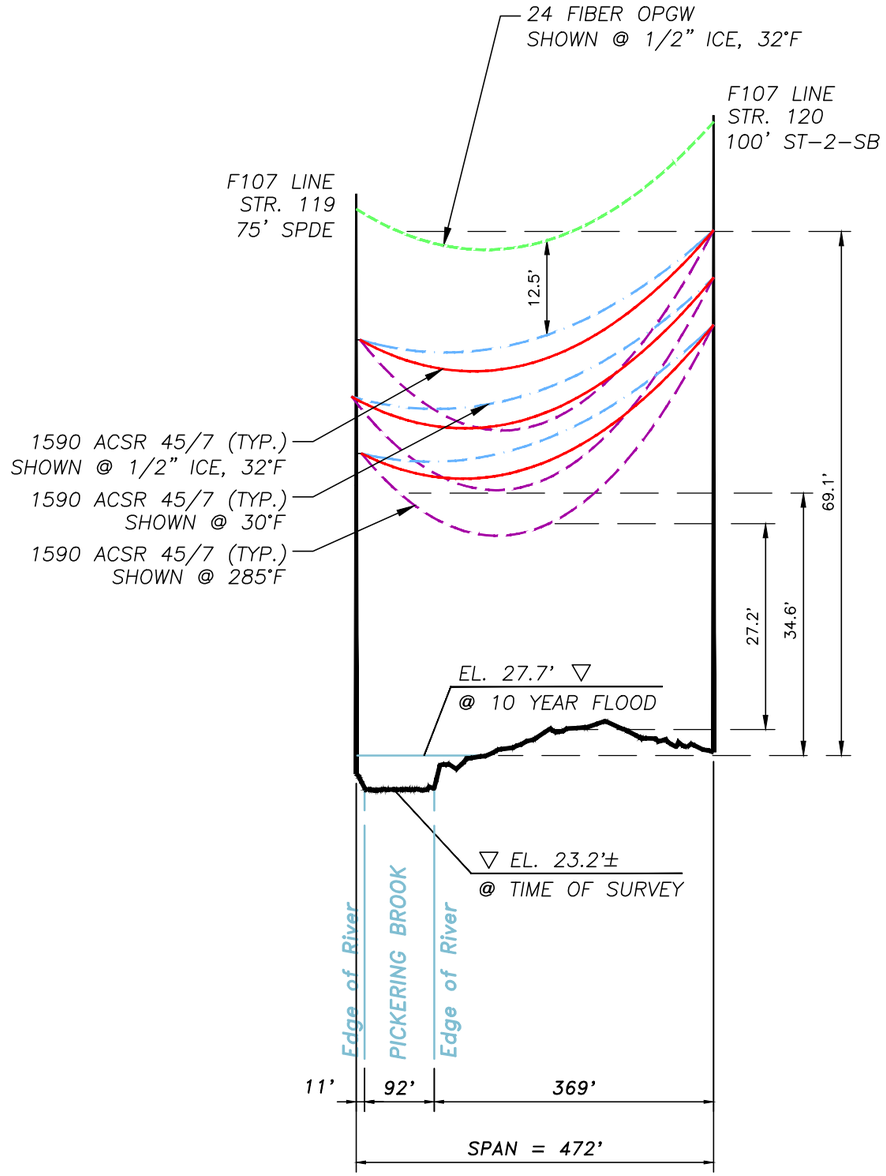
APPROVED:

Eversource — System Projects

LOCATION PLAN
DOUBLE CIRCUIT F107 & 380 LINE CROSSING
OYSTER RIVER
DURHAM, NEW HAMPSHIRE

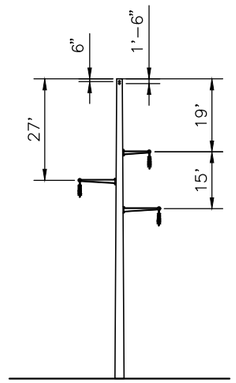
SCALE	DATE	SHEET	DRAWING NO.
1"=1500'	12/8/14	1 OF 1	F10740902

08/2012

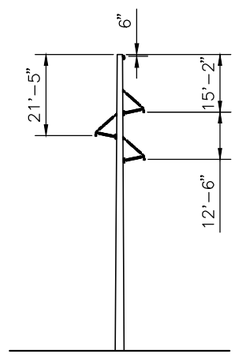


PROFILE

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

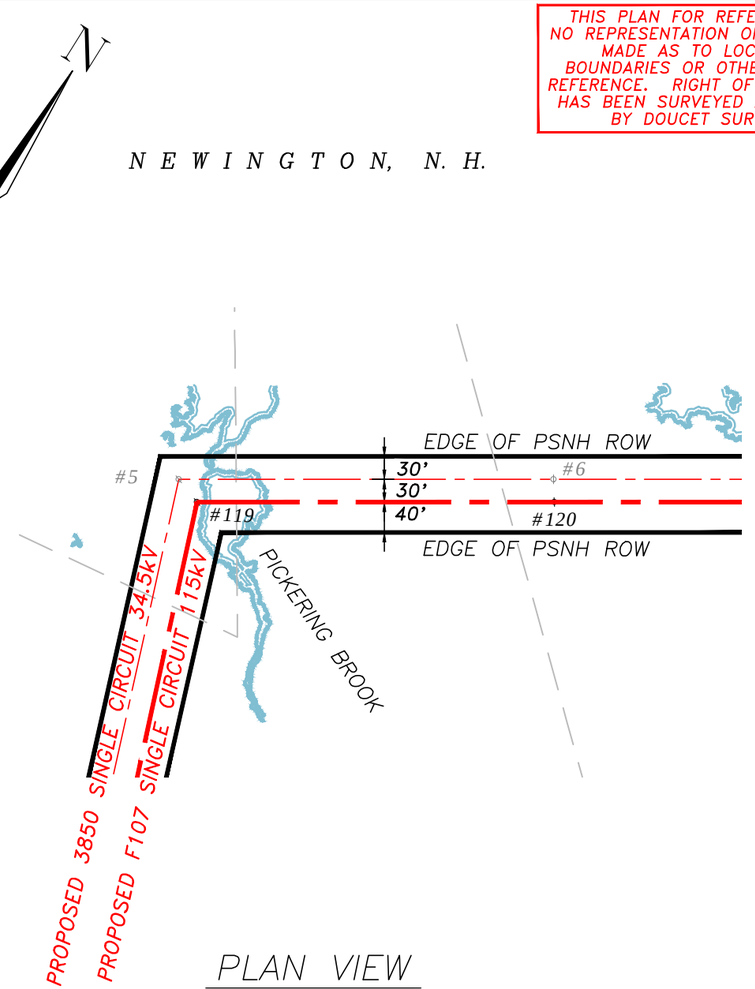


STRUCTURE 119
SINGLE POLE
TYPE SPDE



STRUCTURE 120
SINGLE POLE
TYPE ST-2-SB

N E W I N G T O N, N. H.



PLAN VIEW

SCALE: 1"=200'

200 100 0 200 400 600

GRAPHIC SCALE
1" = 200'

EXHIBIT 3

24 FIBER OPGW INSTALLED @ 4,500 LBS. NESC HVY. INITIAL
1590 ACSR 45/7 INSTALLED @ 11,400 LBS. NESC HVY. INITIAL

NO.	REVISION	DATE	DRWN	CHKD	APPR
5	UPDATED SAGS	8/16	SCF	APJ	–
4	UPDATED F107 STRUCTURE NUMBERS	12/15	SCF	APJ	–

EVERSOURCE ENERGY | TRANSMISSION BUSINESS | 5 T

DRAWN: SCF
ENGINEER: KMS
CHECKED: APJ
APPROVED: –

SINGLE CKT F107
BETWEEN STR. 119 & 120
PICKERING BROOK, NEWINGTON, NEW HAMPSHIRE

SCALE	DATE	SHEET	DRAWING NO.
AS NOTED	3/17/15	1 OF 1	F10740903

8/22/2016 12:57 PM – SFISHER – F10740903.DWG – F10740903

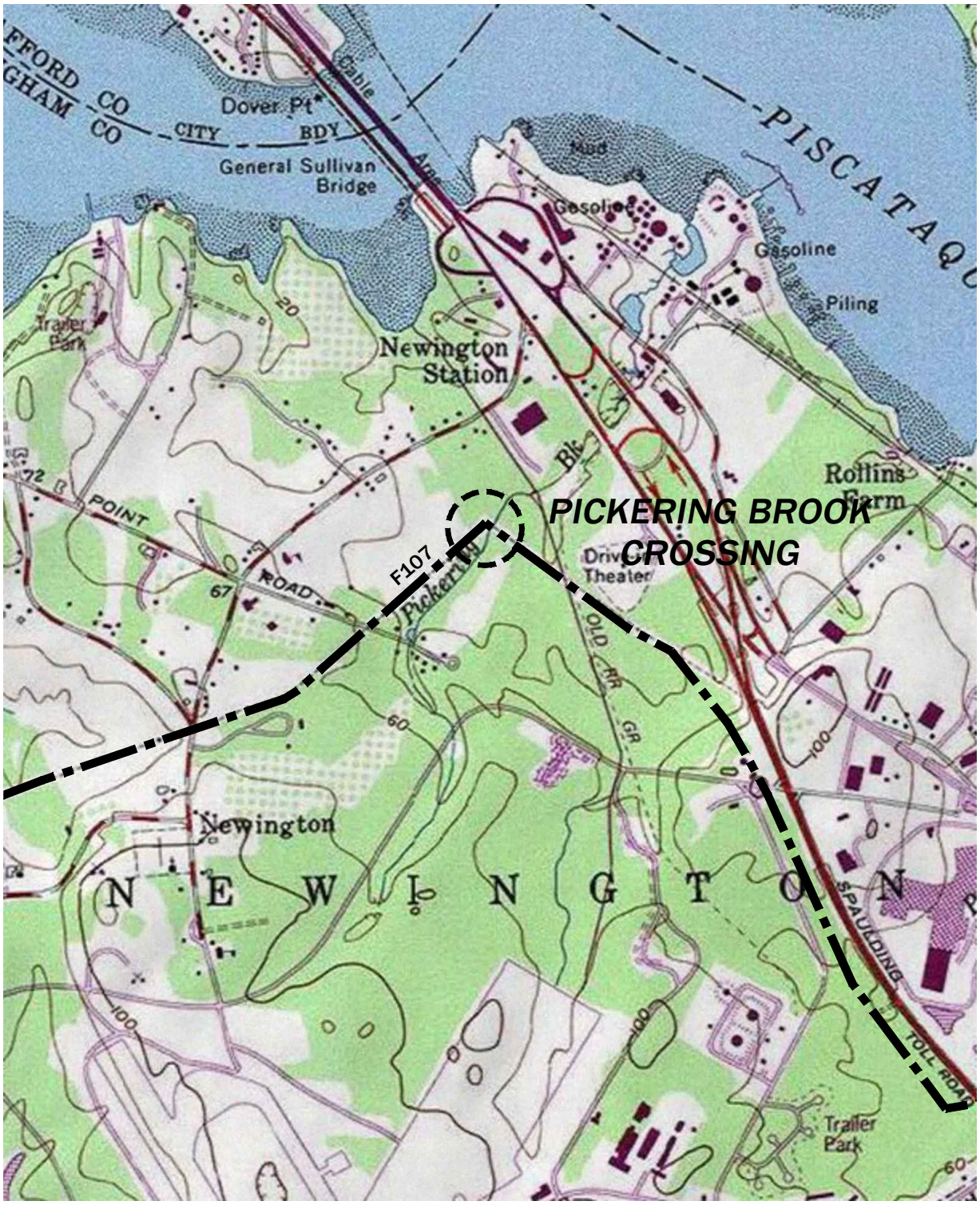


EXHIBIT 4

NO.	REVISION	DATE	DRWN	CHCK	APPR
1	UPDATED ALIGNMENT	8/7/15	SCF	APJ	
0	ISSUED FOR PERMITTING	4/10/15	SCF	APJ	

DRAWN: SCF
DESIGNED: KMS
CHECKED: APJ
APPROVED:

Eversource — System Projects

LOCATION PLAN
SINGLE CIRCUIT F107 LINE CROSSING
PICKERING BROOK
NEWINGTON, NEW HAMPSHIRE

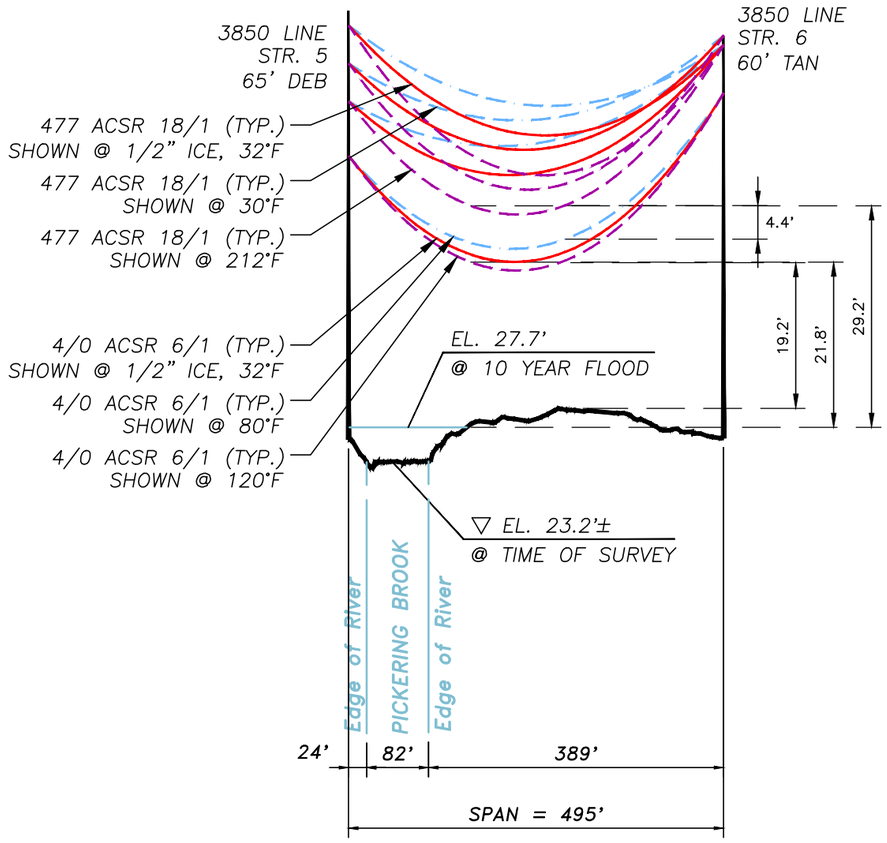
SCALE	DATE	SHEET	DRAWING NO.
1"=1500'	3/17/15	1 OF 1	F10740904

08/2012

THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE. RIGHT OF WAY LOCATION HAS BEEN SURVEYED AND PROVIDED BY DOUCET SURVEY INC.

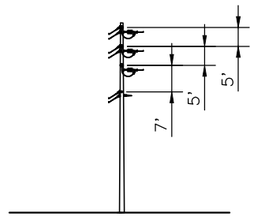
N

NEWINGTON, N. H.

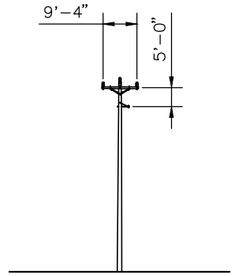


PROFILE

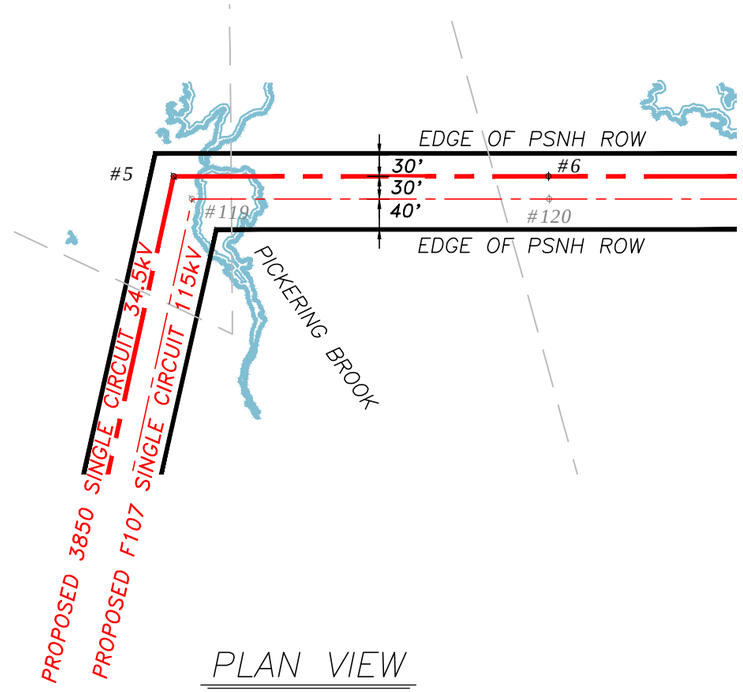
SCALE: 1"=200' HORIZ.
20' VERT.



STRUCTURE 5
SINGLE POLE
TYPE DEB



STRUCTURE 6
SINGLE POLE
TYPE TAN



PLAN VIEW

SCALE: 1"=200'

200 100 0 200 400 600

GRAPHIC SCALE
1" = 200'

EXHIBIT 5

477 ACSR 18/1 INSTALLED @ 4,500 LBS. NESC HVY. INITIAL
4/0 ACSR 6/1 INSTALLED @ 2,500 LBS. NESC HVY. INITIAL

NO.	REVISION	DATE	DRWN	CHKD	APPR
5	ISSUED FOR SEC AMENDMENT	1/17	SCF	APJ	–
4	REVISED 30 PERCENT DESIGN	9/16	SCF	APJ	–

EVERSOURCE ENERGY

TRANSMISSION BUSINESS | 5 T

DRAWN: SCF
ENGINEER: KMS
CHECKED: APJ
APPROVED: –

SINGLE CKT 3850 BETWEEN STR. 5 & 6

PICKERING BROOK, NEWINGTON, NEW HAMPSHIRE

SCALE	DATE	SHEET	DRAWING NO.
AS NOTED	8/4/15	1 OF 1	385040901

1/6/2017 11:40 AM – SFISHER – 385040901.DWG – 385040901

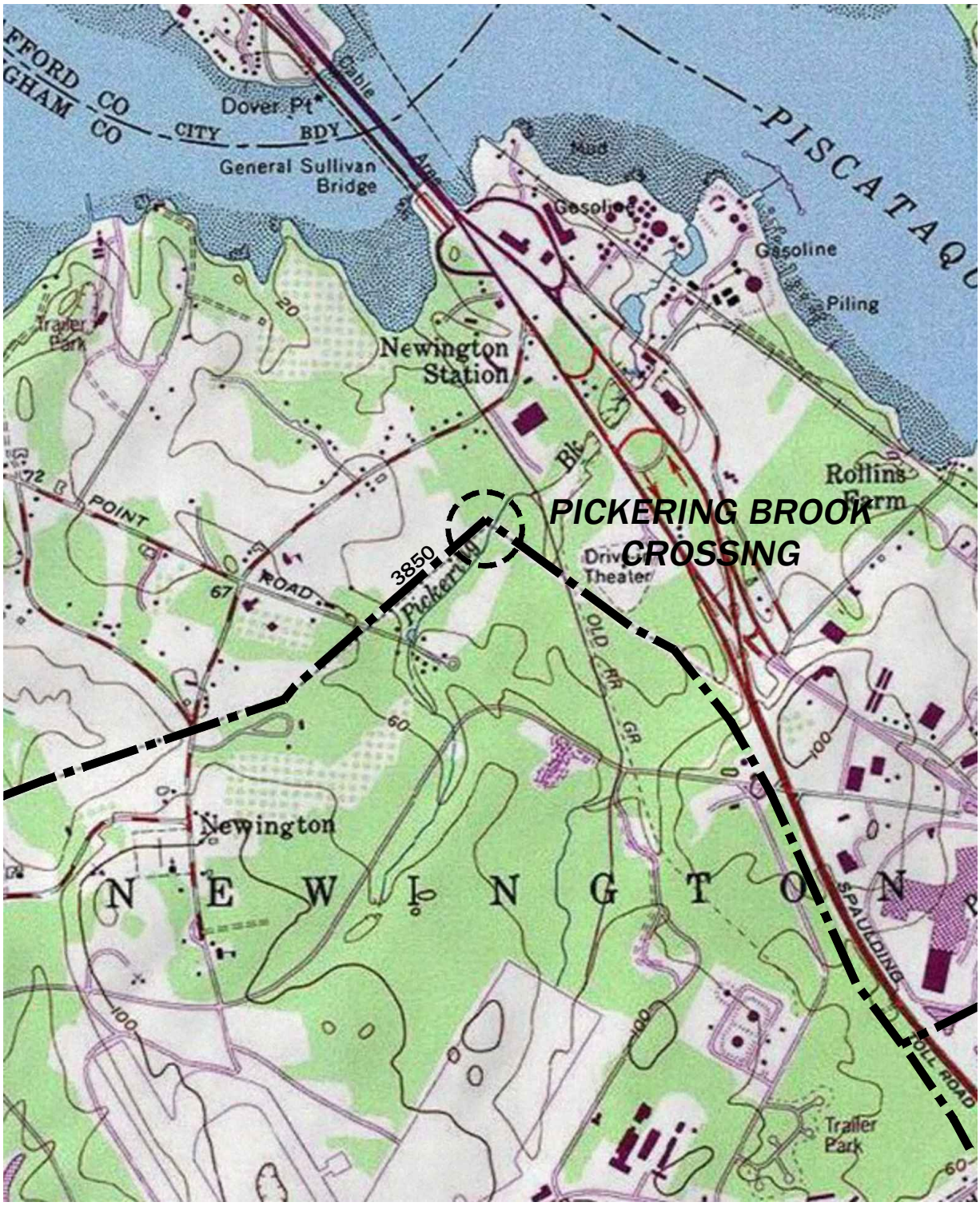


EXHIBIT 6

NO.	REVISION	DATE	DRWN	CHCK	APPR
0	ISSUED FOR PERMITTING	8/7/15	SCF	APJ	

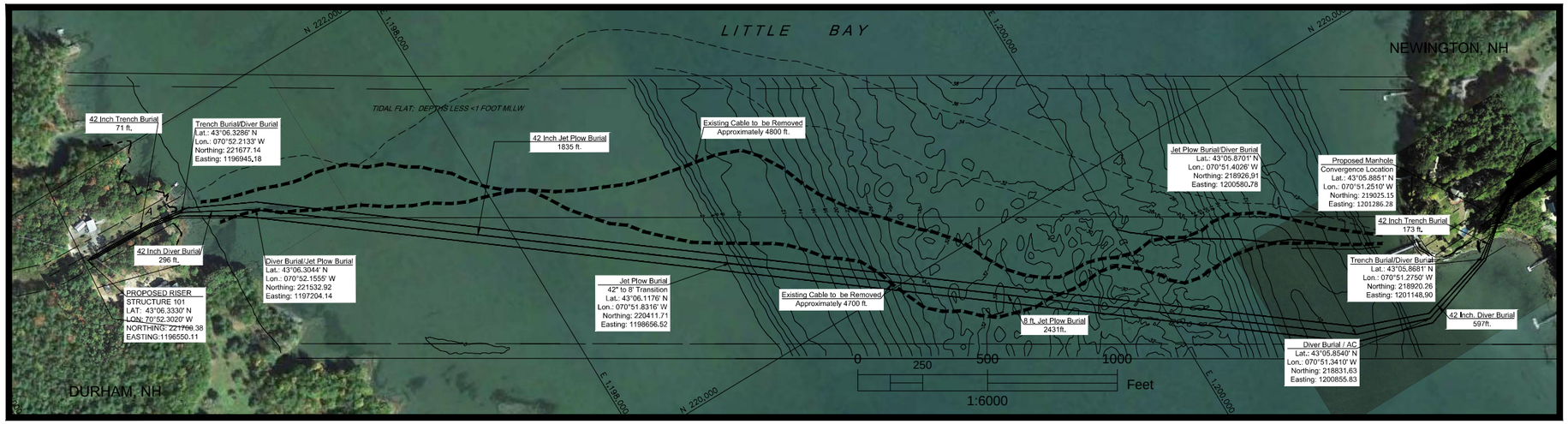
DRAWN: SCF
DESIGNED: KMS
CHECKED: APJ
APPROVED:

Eversource — System Projects

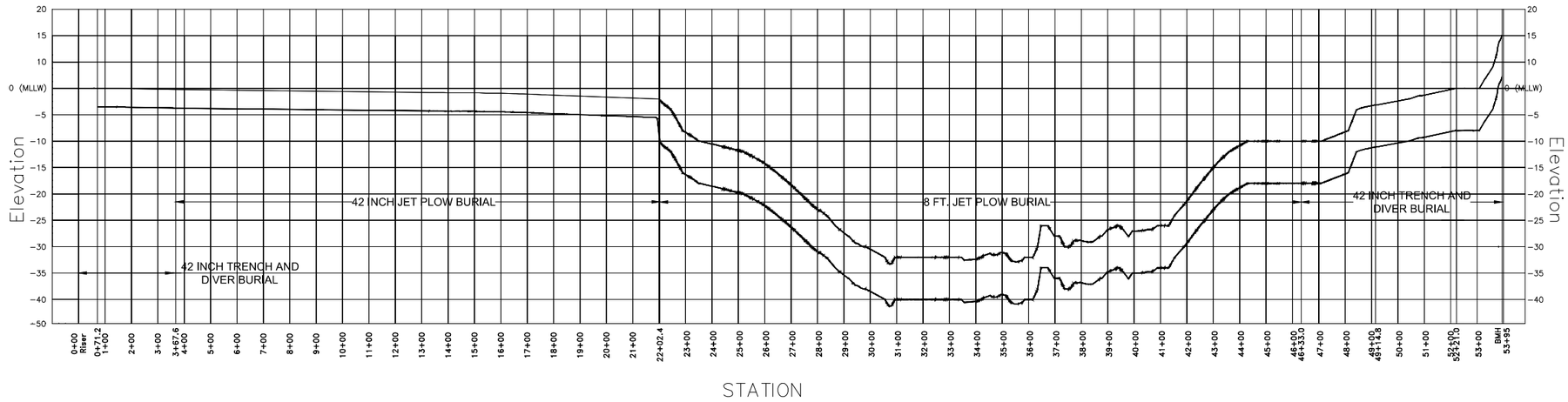
LOCATION PLAN
SINGLE CIRCUIT 3850 LINE CROSSING
PICKERING BROOK
NEWINGTON, NEW HAMPSHIRE

SCALE	DATE	SHEET	DRAWING NO.
1"=1500'	8/4/15	1 OF 1	385040902

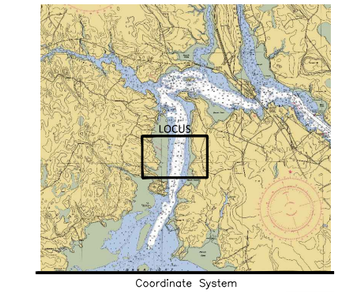
PLAN VIEW



PROFILE VIEW



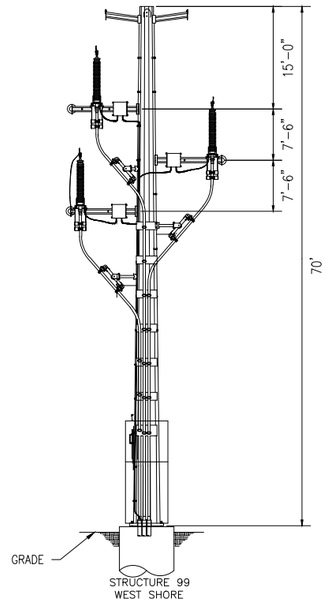
THIS PLAN FOR REFERENCE ONLY. NO REPRESENTATION OR WARRANTY IS MADE AS TO LOCATION OF BOUNDARIES OR OTHER POINTS OF REFERENCE. RIGHT OF WAY LOCATION HAS BEEN SURVEYED AND PROVIDED BY DOUCET SURVEY INC.



Coordinate System

State Plane, NAD 83
2800 – New Hampshire, U.S. Feet

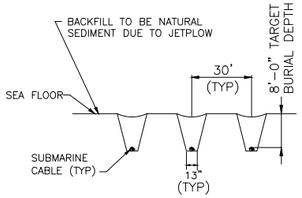
Vertical Datum: MLLW



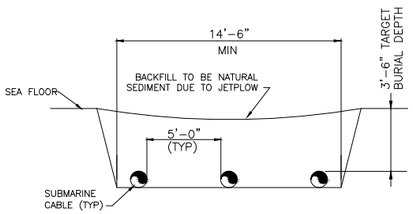
General Notes

PROPOSED RE-ROUTE

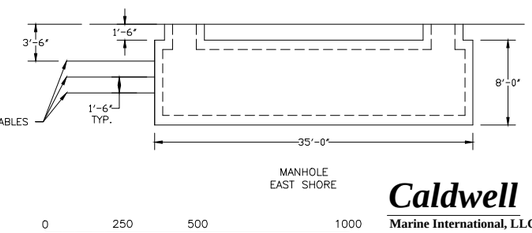
- Magnetometer Hit
- Route Centerline:
- Trench Burial:
- Diver Burial:
- 8'Jet Plow Burial:
- 3' Jet Plow Burial:
- OOS Cable:
- OOS Cable To Be Removed:
- Cable Area:
- Easement Area:
- Mean High Water



TYPICAL SUBMARINE TRENCH SECTION



SHORE LANDING TRENCH SECTION



MANHOLE EAST SHORE

0 250 500 1000

HORIZONTAL SCALE: 500 FEET
VERTICAL SCALE: 1 INCH = 25 FEET

Caldwell
Marine International, LLC.
1433 Highway 34 South
Building B
Farmingdale, NJ 07727
732.557.6100

NO.	REVISION	DATE	DRWN	CHKD	APPR
9	Revised: Border, Riser Structure & Manhole Dimensions	1/17	–	–	
8	Rev. 08/Issue 01	1/16	–	–	–

EXHIBIT 7

POWER ENGINEERS
www.powereng.com

EVERSOURCE ENERGY

TRANSMISSION BUSINESS | 9 | T

DRAWN –
ENGINEER –
CHECKED –
APPROVED –

F107 LINE CROSSING LITTLE BAY

DURHAM AND NEWINGTON, NEW HAMPSHIRE

SCALE	DATE	SHEET	DRAWING NO.
AS NOTED	4/15/15	1 OF 1	F10740905

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NH PUC Docket DE 16-442:

Petition of PSNH d/b/a Eversource Energy to Construct and Maintain
Electric Lines, Neutral Wire and Fiber Optic Cable Over/Across the
Public Lands Owned by the State of NH
in Towns of Durham and Newington

SUMMARY
Revisions between Originally Submitted Petition
And Revised Engineering Design

PETITION OF PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE D/B/A EVERSOURCE ENERGY FOR LICENSES TO CONSTRUCT AND MAINTAIN ELECTRIC LINES, NEUTRAL WIRE AND FIBER OPTIC CABLE OVER AND ACROSS PUBLIC LANDS OWNED BY THE STATE OF NEW HAMPSHIRE IN THE TOWNS OF DURHAM AND NEWINGTON, NEW HAMPSHIRE

Reasons for revision

The original petition of Public Service Company of New Hampshire D/B/A Eversource Energy for licenses to construct and maintain electric lines, neutral wire and fiber optic cable at five locations over and across public lands owned by the State of New Hampshire in the Towns of Durham and Newington, New Hampshire was originally submitted on April 12, 2016 as part of the Application for Certificate of Site and Facility for the Seacoast Reliability Project. Following that submittal several engineering design changes have occurred to accommodate concerns of abutters to the project corridor as well as refine the design to align with Eversource standard structure configurations. This results in minor changes to the engineering crossing drawings and petition appendices as originally submitted, as listed below. The crossings still meet or exceed all NESC requirements.

Changes to Original Petition

Revision to paragraph 15 (page 5) of the petition:

15. As part of the redesign, 34.5kV wood pole labeled Hen3 was shifted out of the wetland and wood pole labeled Hen4 was eliminated for the design, so wetlands permits are no longer required for those structures. Reference to these poles is accordingly eliminated from this paragraph.

Changes to Appendix A

1. Paragraph #1- Revised Drawing number F10799002 (Exhibits 2 and 3) has been supplied. No changes to location plan (Exhibit 1).
2. Paragraph #3- **Change** "WT-1-UB," "WT-2-UB" and "RAX-UB" **to** "ST-1-UB", "ST-2-UB" and "SRAX-UB" respectively.
3. Paragraph #3 Bullet 1- **Change** "7.5-15 feet" **to** "7.5-13 feet"
4. Paragraph #3 Bullet 1- **Change** "nine inches" **to** "six inches"
5. Paragraph #3 Bullet 1- **Change** "7.5 feet" **to** "7.0 feet"
6. Paragraph #3 Bullet 2- **Change** "7.5-15.5 feet" **to** "7.5-12.5 feet"
7. Paragraph #3 Bullet 2- **Change** "nine inches" **to** "six inches"
8. Paragraph #3 Bullet 2- **Change** "0-2.5 feet" **to** "0-5 feet"
9. Paragraph #3 Bullet 3- **Change** "nine inches" **to** "six inches"

10. Paragraph #3 Bullet 3- **Change** "15 feet" **to** "11.75 feet"
11. Table 1 Column 3- **Change** 15.5 feet **to** 18 feet
12. Paragraph #5- **Change** "water" **to** "land"
13. **Replace** Table 3 with revised table below

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 285°F (ft)
46	98	47	84	347	46.4
47	84	48	93.5	464	46.1
48	93.5	49	86.5	217	56
49	86.5	50	88.5	295	52.7
50	88.5	51	79	295	51.5
51	79	52	93.5	325	48.6
52	93.5	53	79	409	50.1
53	79	54	88.5	351	47.5
54	88.5	55	93.5	327	49.2
55	93.5	56	88.5	506	50.9
56	88.5	57	74.5	381	41.1
57	74.5	58	65.5	634	40.4

14. **Replace** Table 4 with revised table below

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 212°F (ft)
46	98	47	84	347	26.2
47	84	48	93.5	464	26.7
48	93.5	49	86.5	217	32.1
49	86.5	50	88.5	295	30.3
50	88.5	51	79	295	31.5
51	79	52	93.5	325	26.9
52	93.5	53	79	409	30.1
53	79	54	88.5	351	25.9
54	88.5	55	93.5	327	26.6
55	93.5	56	88.5	506	25.8
56	88.5	57	74.5	381	21.6
57	74.5	58	65.5	634	24.9

15. **Replace** Table 5 with revised table below

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 120°F (ft)
46	98	47	84	347	19.15
47	84	48	93.5	464	19.35
48	93.5	49	86.5	217	27.4
49	86.5	50	88.5	295	25.1
50	88.5	51	79	295	24.9
51	79	52	93.5	325	20.7
52	93.5	53	79	409	23.5
53	79	54	88.5	351	19.7
54	88.5	55	93.5	327	18.9
55	93.5	56	88.5	506	19.4
56	88.5	57	74.5	381	23.6
57	74.5	58	65.5	634	26.9

Changes to Appendix B

1. Paragraph #1- Revised Drawing number F10799002 (Exhibit 3) has been supplied. No changes to location plan (Exhibit 1).
2. Paragraph #3- **Change** "RAX-UB" **to** "SRAX-UB".
3. Paragraph #3 - **Change** "nine inches" **to** "six inches"
4. Paragraph #3 - **Change** "15 feet" **to** "11.75 feet"
5. Table 1 Column 3- **Change** 15.5 feet **to** 18 feet
6. Paragraph #5- **Change** "water" **to** "land"
7. **Replace** Table 3 with revised table below

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 285°F (ft)
59	50	60	66	264	33.2
60	66	61	79	393	43.2

8. **Replace** Table 4 with revised table below

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 212°F (ft)
59	50	60	66	264	21.6
60	66	61	79	393	23.1

9. **Replace** Table 5 with revised table below

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 120°F (ft)
59	50	60	66	264	23.6
60	66	61	79	393	25.1

Changes to Appendix C

1. Paragraph #1- Revised Drawing number F10799004 (Exhibit 5) has been supplied. No changes to location plan (Exhibit 4).
2. Paragraph #3- **Change** "WT-1-UB **to** "ST-1-UB".
3. Paragraph #3 - **Change** "7.5-15 feet" **to** "7.5-13 feet"
4. Paragraph #3 - **Change** "nine inches" **to** "six inches"
5. Paragraph #3 - **Change** "7.5 feet" **to** "7.0 feet"
6. Table 1 Column 3- **Change** 15.5 feet **to** 18 feet
7. Paragraph #5- **Change** "water" **to** "land"
8. **Replace** Table 3 with revised table below

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 285°F (ft)
74	93.5	75	84	355	47.4
75	84	76	84	414	53.1
76	84	77	84	415	47.4

77	84	78	84	369	42.1
78	84	79	103	376	44.9
79	103	80	103	411	61.5

9. **Replace** Table 4 with revised table below

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 212°F (ft)
74	93.5	75	84	355	30.1
75	84	76	84	414	35.1
76	84	77	84	415	30.1
77	84	78	84	369	25.5
78	84	79	103	376	25.4
79	103	80	103	411	44.0

10. **Replace** Table 5 with revised table below

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 120°F (ft)
74	93.5	75	84	355	19.1
75	84	76	84	414	29.45
76	84	77	84	415	22.96
77	84	78	84	369	19.25
78	84	79	103	376	19.98
79	103	80	103	411	38.28

Changes to Appendix D

1. Paragraph #1- Revised Drawing number F10799006 (Exhibit 7) has been supplied. No changes to location plan (Exhibit 6).
2. Paragraph #3- **Change** "WT-2-UB", "SPRA-BP" and "WA-2" **to** "ST-2-UB", "SPT" and "SA-2" respectively.
3. Paragraph #3 - **Change** "7-15.5 feet" **to** "7-12.5 feet"
4. Paragraph #3 - **Change** "nine inches" **to** "six inches"
5. Paragraph #3 - **Change** "ten feet" **to** "10.25 feet"
6. Table 1 Column 3- **Change** 15.5 feet **to** 18 feet
7. Paragraph #5- **Change** "water" **to** "land"
8. **Replace** Table 3 with revised table below

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 285°F (ft)
123	100	124	100	465	25.8
124	100	125	84	387	52.7
125	84	126	84	506	28.3
126	84	127	66	340	30.1
127	66	128	84	463	27.7
128	84	129	79	430	33.4

9. **Replace** Table 4 with revised table below

Structure	Height	Structure	Height	Span	Clearance

(Back)	(Ft)	(Ahead)	(ft)	(ft)	At 212°F (ft)
9	66.5	10	70	470	22.9
10	70	11	53	394	50.5
11	53	12	48.5	508	24.5
12	48.5	13	39.5	342	25.7
13	39.5	14	61	440	32.3
14	61	15	56	60	55.9

10. **Replace** Table 5 with revised table below

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 120°F (ft)
9	66.5	10	70	470	18.2
10	70	11	53	394	42.75
11	53	12	48.5	508	18.6
12	48.5	13	39.5	342	19.4
13	39.5	14	61	440	27.4
14	61	15	56	60	NA

Changes to Appendix E

1. Paragraph #1- Revised Drawing number F10799008 (Exhibit 9) has been supplied. No changes to location plan (Exhibit 8).
2. Paragraph #3- **Change** "WT-2-UB" and "WA-2" **to** "ST-2-UB" and "SA-2" respectively.
3. Paragraph #3 - **Change** "7-15.5 feet" **to** "7-12.5 feet"
4. Paragraph #3 - **Change** "nine inches" **to** "six inches"
5. Paragraph #3 - **Change** "ten feet" **to** "10.25 feet"
6. Paragraph #5- **Change** "water" **to** "land"
7. **Replace** Table 3 with revised table below

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 285°F (ft)
131	75	132	79	486	29.5
132	79	133	75	357	33.1

15. A wetlands permit from the New Hampshire Department of Environmental Services (NHDES) and the U.S. Army Corp or Engineers (USACE) is required for the installation of Structures 48 and Hen1 (see Appendix A), and for access during construction. The appropriate wetlands permits will be applied for and obtained by PSNH prior to the installation of any new structures in wetlands, in conjunction with PSNH's Seacoast Reliability Project siting application for the F107 Line. The F107 crossings are subject to approval and the issuance of a certificate of site and facility by the New Hampshire Site Evaluation Committee (NHSEC) as part of PSNH's Seacoast Reliability Project filing. All approvals as part of that process will be obtained prior to construction.

16. For all of the overhead crossings which are the subject of this petition, PSNH owns a permanent, minimum 100 foot wide easement or a 100 foot wide use and occupancy utility corridor for its lines and facilities on the public lands of the proposed crossing locations. Each of the overhead crossings will be constructed within the limits of those easements and corridors.

17. Aerial crossings of NH Route 108 are required as part of the crossing between structures 59 and 61 described in Appendix B of this petition. The appropriate NHDOT permission agreements will be applied for and obtained by PSNH prior to the installation of any new structure that will impact NHDOT jurisdictional areas, in conjunction with PSNH's Seacoast Reliability Project siting application.

18. All Seacoast Reliability Project structures in Newington, including all those proposed for the public land crossings which are the subject of this petition, will need an air obstruction determination from the Federal Aviation Administration (FAA) under Federal Aviation Regulation Part 77.9(b), due to proximity to the Portsmouth International Airport at Pease. Determinations will be requested from the FAA and appropriate measures will be taken by PSNH prior to the installation of any new structures that will impact FAA jurisdictional areas.

19. PSNH submits that the licenses petitioned for herein may be exercised without substantially affecting the rights of the public in the public lands covered in this petition. Minimum safe line clearances above all surfaces will be maintained at all times. The use and enjoyment by the public of the public lands will not be diminished in any material respect as a result of the overhead lines.

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;

REVISED
APPENDIX A

F107 & 380 & 3162 Lines
Spans 46-58
State of New Hampshire-Fish and Game Department
DURHAM, NH

1. The design and proposed construction of this crossing is shown on the attached Eversource Energy Drawings entitled "Seacoast Reliability Project Structures #46-56, State of NH Property Crossing" (Drawing No. F10799002 Sheet 1 of 2) and "Seacoast Reliability Project Structures #56-61, State of NH Property Crossing" (Drawing No. F10799002 Sheet 2 of 2) marked as Exhibit 2 and Exhibit 3, respectively.

2. The location of this crossing is shown on the attached Location Plan marked as Exhibit 1.

3. Lines F107, 380 and 3162 will cross the public land north of Bennett Road primarily on 1-pole, direct embed, steel tangent suspension structures designated as Type ST-1-UB, and on a direct embed, steel tangent suspension structures designated as Type ST-2-UB. Structure 49 is a 1-pole, steel deadend structure on a concrete foundation designated as Type SPDE-VUB. Structures 57 and 58 are two-pole, direct embed tangent structures designated as Type SRAX-UB. Details of these structures are shown on Exhibit 11. Above ground structure heights (AGH) for each of the crossing structures is shown on Exhibits 2 and 3.

- As shown on Exhibit 11, for the Type ST-1-UB structures the 115kV phase wires have an approximate separation at the structure of 7.5 -13 feet vertically and 0-13 feet horizontally in a delta configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. The 34.5kV phase wires are arranged horizontally approximately 15 feet below the lowest 115kV conductor and have an approximate separation at the structure of 0-5 feet vertically and 2.5-6 feet horizontally. The neutral wire is carried on the structure by a support bracket approximately 70 feet down below the 34.5kV phase wires.

- As shown on Exhibit 11, for the Type ST-2-UB structures the 115kV phase wires have an approximate separation at the structure of 7.5 -12.5 feet vertically and 0-13 feet horizontally in a delta configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. The 34.5kV phase wires are arranged horizontally approximately 15.5 feet below the lowest 115kV conductor and have an approximate separation at the structure of 0-5 feet vertically and 2.5-6 feet horizontally. The neutral wire is carried on the structure by a support bracket approximately seven feet down below the 34.5kV phase wires.

- As shown on Exhibit 11, for the Type SPDE-VUB structures the 115kV phase wires have an approximate separation at the structure of ten feet vertically and zero feet horizontally in a vertical configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. The 34.5kV phase wires are arranged vertically approximately 13 feet below the lowest 115kV conductor and have an approximate separation at the structure of 5 feet vertically and 0 feet horizontally. The neutral wire is carried on the structure by a support bracket approximately six feet down below the 34.5kV phase wires.

- As shown on Exhibit 11, for the Type SRAX-UB structures the 115kV phase wires have an approximate separation at the structure of zero feet vertically and 14 feet horizontally in a horizontal configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. The 34.5kV phase wires are arranged on a bracket in a spacer cable bundle approximately 11.75 feet below the lowest 115kV conductor and have an approximate separation of 24 inches within the bundle. The neutral wire is carried as the messenger portion of the spacer cable bundle. Structures marked as "Hen" are single wood pole structures used to support the 34.5kV spacer cable on long spans. Only the 34.5kV cables and messenger are attached to the pole on a support bracket located approximately 6 inches from the top of the pole. All NESC clearances at the structure as described in paragraph 12 and 13 of the petition have been met by exceeding the horizontal and/or vertical clearances required.

4. 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 Town of Durham Tax maps
- The physical features such as the location of railroads were digitized from geo-referenced aerial imagery of the project area, dated 2013.
- The existing and future limits of the electric right-of-way (ROW) as well as the road ROW are based on geo-references information received from NHDOT and ground survey, dated 2015.
- Topography and obstacle survey were from aerial LIDAR survey, dated 2013.

5. PSNH has, through the design and modeling process, investigated a multitude of weather and loading and service conditions 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. These conditions include the maximum operating temperature of each

conductor and cable (285°F for 115kV, 212°F for 34.5kv and 120°F for 0kV), and conductor at 32°F with 0.5 inches of radial ice and 32°F with no ice. PSNH used these design conditions and all combinations thereof to determine the minimum clearance of all conductors to the both ground and aerial obstacles, between the phase conductors and OPGW cable and neutral conductors. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Per PSNH standards, span by span verifications were completed to validate the specified NESC clearance requirements were met. The applicable clearances mandated by the NESC and internal PSNH standards are identified and summarized below:

Table 1-Required Vertical Clearances*

Vertical Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
115kV to Ground- Vehicle/Horse Access**	20.1	24
34.5kV to Ground- Vehicle/Horse Access**	18.5	19.5
0kV to Ground- Vehicle/Horse Access**,***	15.5	18
115kV to 115kV (At Structure)	5.1	9
34.5kV to 34.5kV (At Structure)	2.3	4.5
115kV to 34.5kV (At Structure)	4.1	8
115kV to 0kV (At Structure)	3.4	8
34.5kV to 0kV (At Structure)	1.4	5.6
115kV to 115kV (In Span)	4.4	9
34.5kV to 34.5kV (In Span)	1.7	4.5
115kV to 34.5kV (In Span)	3.4	8
115kV to 0kV(In Span)	2.0	8
34.5kV to 0kV (In Span)	1.3	1.3

* Clearances defined in paragraph 11 and 12 of the petition
**PSNH designs all new transmission lines for vehicle access clearance regardless of accessibility
***Because PSNH designs all new lines with a neutral clearance of 18 feet the 34.5kV clearance to ground will always exceed the 18.5 feet required clearance.

Table 2-Required Horizontal Clearances*

Horizontal Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
115kV to 115kV (At Structure)	4.8	8
34.5kV to 34.5kV (At Structure)	1.9	5
115kV to 34.5kV (At Structure)	3.8	7
115kV to 0kV (At Structure)	3.1	7
34.5kV to 0kV (At Structure)	1.5	1.75
115kV to 115kV (In Span)	6.7	8
34.5kV to 34.5kV (In Span)	4.6	5
115kV to 34.5kV (In Span)	5.9	7
115kV to 0kV(In Span)	5.4	7
34.5kV to 0kV (In Span)	4.2	5

*Clearances defined in paragraph 12 of the petition

Shield wires – Due to the fact that the OPGW wire is located above the phase wires, its clearance to the land surface will always exceed the minimum required NESC distance.

- 115 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. A summary of the clearances as part of this crossing is listed in the table below. These clearances exceed the vertical clearance requirements for 115kV phase conductors over roadways and ground accessible by vehicles as listed above.

Table 3- 115kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 285°F (ft)
46	98	47	84	347	46.4
47	84	48	93.5	464	46.1
48	93.5	49	86.5	217	56
49	86.5	50	88.5	295	52.7
50	88.5	51	79	295	51.5
51	79	52	93.5	325	48.6
52	93.5	53	79	409	50.1
53	79	54	88.5	351	47.5
54	88.5	55	93.5	327	49.2
55	93.5	56	88.5	506	50.9
56	88.5	57	74.5	381	41.1
57	74.5	58	65.5	634	40.4

- 34.5 kV Phase Conductors Vertical Clearance –The 212°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. A summary of the clearances as part of this crossing is listed in the table below. These clearances exceed the vertical clearance requirements for 34.5kV phase conductors over roadways and ground accessible by vehicles as listed above.

Table 4- 34.5kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 212°F (ft)
46	98	47	84	347	26.2
47	84	48	93.5	464	26.7
48	93.5	49	86.5	217	32.1
49	86.5	50	88.5	295	30.3
50	88.5	51	79	295	31.5
51	79	52	93.5	325	26.9
52	93.5	53	79	409	30.1
53	79	54	88.5	351	25.9
54	88.5	55	93.5	327	26.6

55	93.5	56	88.5	506	25.8
56	88.5	57	74.5	381	21.6
57	74.5	58	65.5	634	24.9

- 0 kV Neutral- For the neutral conductors the 120°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. A summary of the clearances as part of this crossing is listed in the table below. These clearances exceed the vertical clearance requirements for 0kV neutral conductors over roadways and ground accessible by vehicles as listed above.

Table 5- 0kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 120°F (ft)
46	98	47	84	347	19.15
47	84	48	93.5	464	19.35
48	93.5	49	86.5	217	27.4
49	86.5	50	88.5	295	25.1
50	88.5	51	79	295	24.9
51	79	52	93.5	325	20.7
52	93.5	53	79	409	23.5
53	79	54	88.5	351	19.7
54	88.5	55	93.5	327	18.9
55	93.5	56	88.5	506	19.4
56	88.5	57	74.5	381	23.6
57	74.5	58	65.5	634	26.9

- Conductors and Cables Horizontal Clearance – PSNH Standard centerline spacing is based upon the geometric configuration of the structures along a line assuming a maximum 800 foot span length under 6 pounds per square foot (“psf”) sustained transverse wind. The F107 Line is spaced apart from adjacent lines as specified by PSNH standard and no span along the PSNH portion of the F107 Line exceeds an 800 foot length. Furthermore, a span by span verification was completed assuming a 9psf sustained transverse wind to ensure the horizontal clearances above were exceeded.

REVISED
APPENDIX B

F107 & 3162 Lines
Spans 59-61
State of New Hampshire-Fish and Game Department
DURHAM, NH

1. The design and proposed construction of this crossing is shown on the attached Eversource Energy Drawings entitled "Seacoast Reliability Project Structures #56-61, State of NH Property Crossing" (Drawing No. F10799002 Sheet 2 of 2) marked as Exhibit 3.

2. The location of this crossing is also shown on the attached Location Plan marked as Exhibit 1.

3. Lines F107and 3162 will cross the public land north of Bennett Road. Structure 59 is a multipole, steel, running angle structure on a concrete foundation designated as Type C-UB. Structures 60 and 61 are two-pole, direct embed tangent structures designated as Type SRAX-UB. Details of these structures are shown on Exhibit 11. Above ground structure heights (AGH) for each of the crossing structures is shown on Exhibit 3. As shown on Exhibit 11, for the Type SRAX-UB structures the 115kV phase wires have an approximate separation at the structure of zero feet vertically and 14 feet horizontally in a horizontal configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. The 34.5kV phase wires are arranged on a bracket in a spacer cable bundle approximately 11.75 feet below the lowest 115kV conductor and have an approximate separation of 24 inches within the bundle. The neutral wire is carried as the messenger portion of the spacer cable bundle. Structures marked as "Hen" are single wood pole structures used to support the 34.5kV spacer cable on long spans. Only the 34.5kV cables and messenger are attached to the pole on a support bracket located approximately 6 inches from the top of the pole. As shown on Exhibit 11, for the Type C-UB structure the 115kV phase wires have an approximate separation at the structure of zero feet vertically and 14 feet horizontally in a horizontal configuration. The static wire is carried on the structure by a support bracket approximately twelve inches down from the top of the structure. The 34.5kV phase wires are arranged on a bracket in a spacer cable bundle approximately 15.75 feet below the lowest 115kV conductor and have an approximate separation of 24 inches within the bundle. The neutral wire is carried as the messenger portion of the spacer cable bundle. Structures marked as "Hen" are single wood pole structures used to support the 34.5kV spacer cable on long spans. Only the 34.5kV cables and messenger are attached to the pole on a support bracket located approximately 6 inches from the top of the pole. All NESC clearances at the structure as described in paragraph 12 and 13 of the petition have been met by exceeding the horizontal and/or vertical clearances required.

4. 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 Town of Durham Tax maps
- The physical features such as the location of railroads were digitized from geo-referenced aerial imagery of the project area, dated 2013.

- The existing and future limits of the electric right-of-way (ROW) as well as the road ROW are based on geo-references information received from NHDOT and ground survey, dated 2015.
- Topography and obstacle survey were from aerial LIDAR survey, dated 2013.

5. PSNH has investigated through the design and modeling process a multitude of weather and loading and service conditions 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. These conditions include the maximum operating temperature of each conductor and cable (285°F for 115kV, 212°F for 34.5kv and 120°F for 0kV), and conductor at 32°F with 0.5 inches of radial ice and 32°F with no ice. PSNH used these design conditions and all combinations thereof to determine the minimum clearance of all conductors to the both ground and aerial obstacles, between the phase conductors and OPGW cable and neutral conductors. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Per PSNH standards, span by span verifications were completed to validate the specified NESC clearance requirements were met. The applicable clearances mandated by the NESC and internal PSNH standards are identified and summarized below:

Table 1-Required Vertical Clearances*

Vertical Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
115kV to Ground- Vehicle/Horse Access**	20.1	24
34.5kV to Ground- Vehicle/Horse Access**	18.5	19.5
0kV to Ground- Vehicle/Horse Access**,***	15.5	18
115kV to 115kV (At Structure)	5.1	9
34.5kV to 34.5kV (At Structure)	2.3	4.5
115kV to 34.5kV (At Structure)	4.1	8
115kV to 0kV (At Structure)	3.4	8
34.5kV to 0kV (At Structure)	1.4	5.6
115kV to 115kV (In Span)	4.4	9
34.5kV to 34.5kV (In Span)	1.7	4.5
115kV to 34.5kV (In Span)	3.4	8
115kV to 0kV(In Span)	2.0	8
34.5kV to 0kV (In Span)	1.3	1.3

* Clearances defined in paragraph 11 and 12 of the petition
**PSNH designs all new transmission lines for vehicle access clearance regardless of accessibility
***Because PSNH designs all new lines with a neutral clearance of 18 feet the 34.5kV clearance to ground will always exceed the 18.5 feet required clearance.

Table 2-Required Horizontal Clearances*

Horizontal Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
115kV to 115kV (At Structure)	4.8	8
34.5kV to 34.5kV (At Structure)	1.9	5

115kV to 34.5kV (At Structure)	3.8	7
115kV to 0kV (At Structure)	3.1	7
34.5kV to 0kV (At Structure)	1.5	1.75
115kV to 115kV (In Span)	6.7	8
34.5kV to 34.5kV (In Span)	4.6	5
115kV to 34.5kV (In Span)	5.9	7
115kV to 0kV(In Span)	5.4	7
34.5kV to 0kV (In Span)	4.2	5

*Clearances defined in paragraph 12 of the petition

Shield wires – Due to the fact that the OPGW wire is located above the phase wires, its clearance to the land surface will always exceed the minimum required NESC distance.

- 115 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. A summary of the clearances as part of this crossing is listed in the table below. These clearances exceed the vertical clearance requirements for 115kV phase conductors over roadways and ground accessible by vehicles as listed above.

Table 3- 115kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 285°F (ft)
59	50	60	66	264	33.2
60	66	61	79	393	43.2

- 34.5 kV Phase Conductors Vertical Clearance –The 212°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. A summary of the clearances as part of this crossing is listed in the table below. These clearances exceed the vertical clearance requirements for 34.5kV phase conductors over roadways and ground accessible by vehicles as listed above.

Table 4- 34.5kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 212°F (ft)
59	50	60	66	264	21.6
60	66	61	79	393	23.1

- 0 kV Neutral- For the neutral conductors the 120°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. A summary of the clearances as part of this crossing is listed in the table below. These clearances exceed the vertical clearance requirements for 0kV neutral conductors over roadways and ground accessible by vehicles as listed above.

Table 5- 0kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 120°F (ft)
59	50	60	66	264	23.6
60	66	61	79	393	25.1

- Conductors and Cables Horizontal Clearance – PSNH Standard centerline spacing is based upon the geometric configuration of the structures along a line assuming a maximum 800 foot span length under 6 pounds per square foot ("psf") sustained transverse wind. The F107 Line is spaced apart from adjacent lines as specified by PSNH standard and no span along the PSNH portion of the F107 Line exceeds an 800 foot length. Furthermore, a span by span verification was completed assuming a 9psf sustained transverse wind to ensure the horizontal clearances above were exceeded.

REVISED
APPENDIX C

F107 & 3162 Lines
Spans 74-80
State of New Hampshire-Fish and Game Department
DURHAM, NH

1. The design and proposed construction of this crossing is shown on the attached Eversource Energy Drawings entitled "Seacoast Reliability Project Structures #74-80, State of NH Property Crossing" (Drawing No. F10799004) marked as Exhibit 5.

2. The location of this crossing is shown on the attached Location Plan marked as Exhibit 4.

3. Lines F107 and 3162 will cross the public land east of Sandy Brook Drive primarily on 1-pole, direct embed, steel tangent suspension structures designated as Type ST-1-UB. Details of these structures are shown on Exhibit 11. Above ground structure heights (AGH) for each of the crossing structures is shown on Exhibit 5. As shown on Exhibit 11, for the Type ST-1-UB structures the 115kV phase wires have an approximate separation at the structure of 7.5 -13 feet vertically and 0-13 feet horizontally in a delta configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. The 34.5kV phase wires are arranged horizontally approximately 15 feet below the lowest 115kV conductor and have an approximate separation at the structure of 0-5 feet vertically and 2.5-6 feet horizontally. The neutral wire is carried on the structure by a support bracket approximately 70feet down below the 34.5kV phase wires. All NESC clearances at the structure as described in paragraph 12 and 13 of the petition have been met by exceeding the horizontal and/or vertical clearances required.

4. 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 Town of Durham Tax maps
- The physical features such as the location of railroads were digitized from geo-referenced aerial imagery of the project area, dated 2013.
- The existing and future limits of the electric right-of-way (ROW) as well as the road ROW are based on geo-references information received from NHDOT and ground survey, dated 2015.
- Topography and obstacle survey were from aerial LIDAR survey, dated 2013.

5. PSNH has investigated through the design and modeling process a multitude of weather and loading and service conditions 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. These conditions include the maximum operating temperature of each conductor and cable (285^{o}F for 115kV, 212^{o}F for 34.5kv and 120^{o}F for 0kV), and conductor at 32^{o}F with 0.5 inches of radial ice and 32^{o}F with no ice. PSNH used these

design conditions and all combinations thereof to determine the minimum clearance of all conductors to the both ground and aerial obstacles, between the phase conductors and OPGW cable and neutral conductors. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Per PSNH standards, span by span verifications were completed to validate the specified NESC clearance requirements were met. The applicable clearances mandated by the NESC and internal PSNH standards are identified and summarized below:

Table 1-Required Vertical Clearances*

Vertical Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
115kV to Ground- Vehicle/Horse Access**	20.1	24
34.5kV to Ground- Vehicle/Horse Access**	18.5	19.5
0kV to Ground- Vehicle/Horse Access**,***	15.5	18
115kV to 115kV (At Structure)	5.1	9
34.5kV to 34.5kV (At Structure)	2.3	4.5
115kV to 34.5kV (At Structure)	4.1	8
115kV to 0kV (At Structure)	3.4	8
34.5kV to 0kV (At Structure)	1.4	5.6
115kV to 115kV (In Span)	4.4	9
34.5kV to 34.5kV (In Span)	1.7	4.5
115kV to 34.5kV (In Span)	3.4	8
115kV to 0kV(In Span)	2.0	8
34.5kV to 0kV (In Span)	1.3	1.3

* Clearances defined in paragraph 11 and 12 of the petition
**PSNH designs all new transmission lines for vehicle access clearance regardless of accessibility
***Because PSNH designs all new lines with a neutral clearance of 18 feet the 34.5kV clearance to ground will always exceed the 18.5 feet required clearance.

Table 2-Required Horizontal Clearances*

Horizontal Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
115kV to 115kV (At Structure)	4.8	8
34.5kV to 34.5kV (At Structure)	1.9	5
115kV to 34.5kV (At Structure)	3.8	7
115kV to 0kV (At Structure)	3.1	7
34.5kV to 0kV (At Structure)	1.5	1.75
115kV to 115kV (In Span)	6.7	8
34.5kV to 34.5kV (In Span)	4.6	5
115kV to 34.5kV (In Span)	5.9	7
115kV to 0kV(In Span)	5.4	7
34.5kV to 0kV (In Span)	4.2	5

*Clearances defined in paragraph 12 of the petition

Shield wires – Due to the fact that the OPGW wire is located above the phase wires, its clearance to the land surface will always exceed the minimum required NESC distance.

- 115 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. A summary of the clearances as part of this crossing is listed in the table below. These clearances exceed the vertical clearance requirements for 115kV phase conductors over roadways and ground accessible by vehicles as listed above.

Table 3- 115kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 285°F (ft)
74	93.5	75	84	355	47.4
75	84	76	84	414	53.1
76	84	77	84	415	47.4
77	84	78	84	369	42.1
78	84	79	103	376	44.9
79	103	80	103	411	61.5

- 34.5 kV Phase Conductors Vertical Clearance –The 212°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. A summary of the clearances as part of this crossing is listed in the table below. These clearances exceed the vertical clearance requirements for 34.5kV phase conductors over roadways and ground accessible by vehicles as listed above.

Table 4- 34.5kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 212°F (ft)
74	93.5	75	84	355	30.1
75	84	76	84	414	35.1
76	84	77	84	415	30.1
77	84	78	84	369	25.5
78	84	79	103	376	25.4
79	103	80	103	411	44.0

- 0 kV Neutral- For the neutral conductors the 120°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. A summary of the clearances as part of this crossing is listed in the table below. These clearances exceed the vertical clearance requirements for 0kV neutral conductors over roadways and ground accessible by vehicles as listed above.

Table 5- 0kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 120°F (ft)
74	93.5	75	84	355	19.1
75	84	76	84	414	29.45
76	84	77	84	415	22.96
77	84	78	84	369	19.25
78	84	79	103	376	19.98
79	103	80	103	411	38.28

- Conductors and Cables Horizontal Clearance – PSNH Standard centerline spacing is based upon the geometric configuration of the structures along a line assuming a maximum 800 foot span length under 6 pounds per square foot ("psf") sustained transverse wind. The F107 Line is spaced apart from adjacent lines as specified by PSNH standard and no span along the PSNH portion of the F107 Line exceeds an 800 foot length. Furthermore, a span by span verification was completed assuming a 9psf sustained transverse wind to ensure the horizontal clearances above were exceeded.

REVISED
APPENDIX D

F107 Lines Spans 123-129
3850 Line Spans 9-15
State of New Hampshire- Department of Transportation
NEWINGTON, NH

1. The design and proposed construction of this crossing is shown on the attached Eversource Energy Drawings entitled "Seacoast Reliability Project Structures #123-129, State of NH Property Crossing" (Drawing No. F10799006 Sheet 1 of 1) and "Seacoast Reliability Project Structures #9-14, State of NH Property Crossing" (Drawing No. 385099001 Sheet 1 of 1) marked as Exhibit 7 and Exhibit 10, respectively.

2. The location of this crossing is shown on the attached Location Plan marked as Exhibit 6.

3. Lines F107 will cross the public land west of the Spaulding Turnpike primarily on 1-pole, direct embed, steel tangent suspension structures designated as Type ST-2-SB. Structures 123 and 124 are a 1-pole, steel running angle structure on a concrete foundation designated as Type SPT. Structure 128 is a 1-pole, direct embed running angle structure designated as Type SA-2. Details of these structures are shown on Exhibit 11. Above ground structure heights (AGH) for each of the crossing structures is shown on Exhibits 7 and 10. As shown on Exhibit 11, for the Type ST-2-SB structures the 115kV phase wires have an approximate separation at the structure of 7 -12.5 feet vertically and 0-13 feet horizontally in a delta configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. As shown on Exhibit 11, for the Type SPT structures the 115kV phase wires have an approximate separation at the structure of ten feet vertically and zero feet horizontally in a vertical configuration. The static wire is carried on the structure by a support bracket approximately nine inches down from the top of the structure. As shown on Exhibit 11, for the Type SA-2 structures the 115kV phase wires have an approximate separation at the structure of 10.25 feet vertically and zero feet horizontally in a vertical configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. All NESC clearances at the structure as described in paragraph 12 and 13 of the petition have been met by exceeding the horizontal and/or vertical clearances required.

4. Line 3850 will cross the public land west of the Spaulding Turnpike primarily on 1-pole, direct embed, wood or steel tangent structures designated at Type TAN and Type DX. Structure 10 is a 1-pole, wood or steel direct embed deadend structure designated as Type DEA. Structures 14 and 15 are 1-pole, wood or steel direct embed deadend structure designated as Type DE. As shown on Exhibit 11, for the Type Tan and Type DX structures the 34.5kV phase wires have an approximate separation at the structure of 0 feet vertically and 4.7 feet horizontally in a horizontal configuration. The neutral wire is carried on the structure by a support bracket approximately five feet down below the 34.5kV phase wires. As shown on Exhibit 11, for the Type DE structures the 34.5kV phase wires have an approximate separation at the structure of 0 feet vertically and 4.5 feet horizontally in a horizontal configuration. The neutral wire is carried

on the structure by a support bracket approximately six feet down below the 34.5kV phase wires. As shown on Exhibit 11, for the Type DEA structures the 34.5kV phase wires have an approximate separation at the structure of 0-5 feet vertically and 4.5 feet horizontally in a horizontal configuration. The neutral wire is carried on the structure by a support bracket approximately five feet down below the lowest 34.5kV phase wires. All NESC clearances at the structure as described in paragraph 11 of the petition have been met by exceeding the horizontal and/or vertical clearances required.

5. 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 Town of Newington Tax maps
- The physical features such as the location of road were digitized from geo-referenced aerial imagery of the project area, dated 2013.
- The existing and future limits of the electric right-of-way (ROW) as well as the road ROW are based on geo-references information received from NHDOT and ground survey, dated 2015.
- Topography and obstacle survey were from aerial LIDAR survey, dated 2013.

6. PSNH has, through the design and modeling process, investigated a multitude of weather and loading and service conditions 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. These conditions include the maximum operating temperature of each conductor and cable (285^{o}F for 115kV, 212^{o}F for 34.5kv and 120^{o}F for 0kV), and conductor at 32^{o}F with 0.5 inches of radial ice and 32^{o}F with no ice. PSNH used these design conditions and all combinations thereof to determine the minimum clearance of all conductors to the both ground and aerial obstacles, between the phase conductors and OPGW cable and neutral conductors. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Per PSNH standards, span by span verifications were completed to validate the specified NESC clearance requirements were met. The applicable clearances mandated by the NESC and internal PSNH standards are identified and summarized below:

Table 1-Required Vertical Clearances*

Vertical Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
115kV to Ground- Vehicle/Horse Access**	20.1	24
34.5kV to Ground- Vehicle/Horse Access**	18.5	19.5
0kV to Ground- Vehicle/Horse Access**,***	15.5	18
115kV to 115kV (At Structure)	5.1	9
34.5kV to 34.5kV (At Structure)	2.3	4.5
115kV to 34.5kV (At Structure)	4.1	8
115kV to 0kV (At Structure)	3.4	8
34.5kV to 0kV (At Structure)	1.4	5.6
115kV to 115kV (In Span)	4.4	9

34.5kV to 34.5kV (In Span)	1.7	4.5
115kV to 34.5kV (In Span)	3.4	8
115kV to 0kV(In Span)	2.0	8
34.5kV to 0kV (In Span)	1.3	1.3

* Clearances defined in paragraph 11 and 12 of the petition
**PSNH designs all new transmission lines for vehicle access clearance regardless of accessibility
***Because PSNH designs all new lines with a neutral clearance of 18 feet the 34.5kV clearance to ground will always exceed the 18.5 feet required clearance.

Table 2-Required Horizontal Clearances*

Horizontal Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
115kV to 115kV (At Structure)	4.8	8
34.5kV to 34.5kV (At Structure)	1.9	5
115kV to 34.5kV (At Structure)	3.8	7
115kV to 0kV (At Structure)	3.1	7
34.5kV to 0kV (At Structure)	1.5	1.75
115kV to 115kV (In Span)	6.7	8
34.5kV to 34.5kV (In Span)	4.6	5
115kV to 34.5kV (In Span)	5.9	7
115kV to 0kV(In Span)	5.4	7
34.5kV to 0kV (In Span)	4.2	5

*Clearances defined in paragraph 12 of the petition

Shield wires – Due to the fact that the OPGW wire is located above the phase wires, its clearance to the land surface will always exceed the minimum required NESC distance.

- 115 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. A summary of the clearances as part of this crossing is listed in the table below. These clearances exceed the vertical clearance requirements for 115kV phase conductors over roadways and ground accessible by vehicles as listed above.

Table 3- 115kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 285°F (ft)
123	100	124	100	465	25.8
124	100	125	84	387	52.7
125	84	126	84	506	28.3
126	84	127	66	340	30.1
127	66	128	84	463	27.7
128	84	129	79	430	33.4

- 34.5 kV Phase Conductors Vertical Clearance –The 212°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. A summary of the clearances as part of this crossing is listed in the

table below. These clearances exceed the vertical clearance requirements for 34.5kV phase conductors over roadways and ground accessible by vehicles as listed above.

Table 4- 34.5kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 212°F (ft)
9	66.5	10	70	470	22.9
10	70	11	53	394	50.5
11	53	12	48.5	508	24.5
12	48.5	13	39.5	342	25.7
13	39.5	14	61	440	32.3
14	61	15	56	60	55.9

- 0 kV Neutral- For the neutral conductors the 120°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. A summary of the clearances as part of this crossing is listed in the table below. These clearances exceed the vertical clearance requirements for 0kV neutral conductors over roadways and ground accessible by vehicles as listed above.

Table 5- 0kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 120°F (ft)
9	66.5	10	70	470	18.2
10	70	11	53	394	42.75
11	53	12	48.5	508	18.6
12	48.5	13	39.5	342	19.4
13	39.5	14	61	440	27.4
14	61	15	56	60	NA

- Conductors and Cables Horizontal Clearance – PSNH Standard centerline spacing is based upon the geometric configuration of the structures along a line assuming a maximum 800 foot span length under 6 pounds per square foot (“psf”) sustained transverse wind. The F107 Line is spaced apart from adjacent lines as specified by PSNH standard and no span along the PSNH portion of the F107 Line exceeds an 800 foot length. Furthermore, a span by span verification was completed assuming a 9psf sustained transverse wind to ensure the horizontal clearances above were exceeded.

REVISED
APPENDIX E

F107 Lines
Spans 131-133
State of New Hampshire-Department of Transportation
NEWINGTON, NH

1. The design and proposed construction of this crossing is shown on the attached Eversource Energy Drawings entitled "Seacoast Reliability Project Structures #131-133, State of NH Property Crossing" (Drawing No. F10799008 Sheet 1 of 1) marked as Exhibit 9.

2. The location of this crossing is shown on the attached Location Plan marked as Exhibit 8.

3. Lines F107 will cross the public land west of the Spaulding Turnpike primarily on 1-pole, direct embed, steel tangent suspension structures designated as Type ST-2-SB. Structure 133 is a 1-pole, direct embed running angle structure designated as Type SA-2. Details of these structures are shown on Exhibit 11. Above ground structure heights (AGH) for each of the crossing structures is shown on Exhibit 9. As shown on Exhibit 11, for the Type ST-2-SB structures the 115kV phase wires have an approximate separation at the structure of 7 -12.5 feet vertically and 0-13 feet horizontally in a delta configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. As shown on Exhibit 11, for the Type SA-2 structures the 115kV phase wires have an approximate separation at the structure of10.25 feet vertically and zero feet horizontally in a vertical configuration. The static wire is carried on the structure by a support bracket approximately six inches down from the top of the structure. All NESC clearances at the structure as described in paragraph 12 and 13 of the petition have been met by exceeding the horizontal and/or vertical clearances required.

4. 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 Town of Newington Tax maps
- The physical features such as the location of road were digitized from geo-referenced aerial imagery of the project area, dated 2013.
- The existing and future limits of the electric right-of-way (ROW) as well as the road ROW are based on geo-references information received from NHDOT and ground survey, dated 2015.
- Topography and obstacle survey were from aerial LIDAR survey, dated 2013.

5. PSNH has, through the design and modeling process, investigated a multitude of weather and loading and service conditions 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. These conditions include the maximum operating temperature of each conductor and cable (285°F for 115kV, 212°F for 34.5kv and 120°F for 0kV), and conductor at 32°F with 0.5 inches of radial ice and 32°F with no ice. PSNH used these design conditions and all combinations thereof to determine the minimum clearance of all conductors to the both ground and aerial obstacles, between the phase conductors and OPGW cable and neutral conductors. All NESC clearances have been met by exceeding the horizontal and/or vertical clearances required. Per PSNH standards, span by span verifications were completed to validate the specified NESC clearance requirements were met. The applicable clearances mandated by the NESC and internal PSNH standards are identified and summarized below:

Table 1-Required Vertical Clearances*

Vertical Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
115kV to Ground- Vehicle/Horse Access**	20.1	24
0kV to Ground- Vehicle/Horse Access**	15.5	15.5
115kV to 115kV (At Structure)	5.1	9
115kV to 0kV (At Structure)	3.4	8
115kV to 115kV (In Span)	4.4	9
115kV to 0kV(In Span)	2.0	8

* Clearances defined in paragraph 11 and 12 of the petition
**PSNH designs all new transmission lines for vehicle access clearance regardless of accessibility

Table 2-Required Horizontal Clearances*

Horizontal Clearance Type	NESC Minimum Design Clearance (ft)	PSNH Standard Design Clearance (ft)
115kV to 115kV (At Structure)	4.8	8
115kV to 0kV (At Structure)	3.1	7
115kV to 115kV (In Span)	6.7	8
115kV to 0kV(In Span)	5.4	7

*Clearances defined in paragraph 12 of the petition

Shield wires – Due to the fact that the OPGW wire is located above the phase wires, its clearance to the land surface will always exceed the minimum required NESC distance.

- 115 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. A summary of the clearances as part of this crossing is listed in the table below. These clearances exceed the vertical clearance requirements for 115kV phase

conductors over roadways and ground accessible by vehicles as listed above.

Table 3- 115kV Summary of Clearances at Crossing

Structure (Back)	Height (Ft)	Structure (Ahead)	Height (ft)	Span (ft)	Clearance At 285°F (ft)
131	75	132	79	486	29.5
132	79	133	75	357	33.1

- Conductors and Cables Horizontal Clearance – PSNH Standard centerline spacing is based upon the geometric configuration of the structures along a line assuming a maximum 800 foot span length under 6 pounds per square foot ("psf") sustained transverse wind. The F107 Line is spaced apart from adjacent lines as specified by PSNH standard and no span along the PSNH portion of the F107 Line exceeds an 800 foot length. Furthermore, a span by span verification was completed assuming a 9psf sustained transverse wind to ensure the horizontal clearances above were exceeded.

LINE LIST	OWNER	MANAGED BY	OWNER ADDRESS	TAX MAP ID
232	STATE OF NEW HAMPSHIRE	NH DEPARTMENT OF FISH AND GAME	11 HAZEN DRIVE, CONCORD NH	MAP 15 LOT 1–0
238	STATE OF NEW HAMPSHIRE	NH DEPARTMENT OF FISH AND GAME	11 HAZEN DRIVE, CONCORD NH	MAP 15 LOT 7–3

200 100 0 200 400 600

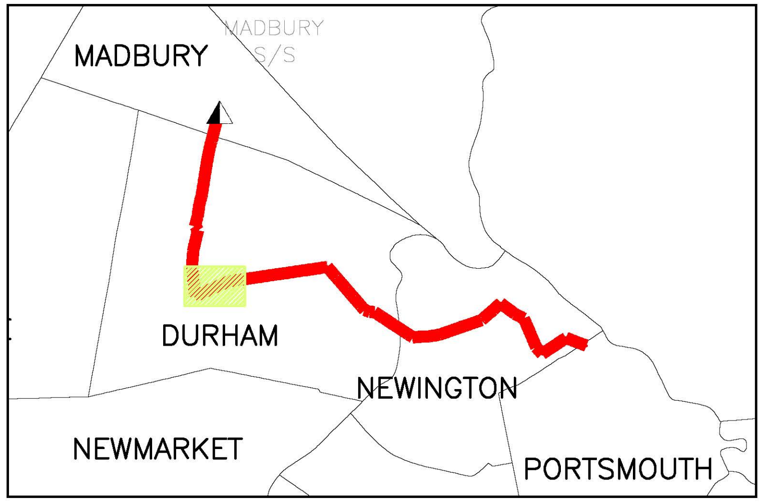
GRAPHIC SCALE
1" = 200'

EXHIBIT 1

LEGEND

PROJECT ROW

PARCEL BOUNDRY

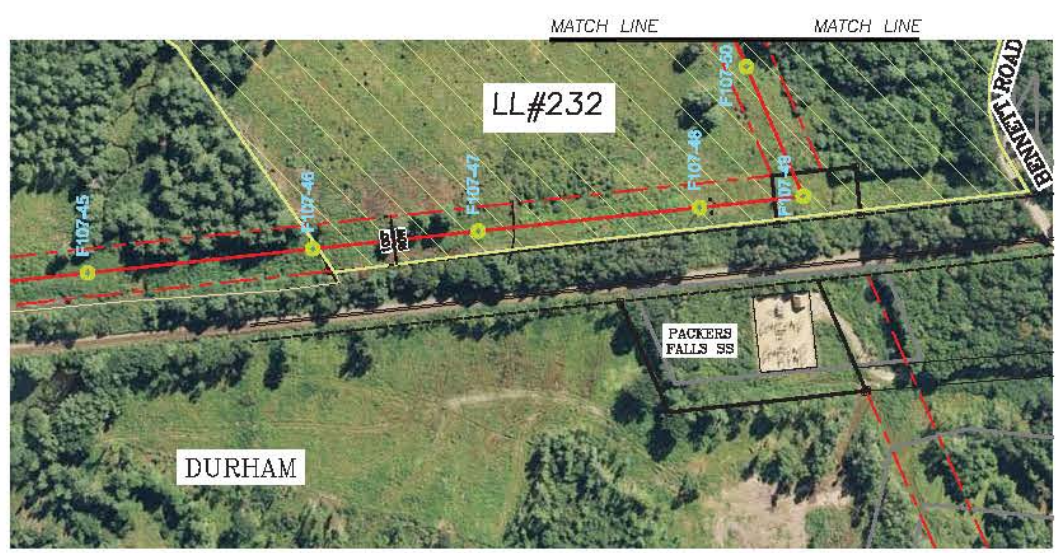


EVERSOURCE ENERGY

SEACOAST RELIABILITY PROJECT
LINE LIST 232 & 238
STATE OF NH PROPERTY CROSSING

TOWN: DURHAM
TRANSMISSION LINE: F107
SHEET 1 OF 1
F10799001

ES VER: 11/2015



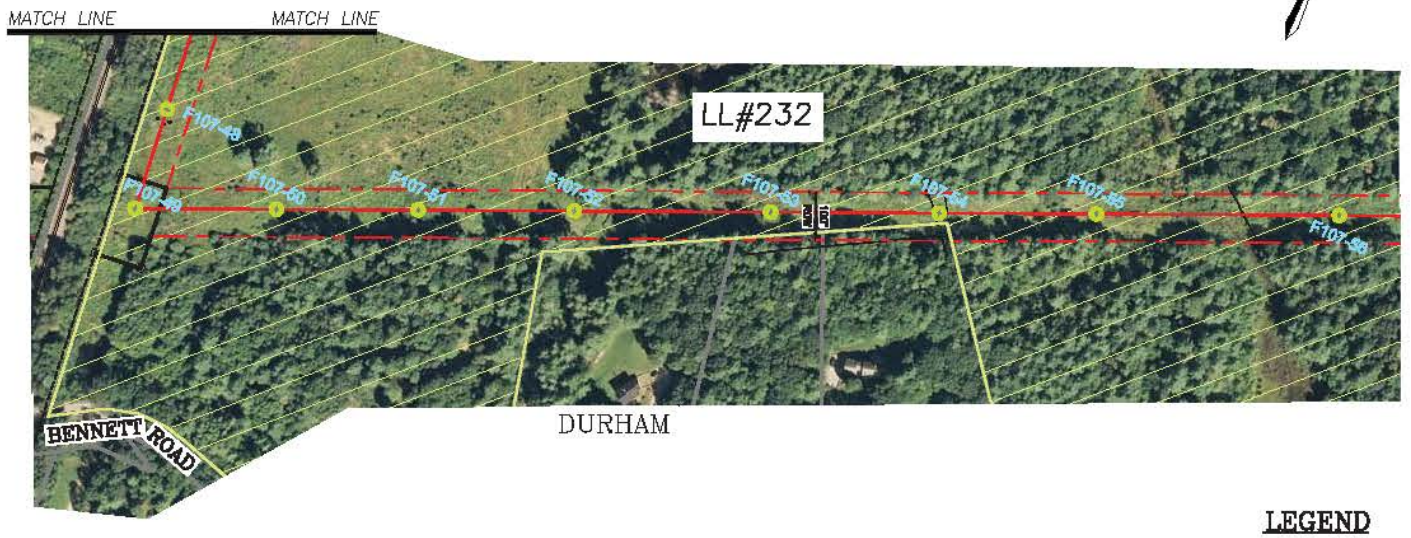


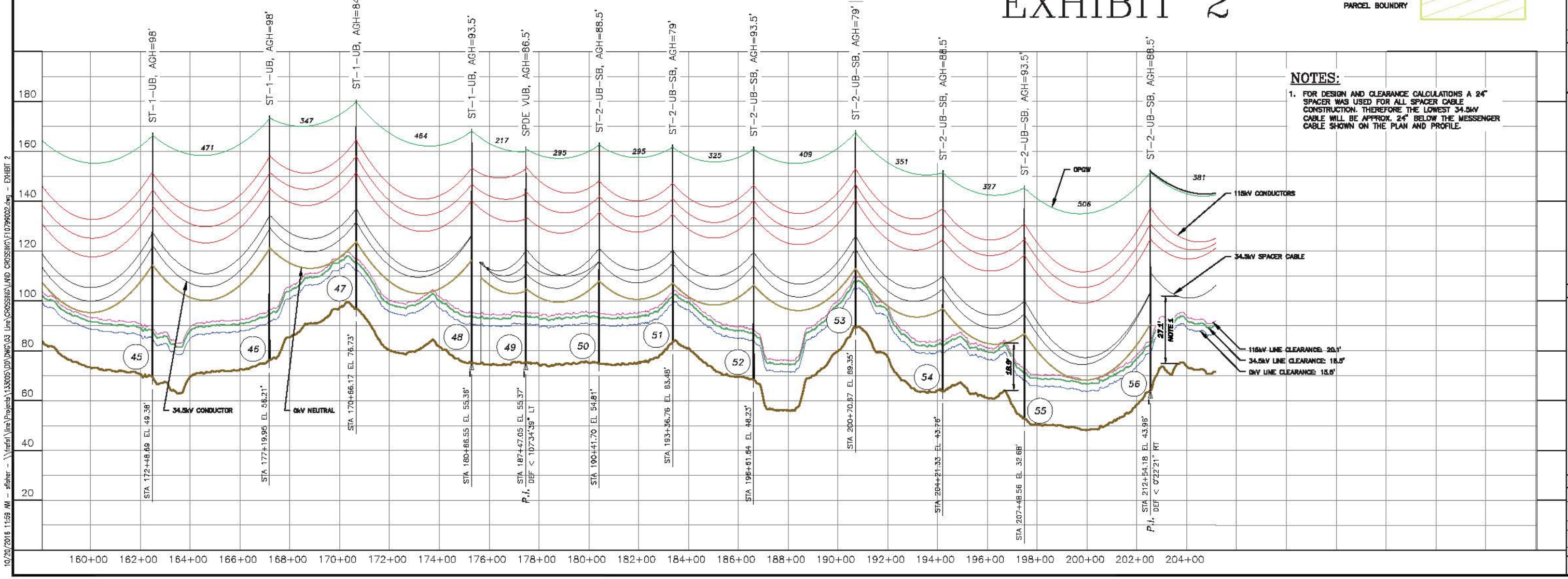
EXHIBIT 2

LEGEND

PROJECT LINE

PROJECT ROW

PARCEL BOUNDRY



NOTES:

1. FOR DESIGN AND CLEARANCE CALCULATIONS A 24" SPACER WAS USED FOR ALL SPACER CABLE CONSTRUCTION. THEREFORE THE LOWEST 34.5kV CABLE WILL BE APPROX. 24" BELOW THE MESSENGER CABLE SHOWN ON THE PLAN AND PROFILE.

NO.	ISSUED FOR	BY	APPR.
1	ISSUED FOR PERMITTING	DTG	RHD
2	REVISED 30 PERCENT DESIGN	SJS	RHD
3			

EVERSOURCE ENERGY

T | 2

SEACOAST RELIABILITY PROJECT
STRUCTURES #46-56
STATE OF NH PROPERTY CROSSING

DATE: 01/22/16

SCALE: H 1"=50', V 1"=50'

DES: – CHK: JRS
DRN: CTS APR: –

TOWN: DURHAM

TRANSMISSION LINE: F107

MILE NO: – –

DISCIPLINE/SHT NO. –

SHEET 1 OF 2

F10798002

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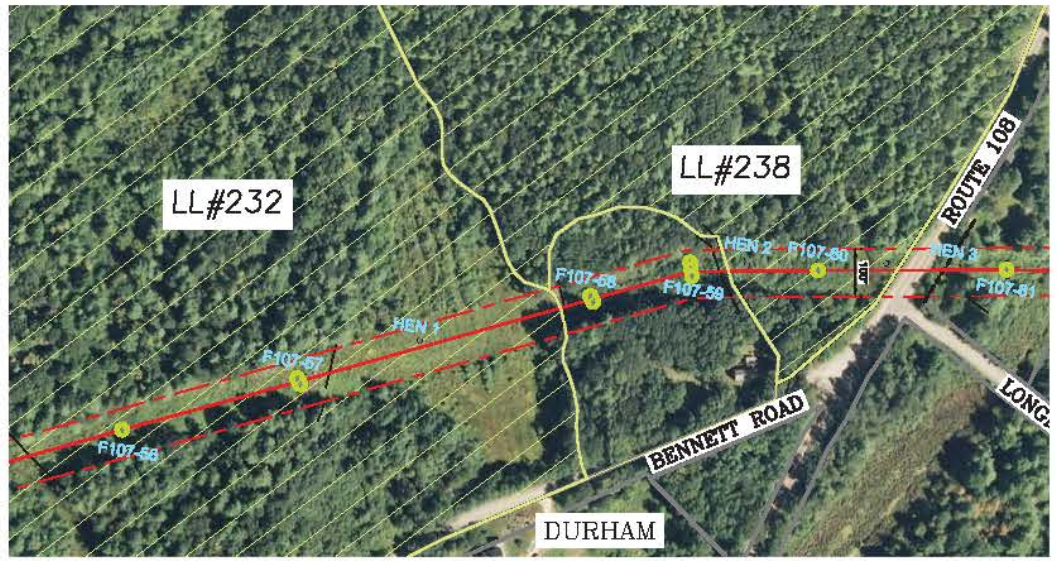


LEGEND

PROJECT LINE

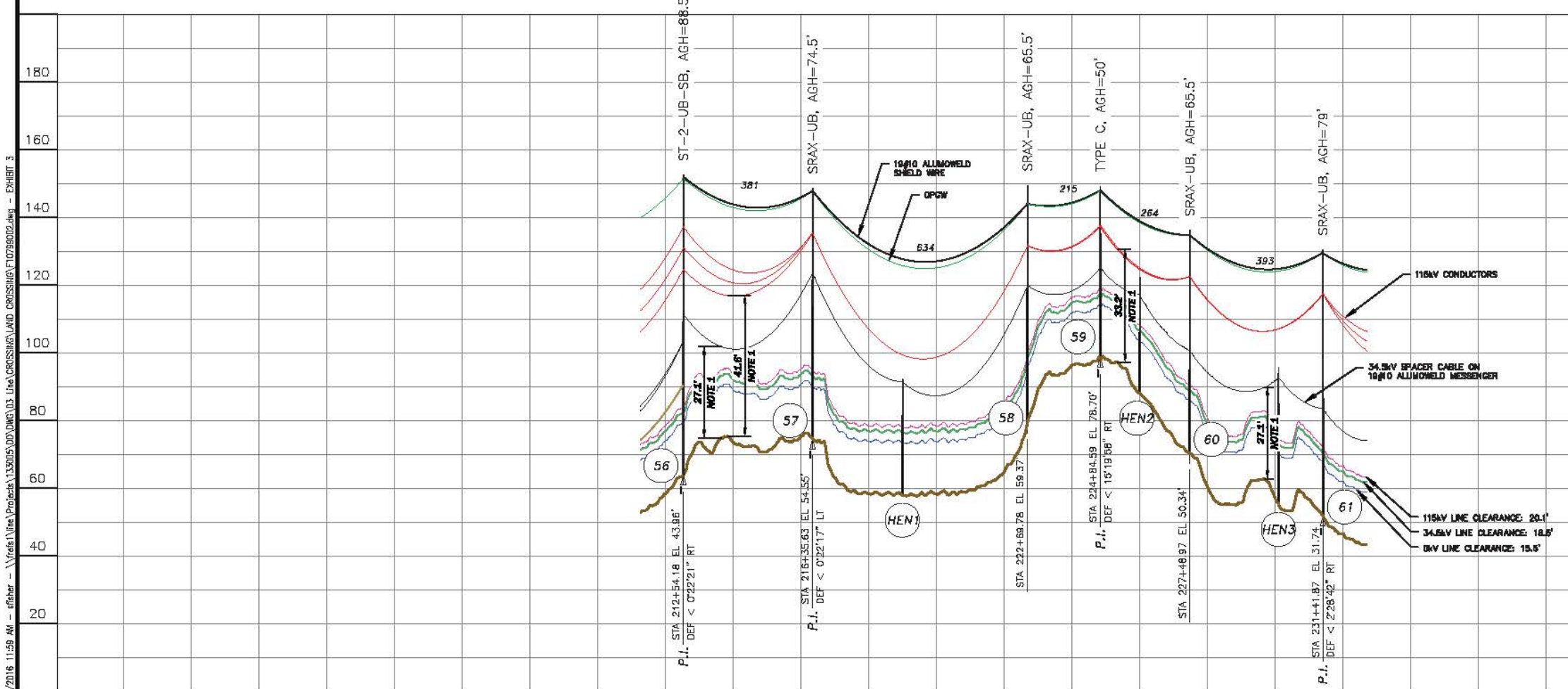
PROJECT ROW

PARCEL BOUNDRY

EXHIBIT 3

NOTES:

1. FOR DESIGN AND CLEARANCE CALCULATIONS A 24" SPACER WAS USED FOR ALL SPACER CABLE CONSTRUCTION. THEREFORE THE LOWEST 34.5kV CABLE WILL BE APPROX. 24" BELOW THE MESSENGER CABLE SHOWN ON THE PLAN AND PROFILE.



NO.	REVISED 30 PERCENT DESIGN	10/21/16	SCP	KMS	-
2	ISSUED FOR PERMITTING	7/1/16	JMC	CHG	APPR.
1	REVISED	DATE	DRWN	CHKD	

EVERSOURCE ENERGY

T 2

SEACOAST RELIABILITY PROJECT
STRUCTURES #56-61
STATE OF NH PROPERTY CROSSING

DATE: 9/1/2015

SCALE: H 1"=200', V 1"=20'

DES'R - | CHKD'RS
DRWN: DTE | APP'R -

TOWN: DURHAM

TRANSMISSION LINE: F107

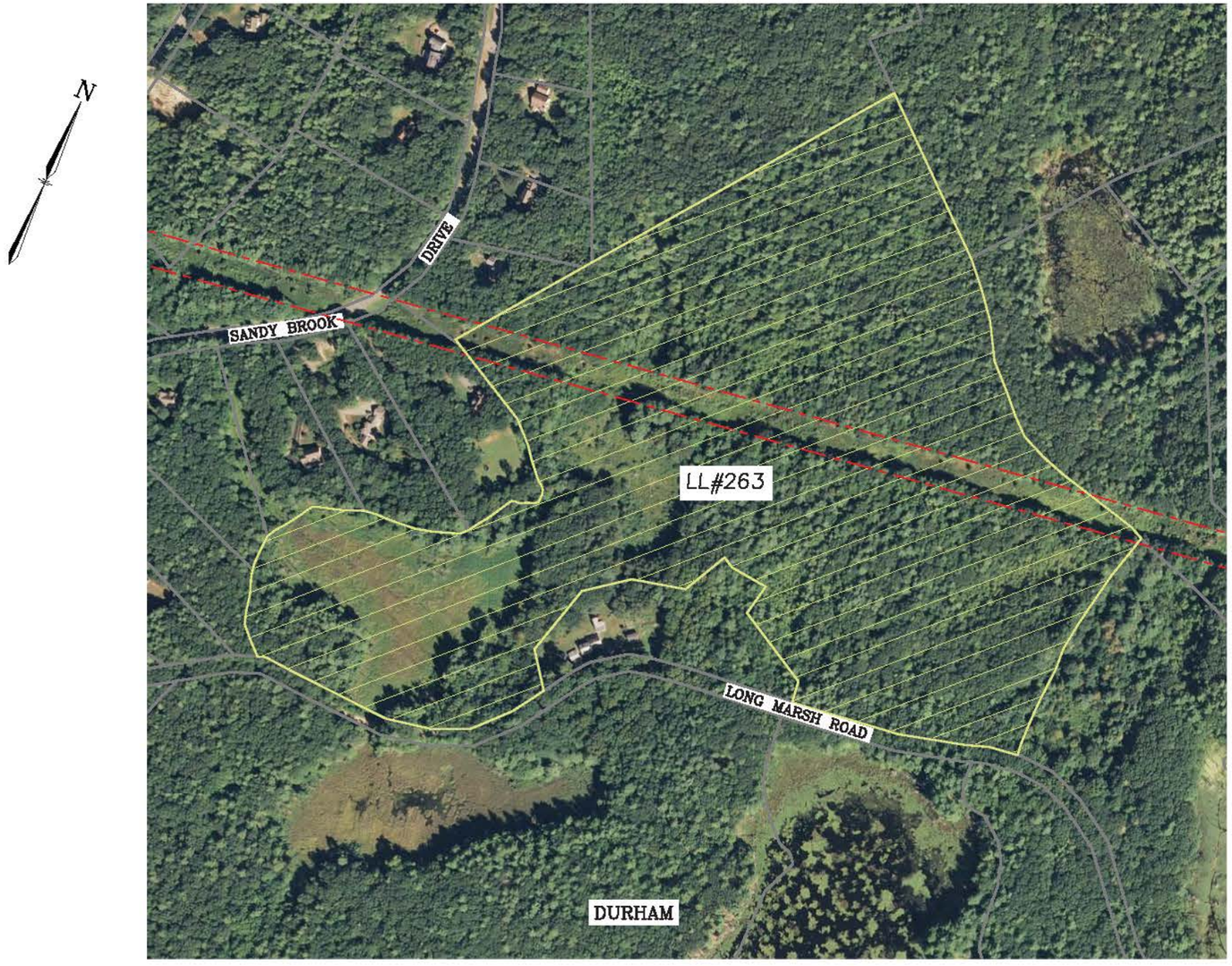
MILE NO: - -

DISCIPLINE/SHT NO. -

SHEET 2 OF 2

F10799002

ES VER: 11/2015



LINE LIST	OWNER	MANAGED BY	OWNER ADDRESS	TAX MAP ID
263	STATE OF NEW HAMPSHIRE	NH DEPARTMENT OF FISH AND GAME	11 HAZEN DRIVE, CONCORD NH	MAP 15 LOT 5-0

200 100 0 200 400 600

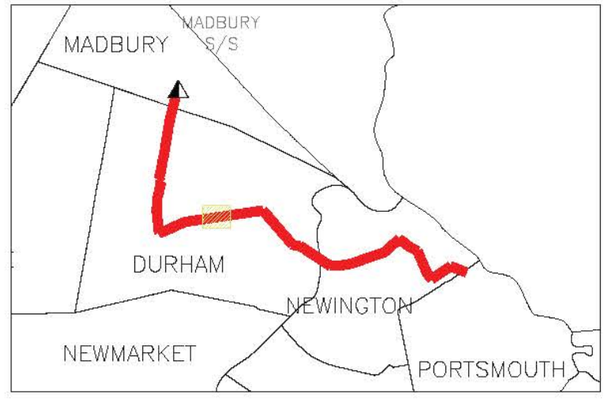
GRAPHIC SCALE
1" = 200'

EXHIBIT 4

LEGEND

PROJECT ROW

PARCEL BOUNDRY



NO.	REVISION	DATE	DRAWN	CHKD	APPRV.
2	REVISED 30 PERCENT DESIGN	10/21/16	SJF	KHS	--
1	ISSUED FOR PERMITTING	1/25/16	CTS	JRS	--

EVERSOURCE ENERGY

T 2

SEACOAST RELIABILITY PROJECT
LINE LIST 263
STATE OF NH PROPERTY CROSSING

DATE: 01/25/16

SCALES AS NOTED

DSGN: -- CHKD/RS
DRWN: CTS APPR: --

TOWN: DURHAM

TRANSMISSION LINE: F107

MILE NOS: --

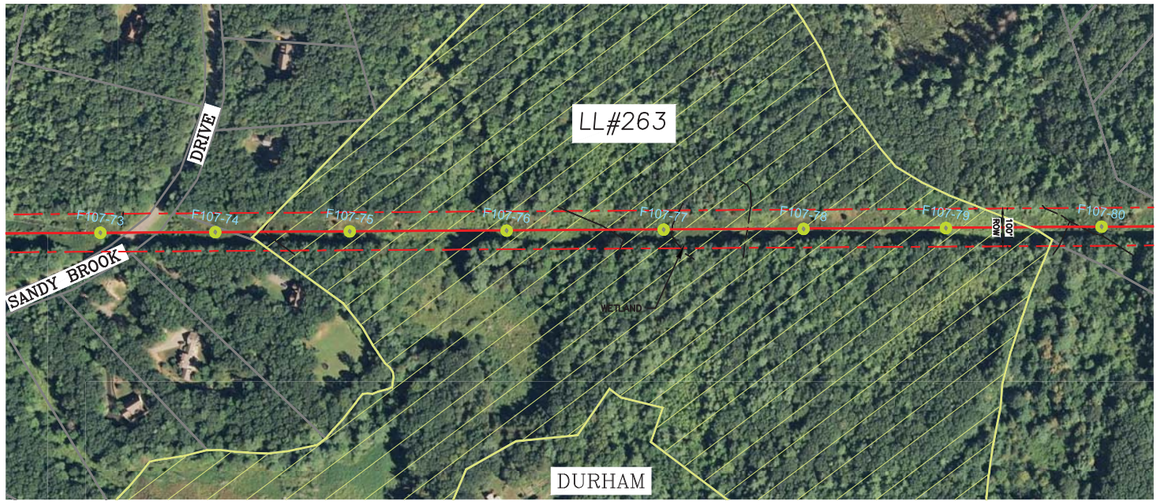
DISCIPLINE/SHT NO.: --

SHEET 1 OF 1

F10799003

10/11/2016 2:00 PM - sjamesc - \\Hrafs1\line\Projects\133005\07\DWG\03 Line\CROSSING\LAND CROSSING\F10799003.dwg - LOCATION MAP 2

ES VER: 11/2015



N

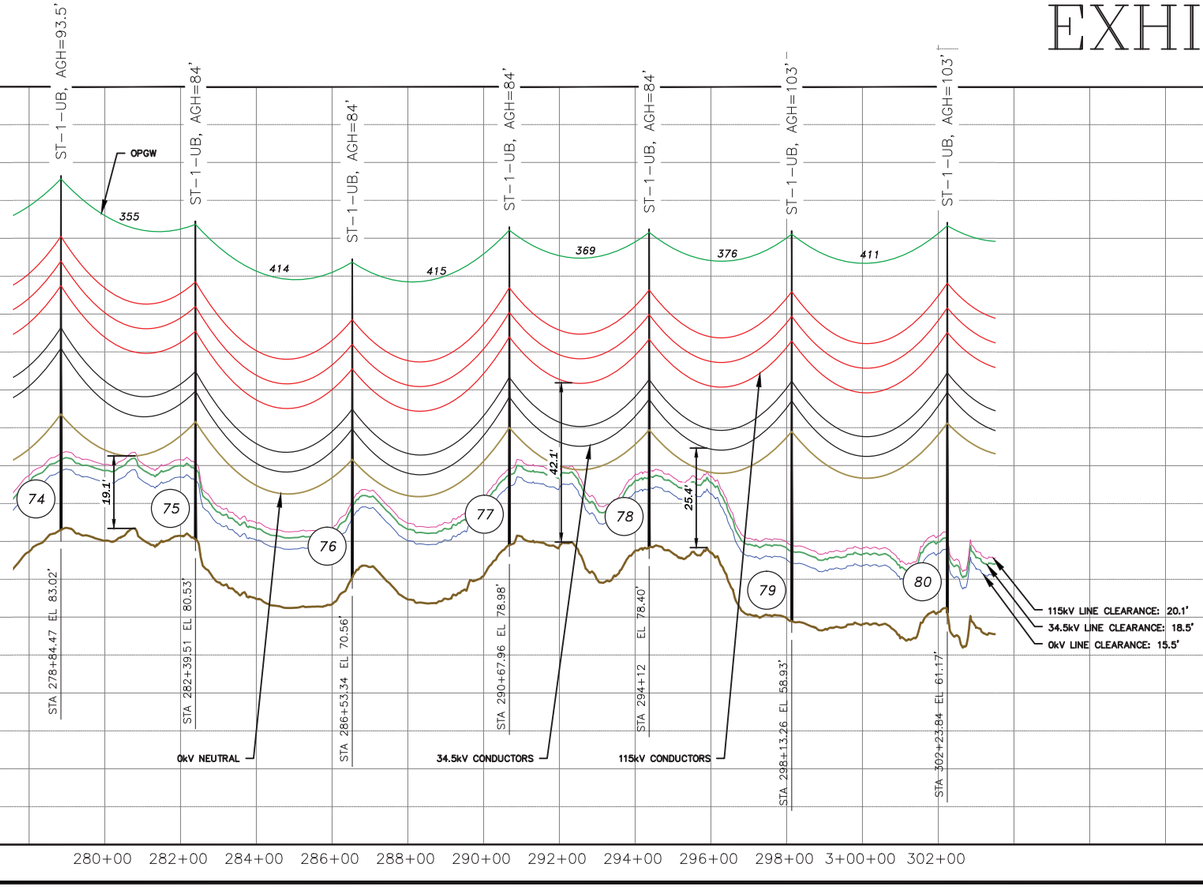
LEGEND

PROJECT LINE

PROJECT ROW

PARCEL BOUNDRY

EXHIBIT 5



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1	ISSUED FOR PERMITTING	7/4/16	CTS	JWC	–

EVERSOURCE ENERGY

T 2

SEACOAST RELIABILITY PROJECT
STRUCTURES #74-80
STATE OF NH PROPERTY CROSSING

DATE: 01/22/16

SCALE: H 1"=200', V 1"=20'

DES: – CHK: JRS
DRW: CTS APP: –

TOWN: DURHAM

TRANSMISSION LINE: F107

MILE NO: – –

DISCIPLINE/SHT NO. --

SHEET 1 OF 1

F10799004

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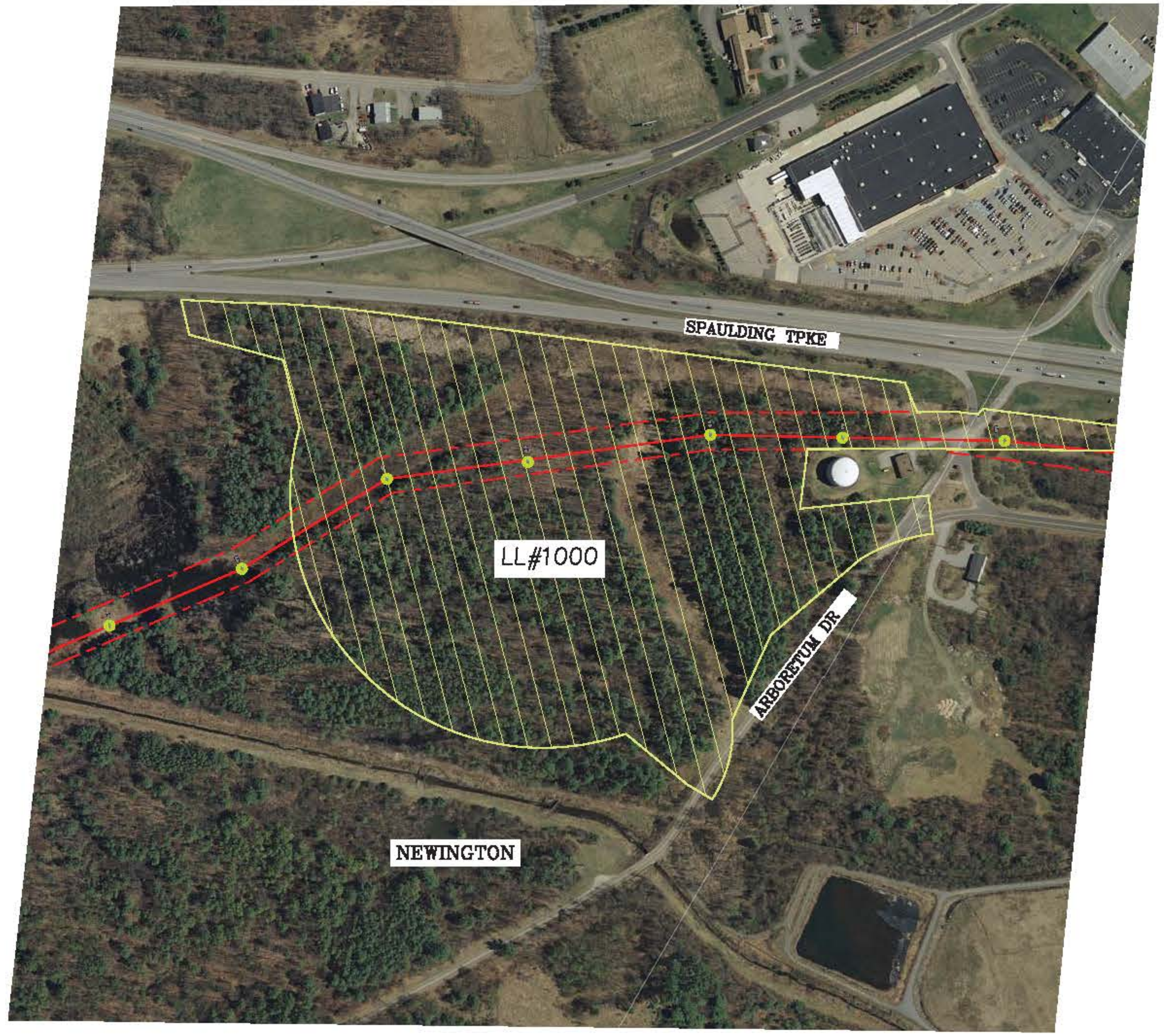


LINE LIST	OWNER	MANAGED BY	OWNER ADDRESS
1000	STATE OF NEW HAMPSHIRE	NH DEPARTMENT OF TRANSPORTATION	7 HAZEN DRIVE, CONCORD NH

GRAPHIC SCALE
1" = 200'

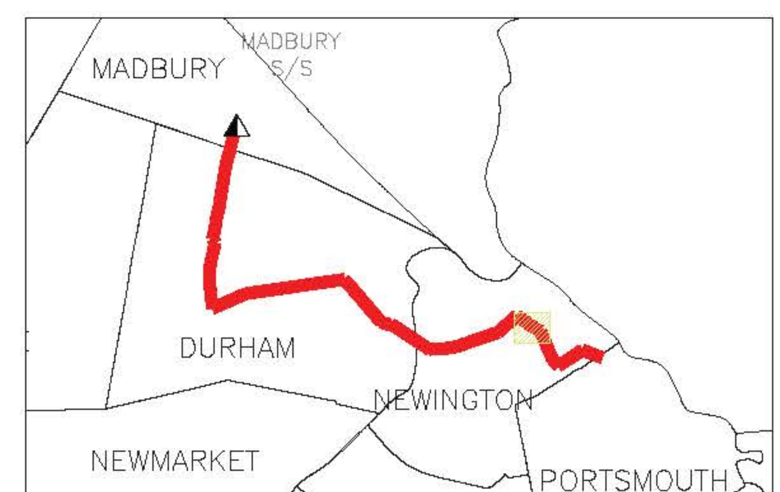
(200 100 0 200 400 600)

EXHIBIT 6

LEGEND

PROJECT ROW

PARCEL BOUNDRY



EVERSOURCE ENERGY

NO.	REVISION	DATE	DRWN	CHKD	APPR.
2	REVISED 30 PERCENT DESIGN	10/21/16	SCF	KMS	–
1	ISSUED FOR PERMITTING	1/22/16	CTS	JRS	–

T 2

SEACOAST RELIABILITY PROJECT
LINE LIST 1000
STATE OF NH PROPERTY CROSSING

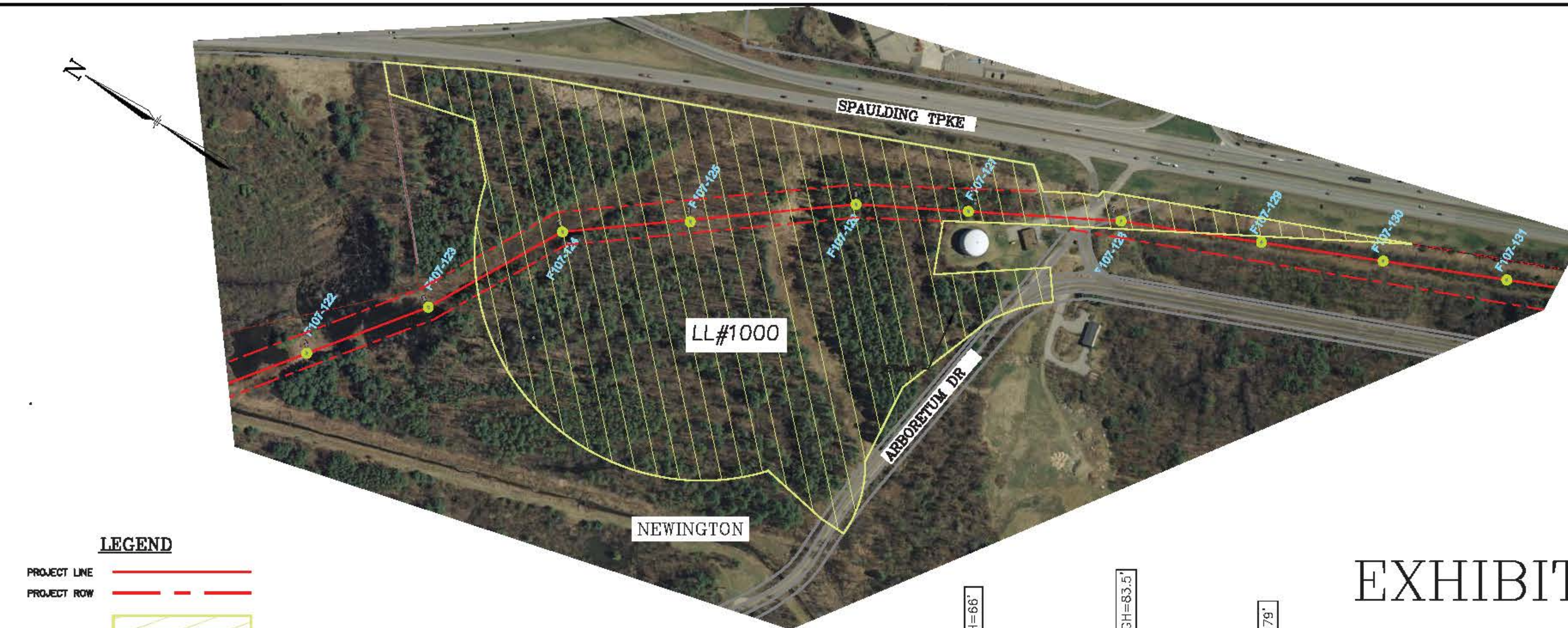
SCALE: AS NOTED DATE:01/22/16

DES: – CHK:JRS
DRW: CTS APR: –

TOWN: NEWINGTON
TRANSMISSION LINE: F107
MILE NO: ––
DISCIPLINE/SHT NO. –
SHEET 1 OF 1
F10799005

10/11/2016 2:05 PM – spenact – \\fsdsl\line\Projects\133065\00\DWG\03 Line\CROSSING\LAND CROSSING\F10799005.dwg – LOCATION MAP 3

ES VER: 11/2015



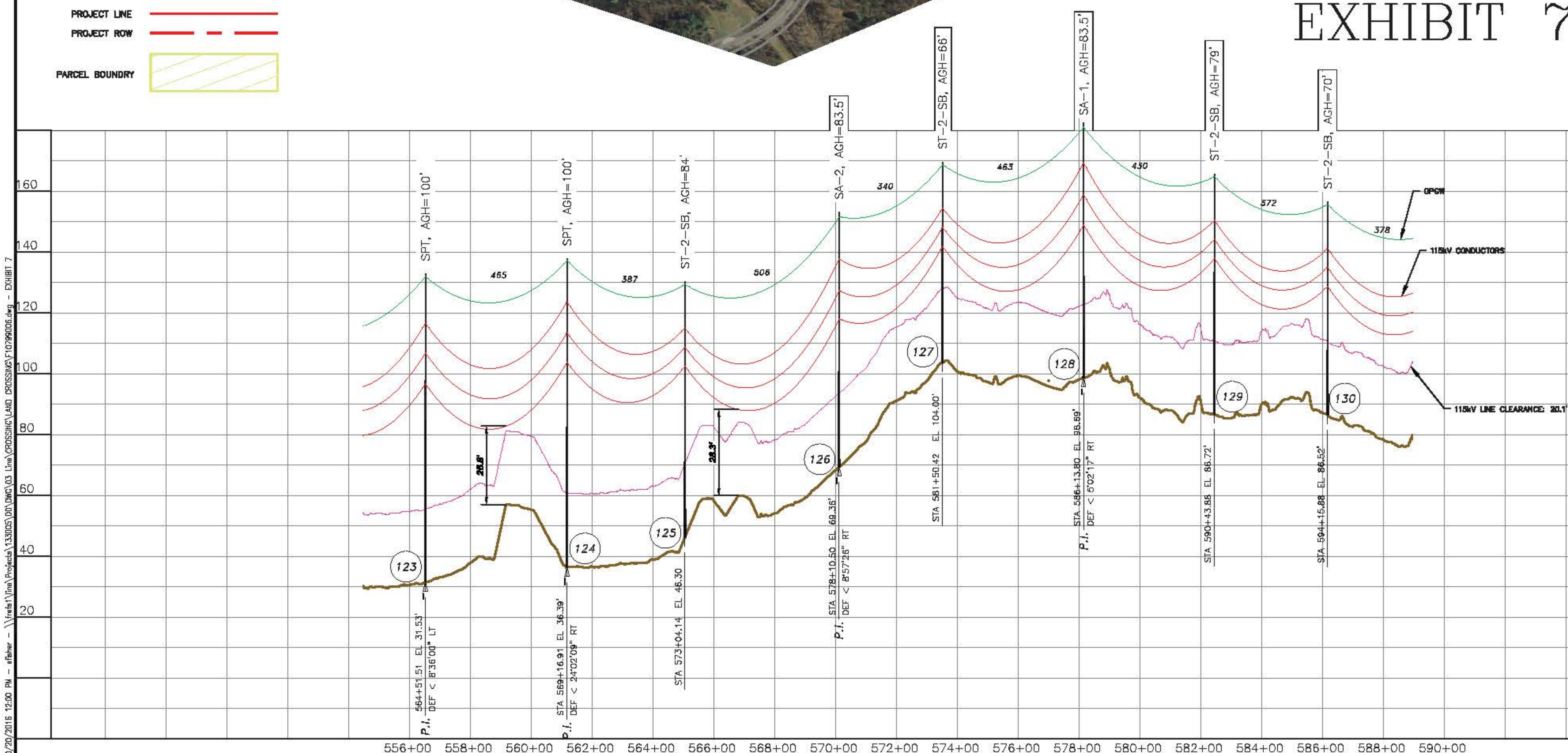
LEGEND

PROJECT LINE

PROJECT ROW

PARCEL BOUNDRY

EXHIBIT 7



NO.	REVISION	DATE	DRWN	CHKD	APPRV.
2	REVISED 30 PERCENT DESIGN	10/21/16	SCF	KMS	–
1	ISSUED FOR PERMITTING		OTS	JRS	–

EVERSOURCE ENERGY

T 2

SEACOAST RELIABILITY PROJECT
STRUCTURES #123–129
STATE OF NH PROPERTY CROSSING

SCALE: H 1=200', V 1=20' DATE: 01/22/16

DES: – CHK/QAS: –
DRW: OTS APR: –

TOWN: NEWINGTON
TRANSMISSION LINE: F107
MILE NO: – –
DISCIPLINE/SHT NO.: –
SHEET 1 OF 1

F10799006

LINE LIST	OWNER	MANAGED BY	OWNER ADDRESS
1001	STATE OF NEW HAMPSHIRE	NH DEPARTMENT OF TRANSPORTATION	7 HAZEN DRIVE, CONCORD NH

200 100 0 200 400 600

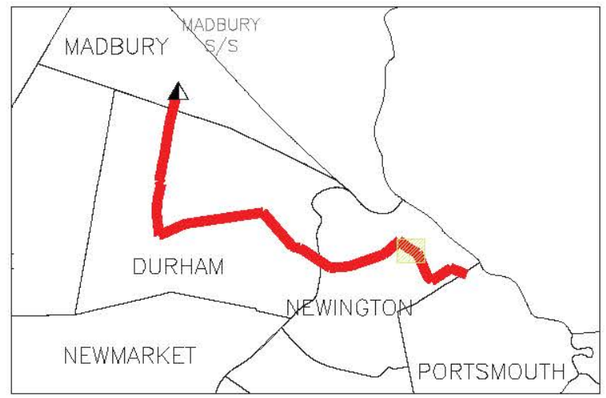
GRAPHIC SCALE
1" = 200'

EXHIBIT 8

LEGEND

PROJECT ROW

PARCEL BOUNDRY

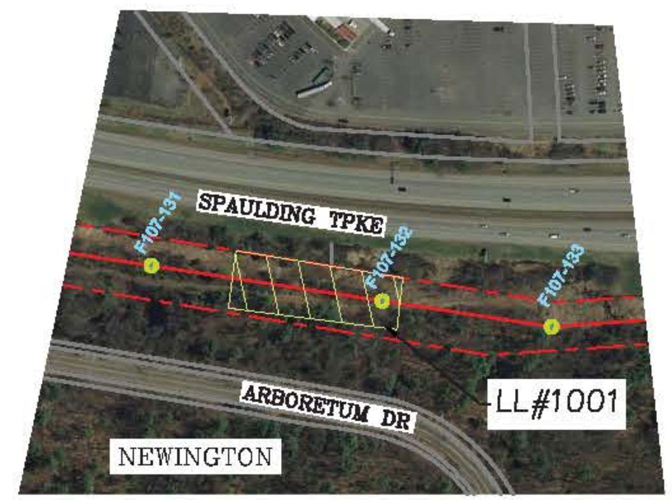


NO.	REVISION	DATE	DRWN	CHKD	APPV.
2	REVISED 30 PERCENT DESIGN	10/21/16	SDF	MMS	—
1	ISSUED FOR PERMITTING	1/22/16	CTS	ARS	—

EVERSOURCE ENERGY

SEACOAST RELIABILITY PROJECT
LINE LIST 1001
STATE OF NH PROPERTY CROSSING

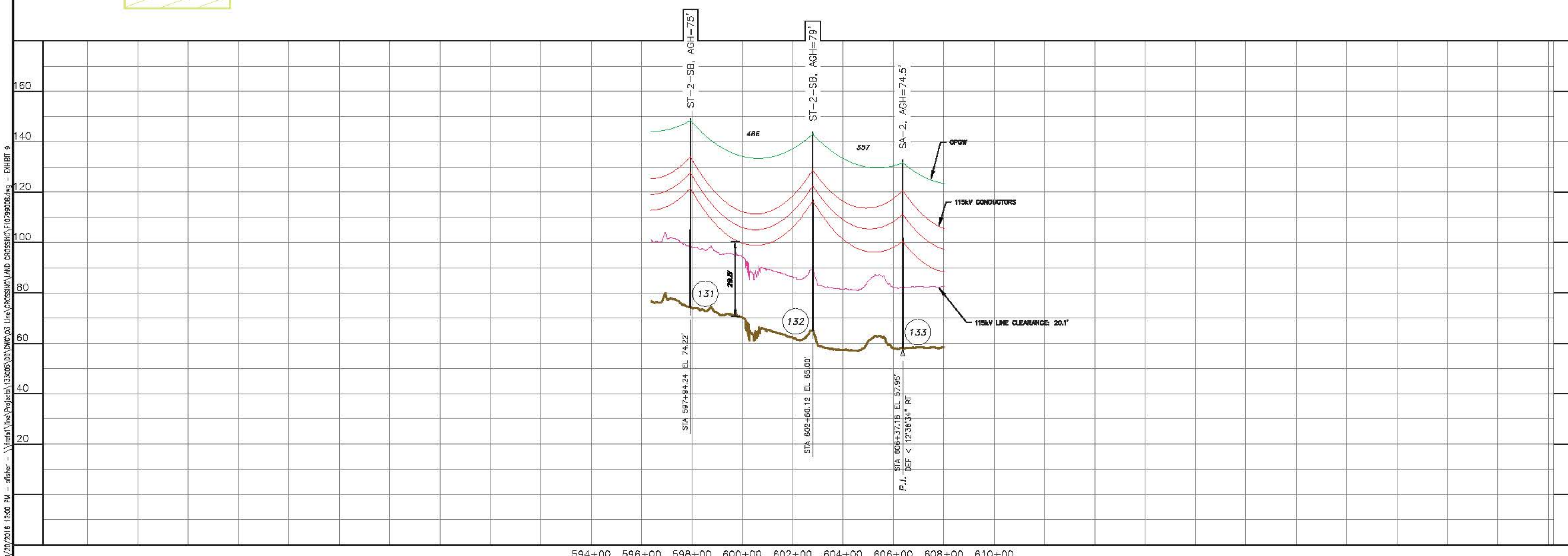
DATE: 01/22/16
SCALE: AS NOTED
DES: — CHK: JPB
DRN: CTS APP: —
TOWN: NEWINGTON
TRANSMISSION LINE: F107
MILE NO.: — —
DISCIPLINE/SHT. NO.: —
SHEET 1 OF 1
F10799007



LEGEND

PROJECT LINE
PROJECT ROW
PARCEL BOUNDRY

EXHIBIT 9



NO.	REVISION	DATE	DRWN	CHKD	APPRV.
2	REVISED 30 PERCENT DESIGN	10/21/18	SCF	KMS	–
1	ISSUED FOR PERMITTING		CTS	JRS	–

EVERSOURCE ENERGY

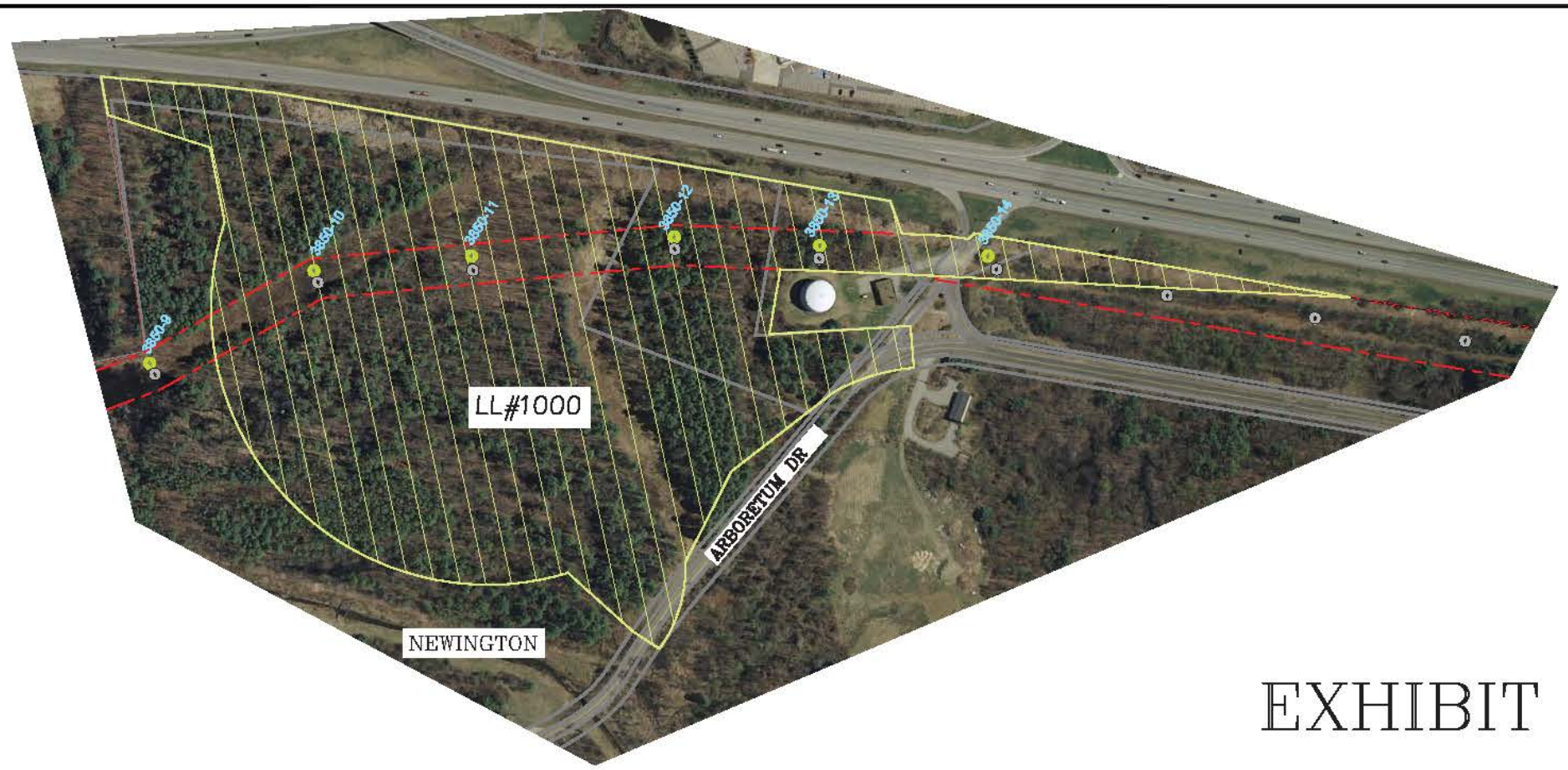
T 2

SEACOAST RELIABILITY PROJECT
STRUCTURES #131–133
STATE OF NH PROPERTY CROSSING

SCALE: H 1=200', V 1=20' DATED: 01/22/15

DES: – CHKD: JRS
DRW: CTS APPR: –
TOWN: NEWINGTON
TRANSMISSION LINE: F107
MILE NO: – –
DISCIPLINE/SHT NO. –
SHEET 1 OF 1
F10799008

ES VER: 11/2015



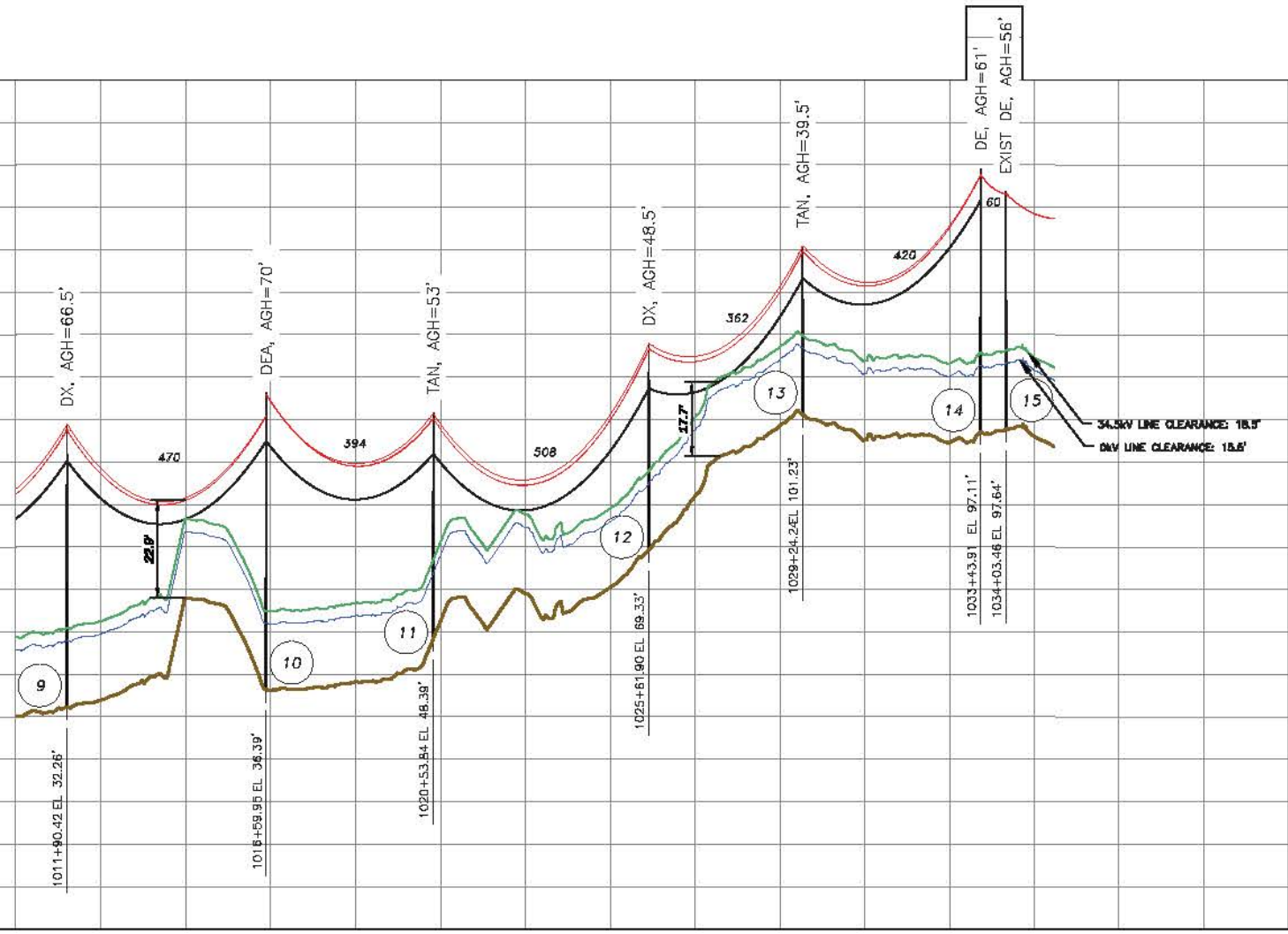
LEGEND

PROJECT LINE

PROJECT ROW

PARCEL BOUNDRY

EXHIBIT 10



NO.	ISSUED FOR PERMITTING	DATE	CHK'D	APP'VD
1		CTS	JPS	

EVERSOURCE ENERGY

SEACOAST RELIABILITY PROJECT
STRUCTURES #9-14
STATE OF NH PROPERTY CROSSING

DATED 1/22/16

SCALE H 1"=60' V 1"=20'

DESI – CHKD JPS
DRN CTS APP. –

TOWN: NEWINGTON

TRANSMISSION LINE: 3860

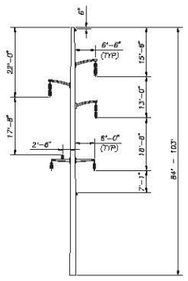
WILE NO: – –

DISCIPLINE/SHT NO. –

SHEET 1 OF 1

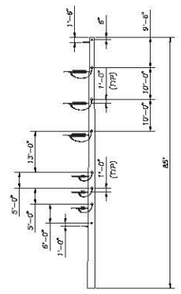
385099001

2/24/2016 2:18 PM - spenset - N:\Xdgn Work Area\NH Work Area\spenset\1107_385099001.dwg - 3860



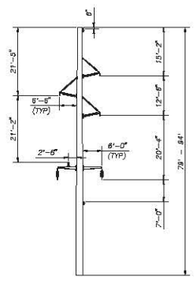
TYPE ST-1-UB

STEEL SINGLE POLE
TANGENT
115 KV WITH 34.5 KV UNDERBUILD
DIRECT EMBED FOUNDATION



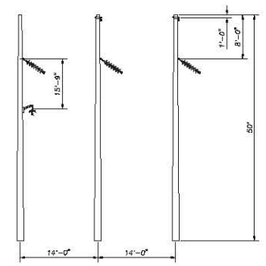
TYPE SPDE-VUB

SELF SUPPORTING STEEL
DEADEND
115 KV WITH 34.5 KV UNDERBUILD
DRILLED PIER FOUNDATION



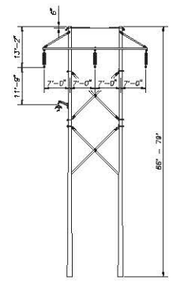
TYPE ST-2-UB-SB

STEEL SINGLE POLE
BRACED POST TANGENT
115 KV WITH 34.5 KV UNDERBUILD
DIRECT EMBED FOUNDATION



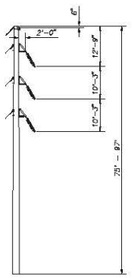
TYPE C-UB

STEEL H-FRAME
12° - 50° ANGLE
115 KV W/ 34.5 KV UB
DRILLED PIER FOUNDATION



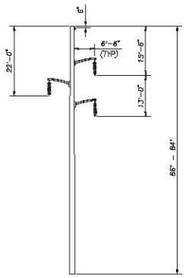
TYPE SRAX-UB

STEEL H-FRAME
TANGENT
115 KV W/ 34.5 KV UB
DIRECT EMBED FOUNDATION



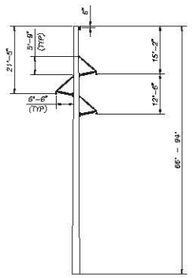
TYPE SA-2

STEEL GUYED SINGLE POLE
8° - 20° ANGLE
115 KV
DIRECT EMBED FOUNDATION



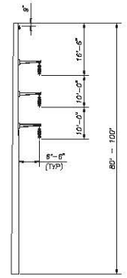
TYPE ST-1

STEEL SINGLE POLE
TANGENT
115 KV
DIRECT EMBED FOUNDATION



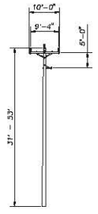
TYPE ST-2-SB

STEEL SINGLE POLE
BRACED POST TANGENT
115 KV
DIRECT EMBED FOUNDATION



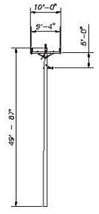
TYPE SPT

SELF SUPPORTING STEEL
TANGENT
115 KV
DRILLED PIER FOUNDATION



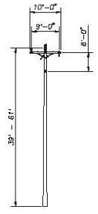
TYPE TAN

ROUNDWOOD OR STEEL SINGLE POLE
TANGENT
34.5 KV
DIRECT EMBED FOUNDATION



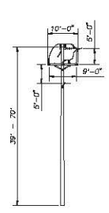
TYPE DX

ROUNDWOOD OR STEEL SINGLE POLE
0° - 12° ANGLE
34.5 KV
DIRECT EMBED FOUNDATION



TYPE DE

ROUNDWOOD OR STEEL SINGLE POLE
0° - 15° DEADEND ANGLE
34.5 KV
DIRECT EMBED FOUNDATION



TYPE DEA

ROUNDWOOD OR STEEL SINGLE POLE
15° - 90° DEADEND ANGLE
34.5 KV
DIRECT EMBED FOUNDATION

EXHIBIT 11

REV	DESCRIPTION	ENG/PE#	DATE	DRN	CHKD	APPR
2	REVISED 30 PERCENT DESIGN		10/21/16	SCF	KMS	--
1	ISSUED FOR PERMITTING		1/25/16	CTS	JRS	--
DWG REV	EPH/DESCRIPTION	CONT/PE#	DATE	DRN	CHKD	APPR

CONTRACT SERVICES

EVERSOURCE ENERGY

TYPE 115 KV STANDARD
SECTION F107 STRUCTURE INDEX

T	2
DRAWN	CTS
ENGINEER	--
CHECKED	JRS
APPROVED	--
DATE	01/25/16
SCALE	NTS
FILE: F10799009.DWG	
IMAGE:	
DRAWING NO.	F10799009