

New Hampshire Line X-178 Rebuild

Planning Advisory Committee Meeting

February 28, 2024

Agenda

- Project Background & Location
- Project Needs
- Solution Alternatives
- Outreach Efforts
- Project Summary
- Feedback & Next Steps
- Appendix – Permits & Project Approvals

Purpose

- Advise ISO-NE and the PAC stakeholder community of asset condition and reliability needs driving the proposed rebuild of the 115 kV X-178 Line in New Hampshire
- Discuss proposed solution alternatives
- Eversource takes a proactive approach to maintain long-term structural integrity and continued reliability of its transmission infrastructure through inspection-based asset management and holistic evaluation of present and future needs, as well as community and environmental impacts

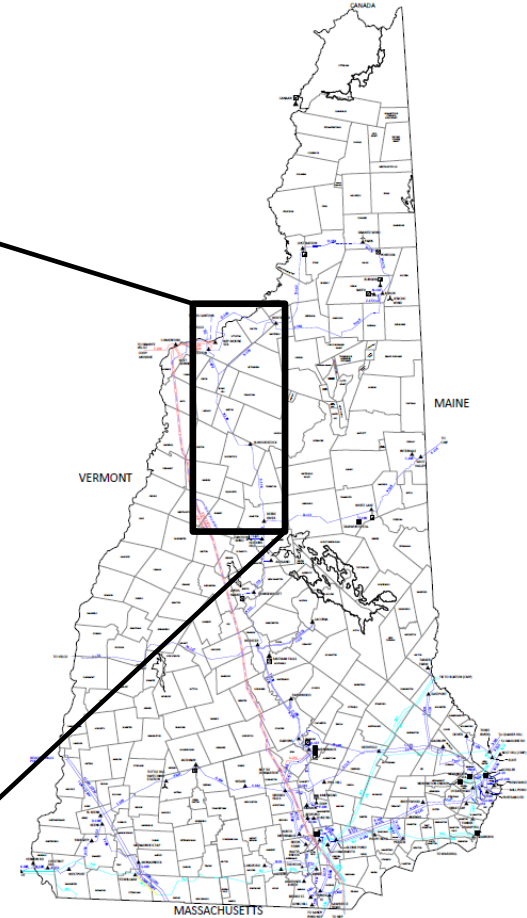
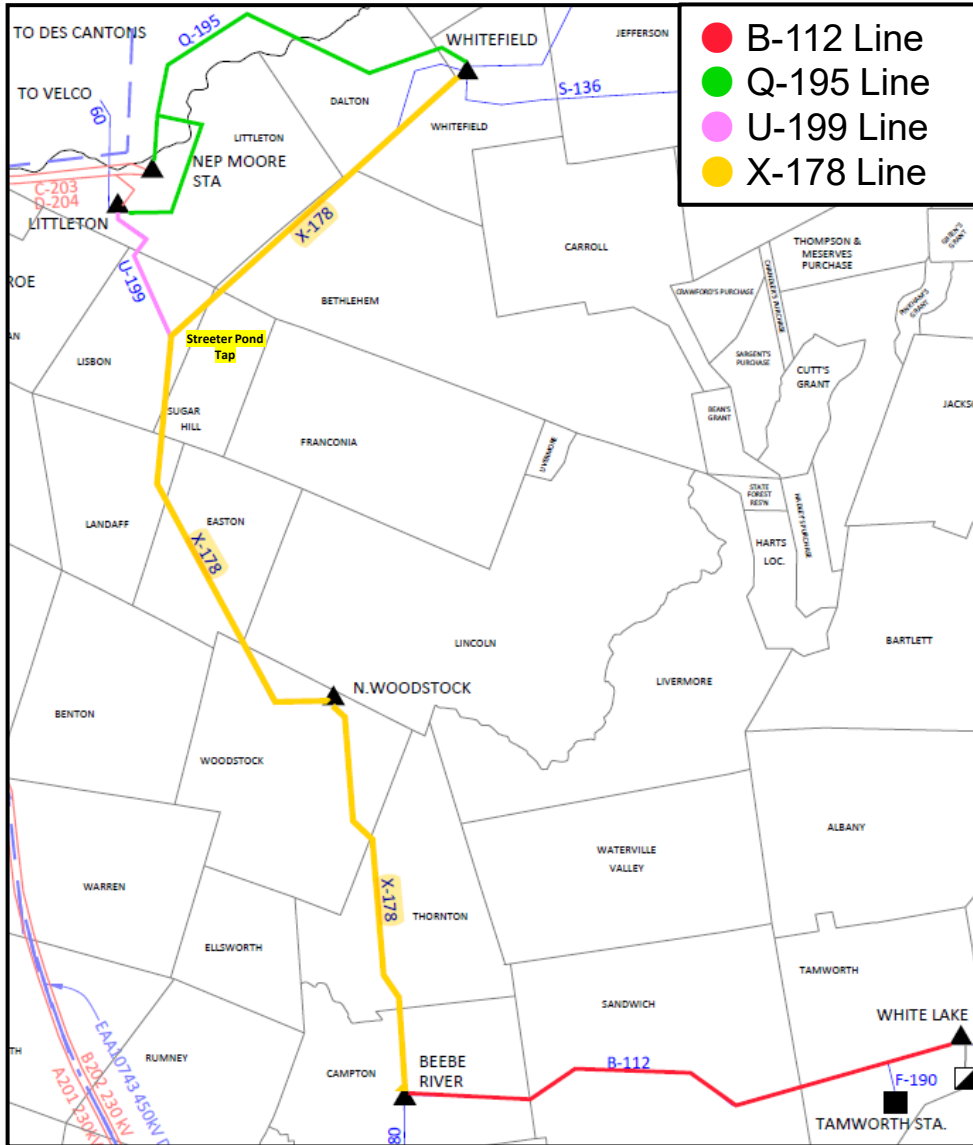


Bog Pond within the White Mountain National Forest

Project Background

- Eversource serves 535,000 customers in New Hampshire, with 145 transmission and distribution substations, 1,057 miles of transmission lines and 14,375 miles of distribution lines
- X-178 115 kV Line runs between Beebe River substation in Campton, NH and Whitefield substation in Whitefield, NH
 - First section of line built between Beebe River and North Woodstock in 1948
 - Majority of Streeter Pond tap to Whitefield built in 1969
 - Majority of Beebe River to Streeter Pond Tap built in 1985
 - Length: 49 miles
 - Structures: 594 structures
 - Combination of 579 natural wood, 2 laminate wood, 11 steel H-frame and 2 weathering steel
 - Average structure age: 45 years old
 - Conductor: 795 ACSR 26/7, 795 ACSR 36/1, and 1272 ACSS 54/19
 - Shield wire: 2 runs consisting of 7/16" Steel or 7#8 Alumoweld

Project Locations



Project Needs – Asset Condition

- 2022 inspections of this line graded condition of structures in accordance with Electric Power Research Institute (EPRI) guidelines
 - *A: Nominal Defect, B: Minimal Defect, C: Moderate Defect, D: Severe Defect*
 - Grade C structures showed one or more of the following age-related degradations, leading to decreased load carrying capability
 - Woodpecker damage, pole top rot, cracked arms, split pole top, and decay
- Additional structures were identified and prioritized for replacement based on Engineering requirements to meet current uplift standards, structure loading concerns, as well as efficiencies in required permitting approvals for replacing Grade C structures, and minimizing environmental impacts

| Reason For Replacement | Total | Priority C | Priority B | Priority A |
|-------------------------------------|------------|------------|------------|------------|
| OPGW Loading / Clearance Failure | 244 | 0 | 242 | 2 |
| Asset Condition + Laminate | 43 | 41 | 2 | 0 |
| Access Opportunity | 231 | 0 | 229 | 2 |
| Additional Opportunity | 62 | 0 | 62 | 0 |
| Total Replacement Structures | 580 | 41 | 535 | 4 |

Project Needs – Photos



Structure 212 – Pole Top Rot & Rusted Hardware

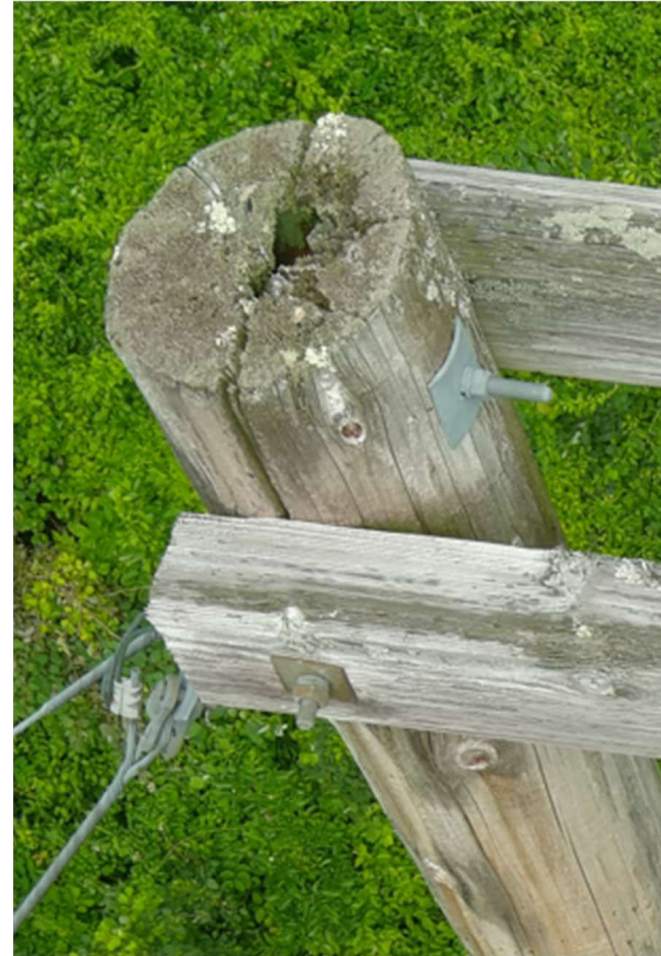


Structure 356 – Split Pole Top

Project Needs – Photos

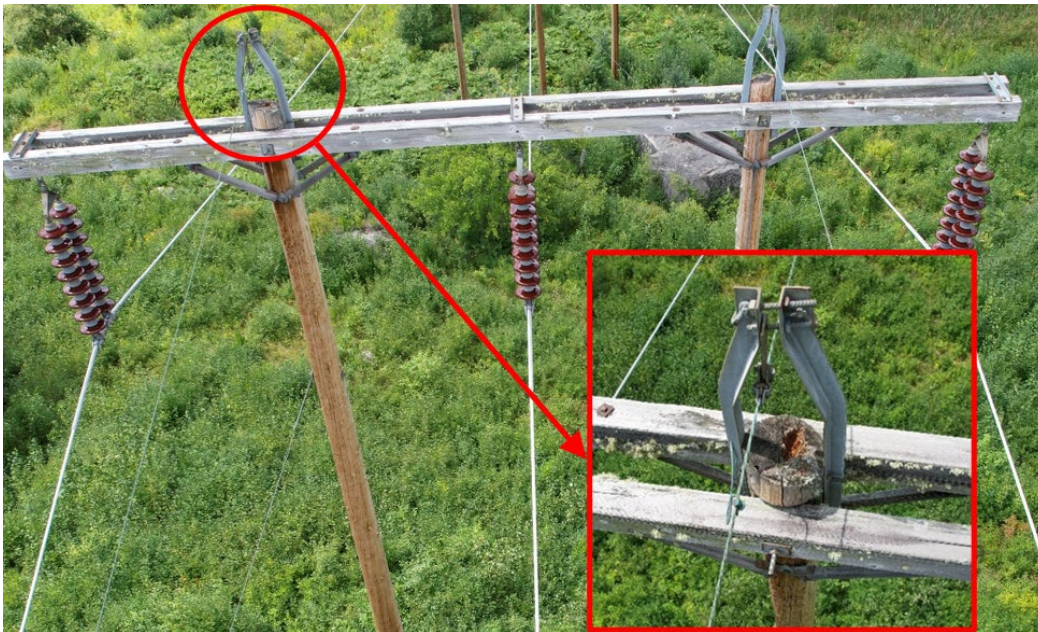


Structure 8 – Severe Structure Splitting

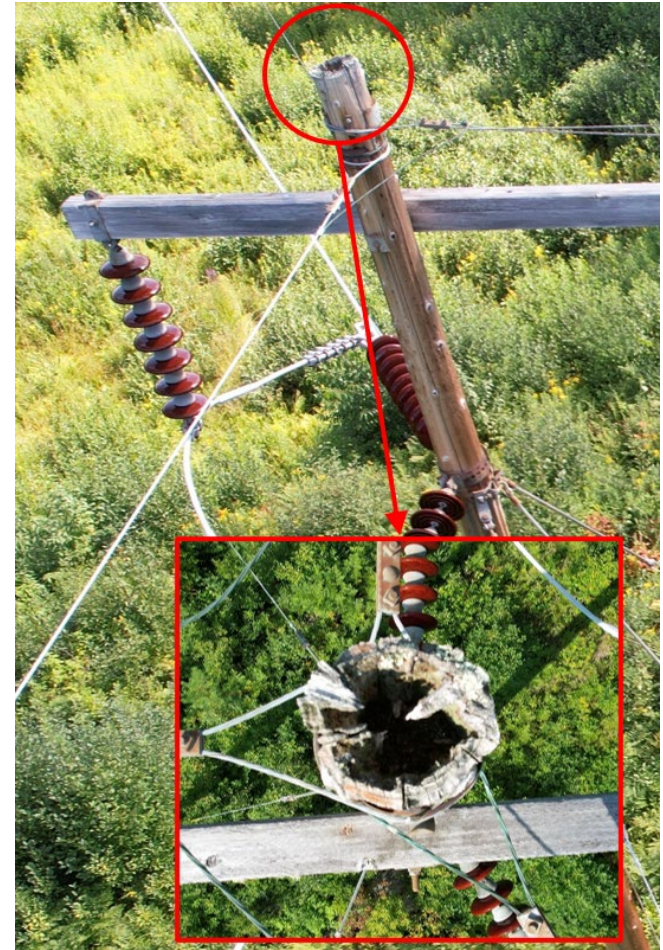


Structure 25 – Pole Top Rot and Splitting at Hardware Attachment Point

Project Needs – Photos



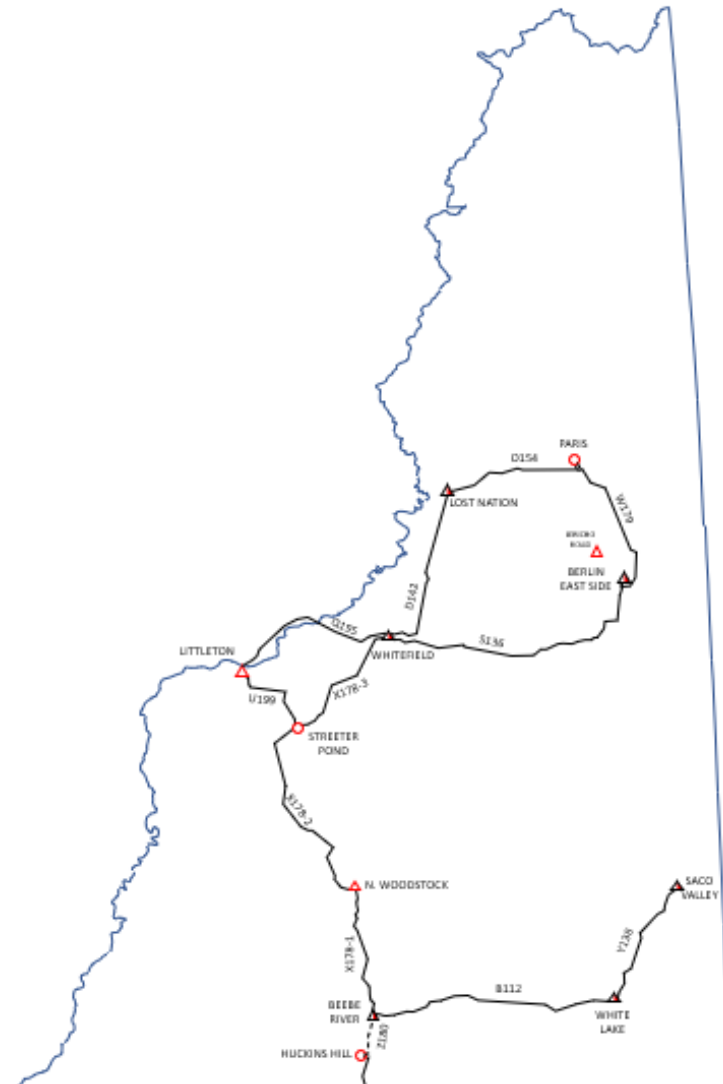
Structure 424 – Pole Top Checking and Large Hole in Pole Top



Structure 419 – Major Pole Top Rot

Project Needs – OPGW

- Eversource does not currently have a high-speed fiber communication path serving the North Country 115 kV loop
- The X-178 line is the connection between the Webster to Beebe corridor and the lines within the North Country (D-142, O-154, S-136, W-179, U-199 & Q-195)
- The installation of a fiber path on this line is important for current and future system reliability



Project Needs – OPGW

- OPGW installation expands a private Eversource OPGW / Synchronous Optical Networking (SONET) loop
 - Provides a controlled, alternate fiber communication path supporting the long-term buildout of the fiber optic network
 - Greatly reduces the reliance on leased services for protection, SCADA, and Phasor Measurement Unit (PMU) and Dynamic Disturbance Recorder (DDR) installations (ISO-NE OP-22)
 - A private network is segregated from third-party telecom services, improving the overall reliability and security of communications paths
- Critical Infrastructure Protection: Fiber provides the necessary bandwidth for physical security monitoring and triaging of alarms for BES Cyber Systems at medium and low impact substations
- The DOE and EPRI recommend fiber as a means to strengthen the security and resilience of critical communication infrastructure to protect against the consequences of electromagnetic pulse attacks
- Fiber optic cable is a non-propagating media for electric and magnetic fields and therefore is considered generally immune to the effects of geomagnetic disturbances

Solution Alternative 1

- Alternative 1: Install OPGW and only replace ACR and OPGW-overloaded structures
 - Scope:
 - Replace 287 structures (41 ACR + 2 LWS + 244 OPGW loading)
 - Replace 49 miles of Alumoweld shield wire with 49 miles of OPGW
 - Pros:
 - Addresses structural asset condition issues
 - Provides a fiber communication path to North Country 115 kV loop
 - Lower cost solution
 - Cons:
 - Re-entry into this right-of-way for future project work will incur significant additional expense and environmental/community impacts
 - The X-178 has some extremely long stretches of ROW corridor with no road crossings (Ex. 9 mile stretch in the WMNF)
 - Multiple miles of matting installation, requiring a significant cost and significant permitting effort may be required each time defective structures are found
 - Repeated permitting costs would be incurred for each individual round of ACR work
 - Outage coordination in northern New Hampshire is difficult due to limited lines flowing into the region
 - **Total estimated PTF cost: \$246.1M (-50/ +200%)**

Solution Alternative 2 (Preferred)

- Alternative 2 (Preferred Solution): Full Rebuild
 - Remove 583 existing structures
 - 579 existing wood H frame, 2 laminate wood, 1 steel H frame, and 1 steel three pole H frame structures
 - Install 580 new structures
 - Combination of two-pole direct embedded single circuit, three-pole H frame steel direct embed, engineered steel monopole, engineered two-pole structures and engineering H-frame structures
 - 3 existing structures to be permanently removed
 - Replace 49 circuit miles of existing conductor with 49 miles of 1272 ACSS 54/19 “Pheasant” conductor
 - Replace existing shield wire with two 49 mile runs of OPGW
 - Utilize ADSS to tie into Beebe River Substation, North Woodstock Substation, Whitefield Substation and Streeter Pond Tap
 - Pros:
 - Addresses structural asset condition issues
 - Provides a fiber communication path to North Country 115 kV loop
 - Takes advantage of permitting and access efficiencies
 - Eliminates need for repeated re-entry into RoW over coming decades, mitigating impact to local communities, landowners, and sensitive environmental regions
 - Cons:
 - Higher up-front cost
 - **Total estimated PTF cost: \$384.61M (-50/ +200%)**

Full Rebuild Benefits

- The X-178 line is a key asset for ensuring reliable 115 kV transmission service to northern New Hampshire
- Due to the combination of various reliability needs, Eversource has determined that a full rebuild of the line is the most cost-effective solution for long-term reliability
 - Addresses present structural asset condition issues
 - Incorporates OPGW to provide high-bandwidth, low latency, secure network operations
 - Replaces aging conductor with Eversource-standard conductor to ensure continued adequate transmission service capability



Existing Structure 267

Full Rebuild Benefits

- A holistic approach to asset condition issues facilitates savings in long-term cost, siting, permitting and minimizes environmental impacts of working on protected land
 - Right-of-way access is limited; some access roads are several miles long
 - Repeated access is costly, time-consuming and more disruptive to the environment and abutting landowners
 - Approximately 12 miles of line is routed through the White Mountain National Forest
 - Right-of-way intersects with Appalachian Trail
 - Mitigates need for significant additional near-term work on this line



Pemi River Crossing in Woodstock, NH

Project Stakeholder Outreach

- Stakeholder outreach efforts began in April 2023
- Municipal briefings
 - Project Introduction briefings and meetings held with municipal leadership
 - Pre-Permitting communication and meetings with Town Conservation Commissions
- Two Public Information Sessions held August 2023
 - Pre-Construction Information Session upcoming spring 2024
- Regular project communication through mailings, door-to-door outreach, website and project phone/email hotline for questions/feedback
- Site visits held with property owners to discuss concerns and mitigation



X-178 Community Information Session

Project Update

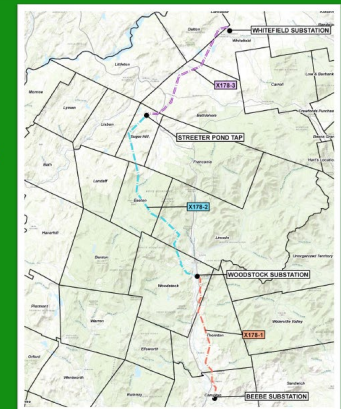
Beebe River to Whitefield (X178) Line Rebuild Project

We want to hear from you!

In August we sent you a postcard to invite you to learn about the upcoming line rebuild project taking place within the existing right-of-way (power line corridor) of the X178 Line, a 115kV transmission line.

We'd like to speak with you to brief you on this project or meet you on your property to discuss the project and answer any questions you may have.

Please contact us at our Projects Hotline 1-888-926-5334 or email NHProjectsInfo@eversource.com



X-178 Project Update Postcard

Summary

- Eversource is planning a complete rebuild of the X-178 115 kV line in northern New Hampshire
 - Replace 583 existing structures with 580 structures of various types
 - Replace 49 circuit miles of existing conductor with 49 miles of 1272 ACSS 54/19 “Pheasant” conductor
 - Replace existing shield wire with two 49 mile runs of OPGW (98 miles total)
 - Utilize ADSS to tie into Beebe River Substation, North Woodstock Substation, Whitefield Substation and Streeter Pond Tap
- Full rebuild solution addresses all present and future predicted reliability needs on this line, facilitates long-term cost savings, and limits repeated disruptions to environment and local communities
- **Total estimated PTF cost:** \$384.61M (-50/ +200%)
- **In-service date:** Q4 2026

Feedback and Next Steps

- Please submit any written comments on these projects to:
 - robin.lafayette@eversource.com
 - pacmatters@iso-ne.com

| Presentation | Date | Description |
|------------------------|--------------|--|
| Initial Presentation | Feb 28, 2024 | Presentation on the rebuild of X-178 line |
| Questions/Feedback | Mar 14, 2024 | Comment deadline |
| Follow-up Presentation | May 15, 2024 | Follow-up presentation to address question and present project development updates |

Questions



Appendix – Permits & Project Approvals

- Based on preliminary assessment, Eversource expects that permit review from the following agencies will be required for this project:
 - Federal
 - United States Army Corps of Engineers
 - United States Fish & Wildlife Service
 - Federal Aviation Administration
 - US Forest Service (NEPA) EA
 - State
 - NHDES Wetlands, Shoreland and Alteration of Terrain programs
 - NH Fish & Game Department
 - NH Natural Heritage Bureau
 - NH Department of Energy
 - NH Department of Natural & Cultural Resources
 - Local
 - Permitting pursuant to local land use ordinances as required