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Line 1759 Asset Condition Structure Replacement and Copperweld Retirement Project

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Project Summary

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Project Drivers

- Inspections have identified multiple structure concerns including wood structure decay, pole top rot, splitting and/or deteriorating poles and crossarms
- Copperweld shield wire on Line 1759 is aging and susceptible to failure

Alternatives Considered

Alternative	Description	Cost Estimate
Alternative 1 (Base Alternative)	Replace deteriorated wood structures, add cross-bracing to overstressed wood structures, and replace Copperweld shield wire with Alumoweld static wire	$16.336 M (-25%, +50%)
Alternative 2	Same as Alternative 1, but replace Copperweld shield wire with optical ground wire (OPGW)	$18.211 M (-25%, +50%)
Alternative 3	Same as Alternative 2, but replace overstressed structures instead of adding cross-bracing	$25.745 M (-50%, +200%)

Preferred Alternative

Alternative	Reason for Recommendation	Cost Estimate
Alternative 2	• Replace 12 priority C structures, 5 priority B overstressed structures, and add cross-bracing to 29 overstressed priority B structures • This option addresses the asset condition structure concerns and the aging Copperweld shield wire • This solution also addresses the telecommunication need on the line with the replacement of Copperweld shield wire with OPGW	**$18.211 M (-25% / +50%)**

Outline

- Background Information
- Project Needs and Drivers
- Solution Alternatives
- Selection of Preferred Solution
- Schedule and Contact Information

Background Information

Line 1759

Key Details	
Location	**From:** Portland Substation, *Portland, CT* **To:** Hopewell Substation, *Glastonbury, CT*
Line Length	9.1 miles
Operating Voltage	115 kV
Age and Upgrade History	• Originally constructed in 1957 • ACL 133, replaced 30 structures on Line 1759 with steel pole structures
Prior PAC Presentations	• 10/17/2018, ACL 133

Existing Structures

Material	Configuration	Number	Avg. age
Wood	Single-circuit H-frame	7	68 years
Wood	Single-circuit H-frame	65	9 years
Steel	Single-circuit H-frame	30	7 years
Steel	3-pole H-frame	1	68 years

Existing Conductor

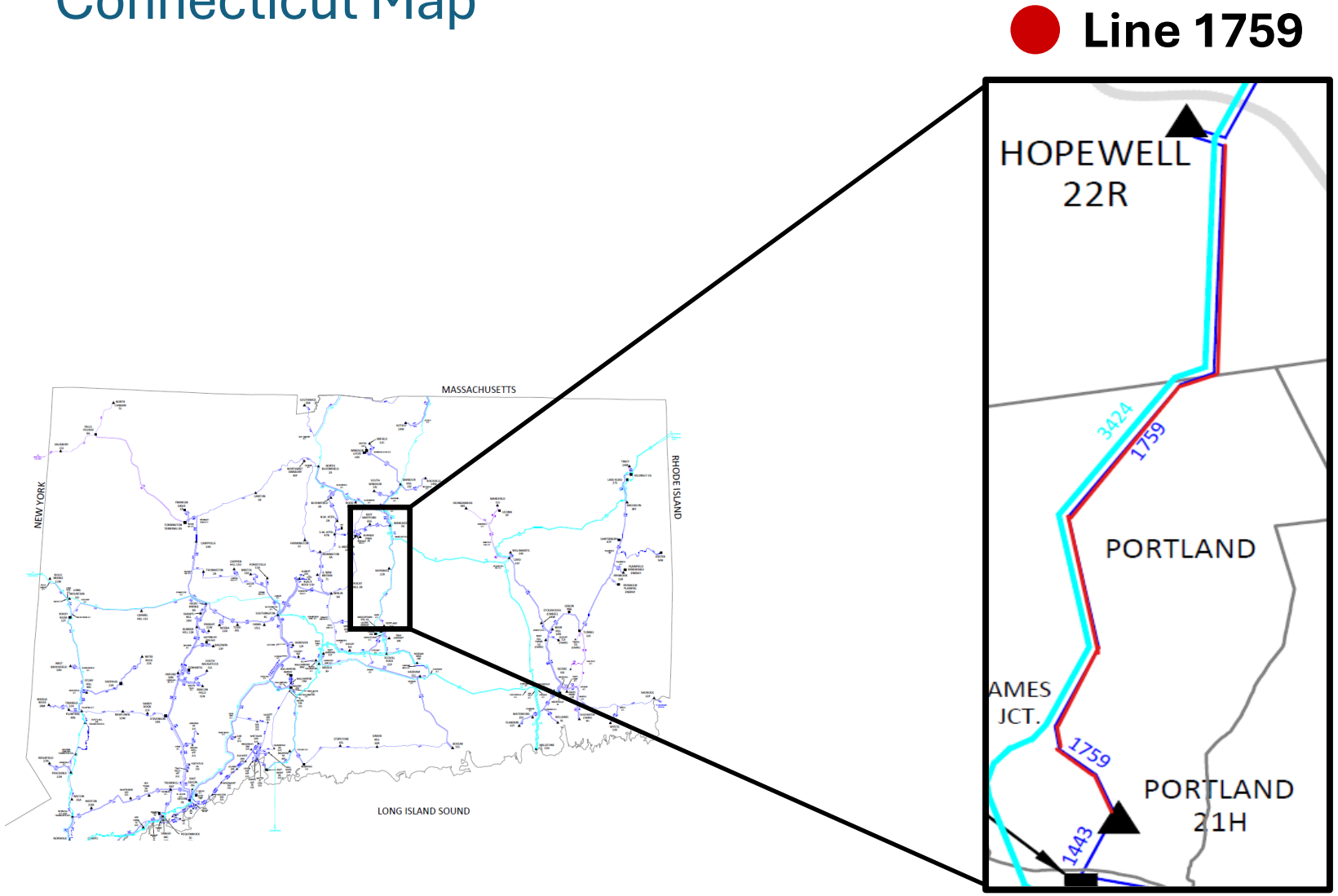
Type	Length	Avg. age
556.5 KCMIL 26/7 ACSR (Dove)	9.1 miles	68 years

Existing Shield Wire

Type	Length	Avg. age
3/8” Copperweld Shield Wire (2 runs)	9.1 miles	68 years

Background Information

Connecticut Map



Project Needs and Drivers

Structure Concerns

Structure Concerns	
Primary Concerns	

Wood structure rot and decay	• Recent inspections performed in 2020 (ground line inspection) and 2023 (drone inspection) have identified 12 category C wood structures with pole top rot, splitting, deteriorating crossarms, growing fungus and/or bug damage, and other forms of decay
	• These structures must be replaced to maintain reliability and ensure ongoing integrity of the line
	• Affected structures average 9 years old, typical useful life for 115 kV natural wood structures (40 – 60 years)
	  • Wood is a natural material that has variances from pole to pole. As such, cracks can form in critical areas (such as at hardware attachment points) that can cause the reliability of the pole to be downgraded very early in its life
	  • Checking and splitting is natural, and so there is no way to predict how damage will occur on a wood structure because it's not a consistent material

Overstressed structures	• Additional Category B structures were identified and prioritized for either replacement or the addition of cross-bracing to meet loading standards • To mitigate the loading violations, 5 structures require replacement and 29 structures require cross-bracing
Secondary Concerns	
None	

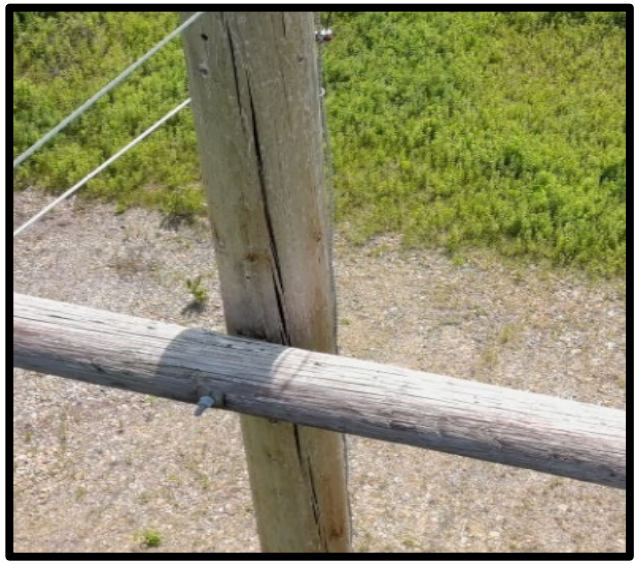
Summary of Current Structure Grades

Category	Recommended Action	Number of Structures
A	No replacement required due to deterioration	20
B	Consider replacement in conjunction with other structure replacements	71
C	Initiate planned structure replacement project **or** Replace as part of upcoming structure replacement project	12
D	Replace immediately (emergency replacement)	0
Total		**103**

Project Needs and Drivers

Structure Concerns

Structure 9019:
Pole Splitting



Structure 9028:
Pole splits, cracking

Structure 9063:
Top rot, cracks

Structure 9031:
Splits and cracks through shield wire hardware

Project Needs and Drivers

Shield Wire

Shield Wire Concerns	
Primary Concerns	
Copperweld	• Line 1759 has two runs of shield wire for the full length of the circuit, 9.1 miles • The existing 68-year-old Copperweld shield wire is obsolete and susceptible to failure • Copperweld shield wires are no longer an industry standard shield wire and spare parts are difficult to obtain • Failure of Copperweld shield wire presents a safety hazard and creates risks to the reliable operation of the transmission system
Secondary Concerns	
None	

Project Needs and Drivers

Telecommunication

Telecommunication Concerns	
Primary Concerns	
None	
Secondary Concerns	
Future telecommunications needs	• Currently, there is no telecommunications direct path connecting Portland to Hopewell substations • Installation of fiber between Portland and Hopewell substations will improve connectivity between the Northern and Southern substations of CT where the Eversource system currently has fiber constraints • The addition of a fiber connection in this corridor will support the completion of a major fiber ring and provide redundancy to surrounding bulk power system (BPS) stations • Fiber capacity and availability further supports direct fiber relaying, grid modernization, increased bandwidth for security infrastructure, and enhanced system reliability • Alternative 2 will allow for installation of OPGW to improve fiber capacity in this part of central CT and provide greater security via a private network

Project Needs and Drivers

Other Concerns

Other Concerns	
Conductors	• No needs identified at this time
Insulators	• No needs identified at this time
Planning	• No needs identified at this time
Operational	• No needs identified at this time

Review of Relevant Transmission Studies

Transmission Study Status
Was this line overloaded in recent Attachment K studies (Reliability Needs Assessments, Longer-Term Transmission Studies, etc.) or other recent studies?
• Yes, Line 1759 experienced overloads in the most recent ISO-NE 2050 study • The most severe overloads documented outside of Winter Peaking 57 GW scenario were in the 51 GW Winter Peaking scenario   • Line 1759, 114.3% at 288 MVA of flow compared to an existing winter LTE rating of 252 MVA
Have modifications or upgrades to this line been identified as potential solutions in any of those studies?
No

Evaluated Solution Alternatives

Alternative 1

Base Alternative	
Description	• Replace 12 category C structure and 5 category B overstressed structures • Add cross-bracing for 29 overstressed structures • Replace 9.1 miles of Copperweld shield wire with Alumoweld Static Wire
Primary needs addressed	• Yes, category C structures, overstressed structures and shield wire concerns are addressed
Secondary needs addressed	• No, future telecommunication needs are not addressed
Advanced transmission technologies to be considered	• None • No advanced transmission technologies are applicable to degraded structures
Cost estimate and accuracy	**$16.336 M (-25%, +50%)**
Longer-term transmission needs addressed	• N/A
Key standards or criteria affecting design if different than current design	• New structures will be steel H-frame and 3-pole structures designed in accordance with the current NESC requirements

Evaluated Solution Alternatives

Alternative 2

Base Alternative, but Replace Copperweld Shield Wire with Optical Ground Wire (OPGW)	
Description	• Replace 12 priority C structure and 5 priority B overstressed structures • Add cross-bracing for 29 overstressed structures • Replace 9.1 miles of Copperweld shield wire with 2 runs OPGW (18.2 miles)
Primary needs addressed	• Yes, category C structures, overstressed structures and shield wire concerns are addressed
Secondary needs addressed	• Yes, future telecommunication needs are addressed
Advanced transmission technologies to be considered	• None • No advanced transmission technologies are applicable to degraded structures
Cost estimate and accuracy	**$18.211 M (-25%, +50%)** • $402k, Incremental material cost of OPGW over Alumoweld • $1.4M, cost for substation telecommunication terminations
Longer-term transmission needs addressed	• N/A
Key standards or criteria affecting design if different than current design	• New structures will be steel H-frame and 3-pole structures designed in accordance with the current NESC requirements

Evaluated Solution Alternatives

Alternative 3

Alternative 2, but Replace Structures That Require Cross-bracing	
Description	• Replace 12 priority C structure and 5 priority B overstressed structures • Replace 29 overstressed structures • Replace 9.1 miles of Copperweld shield wire with 2 runs OPGW (18.2 miles)
Primary needs addressed	• Yes, category C structures, overstressed structures and shield wire concerns are addressed
Secondary needs addressed	• Yes, future telecommunication needs are addressed
Advanced transmission technologies to be considered	• None • No advanced transmission technologies are applicable to degraded structures
Cost estimate and accuracy	**$25.745 M (-50%, +200%)**
Longer-term transmission needs addressed	• N/A
Key standards or criteria affecting design if different than current design	• New structures will be steel H-frame and 3-pole structures designed in accordance with the current NESC requirements

Comparative Analysis of Alternatives

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Comparison

Key Criteria	Alternative 1	Alternative 2	Alternative 3
Addresses primary need	Yes	Yes	Yes
Addresses secondary need	No	Yes	Yes
Cost	**$16.336 M (-25%, +50%)**	**$18.211 M (-25%, +50%)**	**$25.745 M (-50%, +200%)**
Constructability concerns or advantages	Good – no unusual problems anticipated	Good – no unusual problems anticipated	Good – no unusual problems anticipated
Siting, environmental and regulatory issues	• No issues anticipated	• No issues anticipated	• No issues anticipated

Conclusion

- Replacement of structures under Alternative 3 is not necessary as most of the structural issues can be addressed more cost-effectively by adding cross-bracing
- Alternatives 1 and 2 fully address the existing asset condition needs
- Alternative 2 provides the added benefit of adding a new, high-speed private telecommunication path where none exists today with limited additional cost
- Alternative 2 is the preferred solution

Schedule

Planned Schedule	
Start of Major Construction	Q4 2025
Project in Service	Q2 2026

Comment Submission	
Comment Deadline	August 7, 2025
ISO-NE Contact Email Address	pacmatters@iso-ne.com
Transmission Owner Contact Name	Dave Burnham
Transmission Owner Contact Email Address	PAC.Responses@eversource.com

Questions