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New Hampshire Asset Condition Structure Replacements – Lines 373, 385, 391

Planning Advisory Committee Meeting June 16, 2025

Introduction

- The following presentation includes three asset condition structure replacement projects on Lines 373, 385, and 391 from Scobie Pond substation (Londonderry, NH) through Deerfield substation (Deerfield, NH) to the Maine border (Central Maine Power)
- These lines run within the same Right-of-Way (ROW) and consist of H-frame and 3-pole structures
 - Since 2018, Eversource has performed 12 structure replacement projects within this ROW
 - Today, approximately 75% of the structures within the ROW are steel and 25% are original wood
- The three projects:
 - Address similar asset condition needs including structure decay, pole splitting, and woodpecker damage
 - Will provide mobilization and access efficiencies across the projects
 - Are being presented together using a modified presentation template in an effort to fully inform stakeholders of all activities within the ROW



Outline

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



Project Summary

Line 373 – Scobie Pond substation to Deerfield substation

| Project Drivers | | | |
|---|--|-------------------------|--|
| Inspections have identified multiple structure concerns including wood structure decay, pole top rot, cracking, and crossarm delamination | | | |
| Alternatives Considered | | | |
| Alternative | Description | Cost Estimate | |
| Alternative 1 | Base Alternative, replace all structures requiring immediate replacement | \$7.902 M (-50%, +200%) | |
| Alternative 2 | Same as Alternative 1, plus proximity structures | \$9.253 M (-25%, +50%) | |

| Preferred Alternative | | | |
|-----------------------|--|------------------------|--|
| Alternative | Reason for Recommendation | Cost Estimate | |
| Alternative 2 | Replace 27 total wood structures: 23 Category C wood structures and 4 Category B proximity structures Alternative 2 eliminates repeated disturbances to this ROW and avoids near-future project cost to replace remaining wood structures | \$9.253 M (-25%, +50%) | |

Project Summary



Line 385 – Deerfield substation to Maine border

Project Drivers

• Inspections have identified multiple structure concerns including wood structure decay, pole top rot, cracking, and crossarm delamination

| Alternatives Considered | | | |
|-------------------------|--|--------------------------|--|
| Alternative | Description | Cost Estimate | |
| Alternative 1 | Base Alternative, replace all structures requiring immediate replacement | \$10.592 M (-50%, +200%) | |
| Alternative 2 | Same as Alternative 1, plus proximity structures | \$13.410 M (-50%, +200%) | |
| Alternative 3 | Same as Alternative 2, plus last remaining wood structures on this line | \$16.456 M (-25%, +50%) | |

| Preferred Alternative | | | |
|-----------------------|---|-------------------------|--|
| Alternative | Reason for Recommendation | Cost Estimate | |
| Alternative 3 | Replace 54 total wood structures: 28 Category C wood structures, 12 Category B proximity structure, and 14 last remaining wood structures (Category B) Alternative 3 eliminates repeated disturbances to this ROW and avoids near-future project cost to replace remaining wood structures | \$16.456 M (-25%, +50%) | |



Project Summary

Line 391 – Scobie Pond substation to Maine border

| Project Drivers | | | |
|--|--|--------------------------|--|
| Inspections have identified multiple structure concerns including wood structure decay, pole top rot, cracking, and crossarm splitting | | | |
| Alternatives Considered | | | |
| Alternative | Description | Cost Estimate | |
| Alternative 1 | Base Alternative, replace all structures requiring immediate replacement | \$12.460 M (-50%, +200%) | |
| Alternative 2 | Same as Alternative 1, plus proximity structures | \$22.600 M (-50%, +200%) | |
| Alternative 3 | Same as Alternative 2, plus last remaining wood structures on this line | \$25.822 M (-25%, +50%) | |

| Preferred Alternative | | | |
|-----------------------|--|-------------------------|--|
| Alternative | Reason for Recommendation | Cost Estimate | |
| Alternative 3 | Replace 89 total wood structures: 36 Category C wood structures, 32 Category B proximity structures, and 21 last remaining wood structures (Category B) Alternative 3 eliminates repeated disturbances to this ROW and avoids near-future project cost to replace remaining wood structures | \$25.822 M (-25%, +50%) | |



Background Information

| Key Details | |
|----------------------------|--|
| Location | From: Scobie Pond Substation Londonderry, NH |
| | Deerfield, NH |
| Line Length | 18.6 miles |
| Operating Voltage | 345 kV |
| Age and Upgrade History | Originally constructed in 1969 Several structure replacements in recent years |
| Prior PAC Presentations | ACL 188: 2019 PAC Presentation ACL 282: 2021 PAC Presentation ACL 344: 2022 PAC Presentation ACL 390: 2023 PAC Presentation |

| Existing Structures | | | |
|---------------------|------------------------|--------|-----------|
| Material | Configuration | Number | Avg. age |
| Wood | Single circuit H-frame | 27 | 56 years |
| Steel | Single circuit H-frame | 150 | 1-9 years |

| Existing Conductor | | |
|--|------------|----------|
| Туре | Length | Avg. age |
| Twin bundled 850.8 ACSR 45/7 (Buzzard) | 18.6 miles | 56 years |



Background Information

Line 385

| Key Details | | |
|----------------------------|--|--|
| Location | From: Deerfield Substation Deerfield, NH | |
| | To: Buxton Substation (Line continues to Maine border) <i>Buxton, ME</i> | |
| Line Length | 18.7 miles (Eversource Portion) | |
| Operating Voltage | 345 kV | |
| Age and Upgrade History | Originally constructed in 1969 Several structure replacements in recent years | |
| Prior PAC Presentations | ACL 191: 2019 PAC Presentation ACL 346: 2022 PAC Presentation | |

| Existing Structures | | | |
|---------------------|------------------------|--------|------------|
| Material | Configuration | Number | Avg. age |
| Wood | Single circuit H-frame | 54 | 56 years |
| Steel | Single circuit H-frame | 115 | 1-14 years |

| Existing Conductor | | |
|--|------------|----------|
| Туре | Length | Avg. age |
| Twin bundled 850.8 ACSR 45/7 (Buzzard) | 18.7 miles | 56 years |



Background Information

| Key Details | | | |
|----------------------------|---|--|--|
| Location | From: Scobie Pond Substation Londonderry, NH | | |
| | To: Buxton Substation (Line continues to Maine border) <i>Buxton, ME</i> | | |
| Line Length | 37.3 miles (Eversource Portion) | | |
| Operating Voltage | 345 kV | | |
| Age and Upgrade History | Originally constructed in 1970 Several structure replacements in recent years | | |
| Prior PAC Presentations | ACL: 60 2017 Presentation ACL: 192 2019 PAC Presentation ACL: 347 2022 Presentation ACL: 389 2023 Presentation | | |

| Existing Structures | | | |
|---------------------|------------------------|--------|-----------|
| Material | Configuration | Number | Avg. age |
| Wood | Single-circuit H-frame | 89 | 55 years |
| Steel | Single-circuit H-frame | 246 | 2-9 years |

| Existing Conductor | | |
|--|------------|----------|
| Туре | Length | Avg. age |
| Twin bundled 850.8 ACSR 45/7 (Buzzard) | 37.3 miles | 55 years |



TIE TO BUXTON (CMP)

EASTPORT

ROCHESTER

Background Information

New Hampshire Map





FARMINGTON

BARNSTEAD

PITTSFIELD

EPSOM

-146

HILL

STRAFFORD



Project Needs and Drivers

Structure Concerns

| Structure Concerns | |
|------------------------------|---|
| Primary Concerns | |
| Wood structure deterioration | Recent inspections performed in 2024 have identified 87 wood structures with woodpecker damage, pole top rot, splitting poles, crossarm rot, and other forms of decay These structures must be replaced to maintain reliability and ensure ongoing integrity of the line Affected structures are on average 56 years old and are reaching the end of the typical useful life for 345 kV natural wood structures (40 – 60 years) |
| Secondary Concerns | |
| Category B structures | Category B structures are in close proximity to the work sites that will be required to replace the Category C structures All Category B remaining wood structures are original to the line installation and are approximately 56 years old |

| Summary of Current Structure Grades | | Structure Count by Transmission Line | | |
|-------------------------------------|--|--------------------------------------|-----|-----|
| Category | Recommended Action | 373 | 385 | 391 |
| A * | No replacement required due to deterioration | 150 | 115 | 246 |
| В | Consider replacement in conjunction with other structure replacements | 4 | 26 | 53 |
| с | Initiate planned structure replacement project or Replace as part of upcoming structure replacement project | 23 | 28 | 36 |
| D | Replace immediately (emergency replacement) | 0 | 0 | 0 |
| Total | | 177 | 169 | 335 |

*Newer steel structures were rated both A and B, in the latest inspections under Eversource's rating guidelines. All are listed as Category A here because no replacements are expected to be necessary due to deterioration for the foreseeable future

Project Needs and Drivers Structure Concerns



Line 373 Structure 180 Splits, checking







Line 385 Structure 82 Crossarm rot, decay

Line 385 Structure 17 Splits, cracking

Project Needs and Drivers Structure Concerns









Line 391 Structure 67 Pole top splits, cracks

Project Needs and Drivers Structure Concerns - Map



 Category C structures
 Proximity structures
 Last remaining wood structures

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Project Needs and Drivers

Other Concerns

| Other Concerns | |
|-------------------|----------------------------------|
| Conductors | No needs identified at this time |
| Insulators | No needs identified at this time |
| Shield Wire | No needs identified at this time |
| Planning | No needs identified at this time |
| Operational | No needs identified at this time |
| Telecommunication | No needs identified at this time |

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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, all three lines 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 373, 169.1% at 1663 MVA
 - Line 385, 189.8% at 1663 MVA
 - Line 391, 122.1% at 1663 MVA

Have modifications or upgrades to this line been identified as potential solutions in any of those studies?

No



| Base Alternative, Replace Category C Structures | | |
|--|---|--|
| Description | Replace the 87 Category C wood structures Line 373 – 23 C structures Line 385 – 28 C structures Line 391 – 36 C structures | |
| Primary needs addressed | Yes, Category C structure concerns are addressed | |
| Secondary needs addressed | • No | |
| Advanced transmission technologies to be considered | None No advanced transmission technologies are applicable to degraded structures | |
| Cost estimate and accuracy | Line 373 – \$7.902M (-50%, +200%) Line 385 – \$10.592M (-50%, +200%) Line 391 – \$12.460M (-50%, +200%) | |
| Longer-term transmission needs addressed | • N/A | |
| Key standards or criteria affecting design if different than current design | None New structures will be Steel H-frame and 3-pole designs | |



| Base Alternative, Plus Proximity Structures | | |
|--|---|--|
| Description | 135 total structure replacements Replace the 87 Category C wood structures Replace 48 Category B proximity structures due to permitting and its location along the access route and work area Line 373 – 23 Category C, 4 proximity B structures Line 385 – 28 Category C, 12 proximity B structures Line 391 – 36 Category C, 32 proximity B structures | |
| Primary needs addressed | Yes, Category C structure concerns are addressed | |
| Secondary needs addressed | Yes, some Category B structure concerns are addressed | |
| Advanced transmission technologies to be considered | None No advanced transmission technologies are applicable to degraded structures | |
| Cost estimate and accuracy | Line 373 – \$9.253M (-25%, +50%) Line 385 – \$13.410M (-50%, +200%) Line 391 – \$22.600M (-50%, +200%) | |
| Longer-term transmission needs addressed | • N/A | |
| Key standards or criteria affecting design if different than current design | None New structures will be Steel H-frame and 3-pole designs | |



| Alternative 2 (Line 373), Plus Last Remaining Wood Structures (Line 385 and 391) | | |
|--|--|--|
| Description | 170 total structure replacements and Line 373 – 23 Category C, 4 proximity Category B, 0 last remaining wood structures Alternative 3 same as alternative 2, there are no additional last remaining wood structures for line 373 Line 385 – 28 Category C, 12 proximity Category B, 14 last remaining wood structures (Category B) Line 391 – 36 Category C, 32 proximity Category B, 21 last remaining wood structures (Category B) | |
| Primary needs addressed | Yes, Category C structure concerns are addressed | |
| Secondary needs addressed | Yes, all Category B structure concerns are addressed | |
| Advanced transmission technologies to be considered | None No advanced transmission technologies are applicable to degraded structures | |
| Cost estimate and accuracy | Line 373 – \$9.253M (-25%, +50%) Line 385 – \$16.456M (-25%, +50%) Line 391 – \$25.822M (-25%, +50%) | |
| Longer-term transmission needs addressed | • N/A | |
| Key standards or criteria affecting design if different than current design | None New structures will be Steel H-frame and 3-pole designs | |



| Alternative 3, Plus reconductoring | Alternative 3, Plus reconductoring | | |
|--|---|--|--|
| Description | 74.6 total miles of reconductoring of bundled 1590 ACSS 54/19 Falcon All new structures proposed for installation in Alternatives 1, 2, and 3 can support bundled 1590 ACSS 54/19 Falcon with no further modifications However, some existing structures would need to be replaced under this alternative | | |
| Primary needs addressed | Yes, Category C structure concerns are addressed | | |
| Secondary needs addressed | Yes, all Category B structure concerns are addressed | | |
| Advanced transmission technologies to be considered | • None | | |
| Cost estimate and accuracy | • Cost estimates were not produced for this alternative as this is no primary need to replace the existing conductor | | |
| Longer-term transmission needs addressed | • N/A | | |
| Key standards or criteria affecting design if different than current design | None New structures will be Steel H-frame and 3-pole designs Bundled 1590 ACSS 54/19 Falcon is consistent with Eversource standard design criteria for new 345 kV line construction | | |

Comparative Analysis of Alternatives



Comparison

| Key Criteria | Alternative 1 | Alternative 2 | Alternative 3 |
|---|--|---|---|
| Addresses primary need | Yes | Yes | Yes |
| Addresses secondary need | No | Yes (Proximity structures) | Yes (Proximity + last remaining wood) |
| Cost | Line 373 - \$7.902M (-50%, +200%) Line 385 - \$10.592M (-50%, +200%) Line 391 - \$12.460M (-50%, +200%) | Line 373 – \$9.253M (-25%, +50%) Line 385 – \$13.410M (-50%, +200%) Line 391 – \$22.600M (-50%, +200%) | Line 373 – \$9.253M (-25%, +50%) Line 385 – \$16.456M (-25%, +50%) Line 391 – \$25.822M (-25%, +50%) |
| Constructability concerns or advantages | Good – no unusual problems anticipated | Good – no unusual problems anticipated | Good – no unusual problems anticipated |
| Siting, environmental and regulatory issues | • Resolves immediate structure issues but does not minimize repeated future disturbances within the same section of the ROW by leaving Category B structures located in close-proximity to the work sites | • Minimizes repeated near-future disturbances within the same section of the ROW by replacing 48 Category B structures located in close-proximity to the work sites | • Eliminates repeated future disturbances within the same ROW while taking advantage of the significant access effort, engineering permitting, outreach, etc. by replacing 48 Category B proximity and 35 last remaining wood structures |

Cost Drivers

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- Total access costs to support the three projects are estimated to be \$10.5M
 - The right of way contains many challenges, such as significant number of wetlands, terrain challenges, matting requirements, archeological sensitive areas, and corresponding permitting
 - Taking advantage of a single mobilization effort creates cost efficiencies relative to smaller, separate projects
- Under Alternative 1, the average cost per structure replacement is \$356k
- Under Alternative 2, the incremental cost to replace proximity structures is approx. \$298k per structure
- Under Alternative 3, the incremental cost to replace all remaining wood structures is approx. \$179k per structure



Conclusion

- Alternative 2 would replace all Category C structures and Category B proximity structures
 - o 5% of structures on ROW would remain as wood, with an average age of 56 years
 - Construction fatigue has been a growing concern within the communities we serve along this ROW, as Eversource has been performing structure replacements on a nearly continuous basis on this ROW for the past 7 years
- Alternative 3 would replace all remaining wood structures
 - This alternative would replace the remaining 5% of 56-year-old Category B wood structures that are anticipated to continue to decline and require replacement in the near future
 - Eliminates repeated structure replacement projects on this ROW and avoids additional future project costs to replace remaining wood structures
 - Incremental cost of additional structure replacements compared to Alternatives 1 and 2 is low

Alternative 3 is the preferred solution

Schedule

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| Planned Schedule | | |
|-----------------------------|--------------------|--|
| Start of Major Construction | Line 373 – Q1 2026 | |
| | Line 385 – Q1 2026 | |
| | Line 391 – Q1 2026 | |
| Project in Service | Line 373 – Q1 2028 | |
| | Line 385 – Q1 2028 | |
| | Line 391 – Q1 2028 | |

Potential deferral to accommodate Longer-Term Transmission Planning (LTTP) RFP

- Eversource recognizes that proposals in the LTTP RFP could include upgrades to these lines (i.e. corollary upgrades)
- Eversource has confirmed that new structures planned for installation as part of these projects can support future reconductoring with bundled 1590 ACSS 54/19 Falcon conductor, which is significantly larger than the existing bundled 850.8 ACSR 45/7 Buzzard
- If necessary, Eversource will defer the planned structure replacements until ISO-NE determines whether any upgrades associated with LTTP proposals will be needed on these lines

| Comment Submission | |
|--|------------------------------|
| Comment Deadline | July 1, 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

