

1191 115-kV Line Copper Conductor Replacement and Wood Pole Asset Condition Project

Planning Advisory Committee Meeting

August 27th, 2020

Agenda

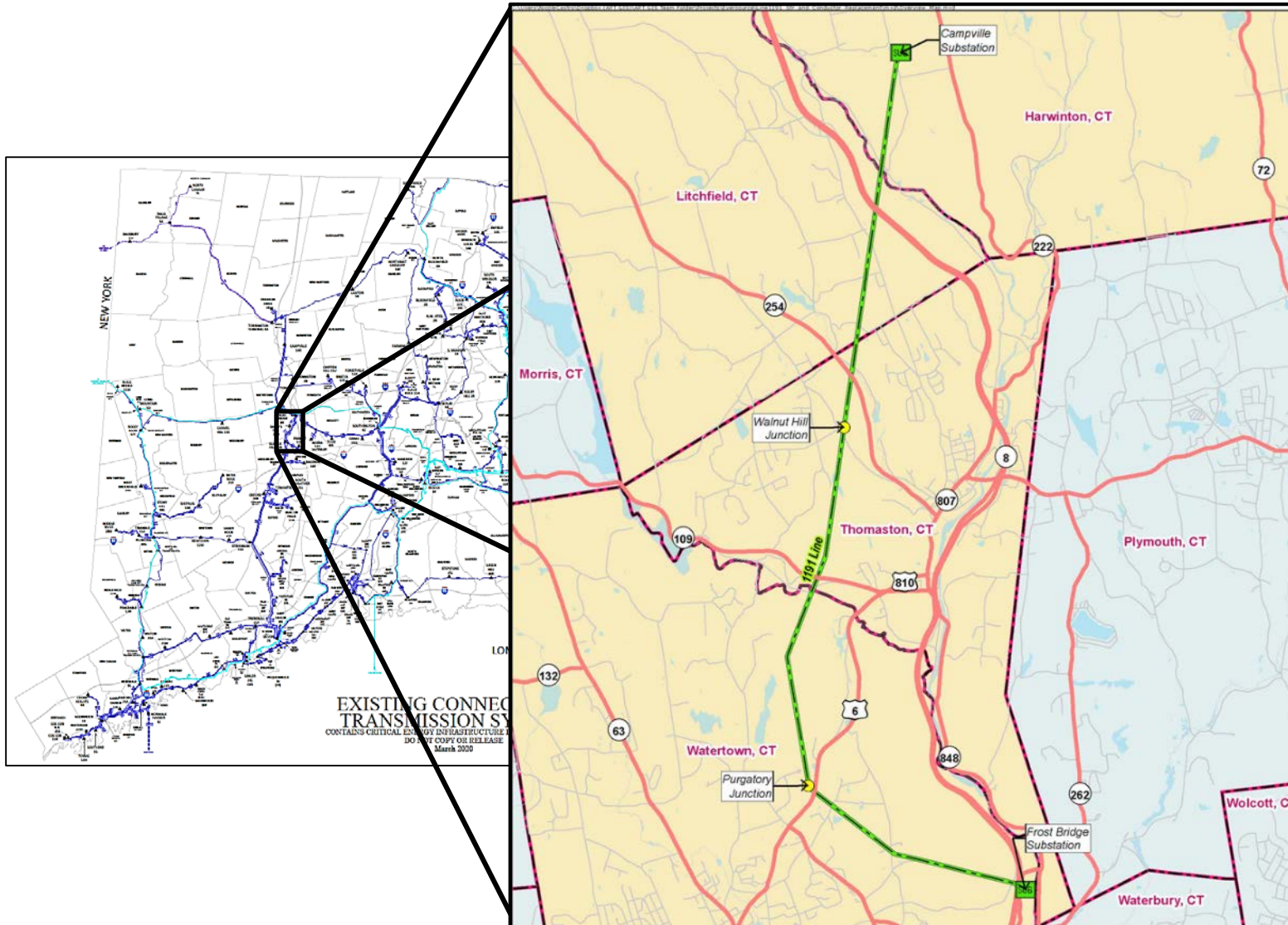
- Project Background
- Project Location
- Project Needs
- Project Scope
 - Preferred Solution
 - Alternatives
- Summary

Project Background

- The 1191 115-kV line is 10.3 miles long and runs between the Campville 14R (Harwinton, CT) and Frost Bridge 8R (Watertown, CT)
- Originally constructed in 1933 as two parallel lines operated at 27.6 kV
- The lines were bundled and reconfigured to a single 115-kV transmission line in 1957



Project Location



Project Needs – Asset Condition – Copper Conductor

- Existing 2/0 copper conductor and 3/8” copperweld shield wires are obsolete and susceptible to failure due to thermal rating degradation and degradation due to environmental factors
- 2/0 copper conductor used is no longer used for transmission purposes
- Hardware for 2/0 copper conductor is not readily available, and non-traditional repair methods have to be employed



Project Needs – Asset Condition – Copper Conductor

- National Electric Energy Testing, Research and Applications Center (NEETRAC) Report on Similar 1779 115-kV Line (~96 years old)
- Test Results Indicate:
 - Aluminum strands exhibit significant oxidation
 - Steel core exhibits significant corrosion
 - Average aluminum strand tensile strength has deteriorated to 81% of ASTM required value
 - Average steel core tensile strength has deteriorated to 89% of American Society for Testing and Materials (ASTM) required value
 - Conductor resistance has increased by 6.5%, failing to meet ASTM required value

Project Needs – Asset Condition – Copper Conductor



Project Needs – Asset Condition – Structure Replacement

- Nearly all structures cannot support new conductor and OPGW due to loading requirements
- 30% of the structures are priority C and have known defects
- Priority C (moderate defect) structures have one or more of the following deficiencies:
 - Woodpecker damage
 - Pole top rot
 - Cracked arms
 - Split pole top
 - Decay
- Other structures do not adhere to Eversource design standards for uplift and clearance



Project Scope – Preferred Solution

- Replace 96 wood H-Frames and one lattice tower with new single-circuit weathering steel vertical monopole structures
 - Four structures will be completely removed in order to optimize the line
- Reconductor the 1191 115-kV Line from Frost Bridge to Campville Substations with 1272-kcmil ACSS
- Replace shield wire with OPGW and terminate in the Frost Bridge & Campville Control Houses

Project Scope – Alternatives

- Replace only Priority C structures
 - Does not address concerns of aging and obsolete copper materials
 - Does not allow for replacement of shield wire due to increased loading
- Replace only Priority C structures, copper conductor, and copperweld shield wire
 - Not feasible - introduction of new conductor requires replacement of all structures due to increased loading
- Replace structures with steel H-Frames instead vertical monopoles
 - Does not comply with National Electrical Safety Code horizontal blowout requirements

Note: Structures are Graded in Accordance with EPRI Guidelines

- A: Nominal Defect - No action required.
- B: Minimal Defect - Monitor degradation
- C: Moderate Defect - Repair or replace under next maintenance
- D: Severe Defect - Repair, reinforce, or replace immediately

Summary

- Rebuild the 1191 Line structures from wood H-frames to single-circuit, weathering steel monopoles
- Replace all copper conductor with 1272-kcmil ACSS
- Replace 3/8" copperweld shield wires with OPGW
- Pull and terminate OPGW into the Frost Bridge & Campville substations

Estimated Cost = \$38.05 Million (-25% / +50%)

Projected In-service date: Q2 2022

Questions

