DOCKET NO. 466 - The Connecticut Light & Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton, which consists of (a) construction, maintenance and operation of a new 115-kV overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4 mile segment of two existing 115-kV electric transmission lines across the Naugatuck River in the Towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV electric transmission line.	} } }	Connecticut Siting Council April 14, 2016

Findings of Fact

Introduction

1. Pursuant to Connecticut General Statutes (C.G.S.) §16-50g et seq., on December 23, 2015, The Connecticut Light and Power Company doing business as Eversource Energy (Eversource), applied to the Connecticut Siting Council (Council) for a Certificate of Environmental Compatibility and Public Need for the Frost Bridge to Campville 115-kilovolt (kV) electric transmission line project that traverses the municipalities of Watertown, Thomaston, Litchfield, and Harwinton, which consists of (a) construction, maintenance and operation of a new 115-kV predominantly overhead electric transmission line entirely within existing Eversource right-of-way and associated facilities extending approximately 10.4 miles between Eversource's existing Frost Bridge Substation in the Town of Watertown and existing Campville Substation in the Town of Harwinton; (b) related modifications to Frost Bridge Substation and Campville Substation; and (c) reconfiguration of a 0.4 mile segment of two existing 115-kV electric transmission lines on common structures across the Naugatuck River in the Towns of Litchfield and Harwinton within the same existing right-of-way as the new 115-kV electric transmission line (Project). (Eversource 1, Vol. 1, p. ES-1)

2. The purpose of the Project is to bring the electric supply system in northwest Connecticut into compliance with applicable national and regional reliability standards and criteria by eliminating potential thermal overloads and voltage violations identified in studies conducted by the Independent System Operator in New England (ISO-NE). (Eversource 1, Vol. 1, p. ES-1)

3. The parties in this proceeding are Eversource and the Office of Consumer Counsel (OCC). (Transcript, February 23, 2016, 2:00 p.m. [Tr. 1], pp. 5-6, 21; Transcript, March 1, 2016, 3:30 p.m. [Tr. 2], pp. 26, 80)

4. Pursuant to C.G.S. §16-50*l*(b), Eversource provided legal service and notice of the application. This included notice to municipalities traversed by the proposed Project; municipalities within 2,500 feet of the proposed Project; federal, state, local and regional agencies, elected officials, and abutters of both substations. Eversource published notice of the application filing in the Litchfield County Times on December 11 and 18, 2015, Waterbury Republican-American on December 15 and 17, 2015, and the Torrington Register Citizen on December 15 and 19, 2015. Eversource included a project information insert in one or more of its monthly bills to customers within Watertown, Thomaston, Litchfield and Harwinton within 60 days before submission of the application to the Council. (Eversource 1, Vol. 1,

pp. FR-8-10, Affidavit of Service of Application; Affidavit Regarding Publication of Legal Notice; Affidavit Regarding Notice Provided to Customers of CL&P d/b/a Eversource; Affidavit Regarding Notice to Community Groups; Affidavit of Service of Notice Upon Owners of Property Abutting Substations)

5. On or before December 18, 2016 Eversource notified property owners abutting both substations through certified mailings. Eversource received all certified mailing return receipts. (Eversource 2, R. 19)

6. In accordance with the Council's Application Guide for an Electric and Fuel Transmission Line Facility, Eversource provided notice to a number of community groups including applicable economic development commissions, land trusts, environmental groups, river protection organizations, historic preservation groups, and water companies with watersheds within the Project area. (Eversource 1, Vol. 1, pp. FR-8-10, Affidavit Regarding Notice to Community Groups)

7. Pursuant to C.G.S. §16-50*l*(b), Eversource served a copy of the application for the proposed Project on federal, state, regional and local officials listed therein. (Eversource 1, Vol. 1, pp. FR-18-19; Affidavit of Service of Application)

Council Procedures

8. On December 28, 2015, the Council sent a letter to the State Treasurer, with copies to the Chief Elected Officials of Litchfield, Harwinton, Watertown, Thomaston, Waterbury, and Plymouth, stating that $25,000 was received from Eversource as payment to the Municipal Participation Fund (Fund) and deposited in the office of the State Treasurer's department account. The Fund is available for any or all of the municipalities to apply for as reimbursement to defray expenses incurred by the municipalities if they participated as a party in the proceeding, pursuant to C.G.S. §16-50bb. None of the subject municipalities applied for party status in the proceeding. (Record)

9. During a regular Council meeting on January 21, 2016, the application was deemed complete pursuant to Regulations of Connecticut State Agencies (R.C.S.A.) §16-50*l*-1a and the public hearing schedule was approved by the Council. (Record)

10. Pursuant to C.G.S. §16-50m, the Council published legal notice of the date and time of the public hearing in the Waterbury Republican-American on January 26, 2016. (Record)

11. Pursuant to C.G.S. § 16-50m, on January 22, 2016, the Council sent a letter to the Towns of Harwinton, Litchfield, Plymouth, Thomaston, Waterbury, and Watertown to provide notification of the scheduled public hearing and to invite each municipality to participate in the proceeding. (Record)

12. On February 3, 2016, the Council held a pre-hearing conference on procedural matters for parties and intervenors to discuss the requirements for pre-filed testimony, exhibit lists, administrative notice lists, expected witness lists, filing of pre-hearing interrogatories and the logistics of the public inspection of the Project. (Council pre-hearing conference memoranda dated January 27, 2016)

13. In compliance with R.C.S.A. §16-50j-21, Eversource installed twelve signs throughout the Project area that presented the type of facility proposed, the public hearing date, and contact information for the Council. (Eversource 3, p. 38)

14. Pursuant to C.G.S. §16-50m, the Council, after giving due notice thereof, held a public evidentiary hearing session on February 23, 2016, beginning at 2:00 p.m. at the Council's office at 10 Franklin Square, New Britain, Connecticut. (Council Hearing Notice dated January 22, 2016; Tr. 1, p. 1)

15. The Council and its staff conducted a field review of the proposed Project on March 1, 2016 beginning at 1:00 p.m. Eversource provided bus transportation to both substations and various locations along the proposed electric transmission line route. (Council Hearing Notice dated January 22, 2016; Eversource 6)

16. On March 1, 2016, the Council continued the public evidentiary hearing session beginning at 3:30 p.m. and held a public comment hearing session beginning at 6:30 p.m. at the Northfield Volunteer Fire Department, 12 Knife Shop Road, Litchfield, Connecticut. (Tr. 2, p. 16; Transcript, March 1, 2016, 6:30 p.m. [Tr. 3], p. 81)

Municipal Consultation and Community Outreach

17. Eversource began its outreach efforts to the Towns of Watertown, Harwinton, Thomaston and Litchfield in April 2015 by meeting with Town officials and providing a project overview presentation. (Eversource 1, Bulk File g)

18. Eversource presented materials to the Litchfield Board of Selectmen on May 19, 2015 and the Thomaston Board of Selectmen and the Harwinton Board of Selectmen on October 6, 2015. The Town of Watertown declined an offer to meet with Eversource. (Eversource Bulk File h; Eversource 3, p. 36)

19. Pursuant to C.G.S. §16-50*l*(e), Eversource delivered a Municipal Consultation Filing (MCF) to the Towns of Watertown, Harwinton, Thomaston and Litchfield in early September 2015 to begin the 60-day municipal consultation process. Additionally, copies of the MCF were provided to the Town of Plymouth and the City of Waterbury as they are within 2,500 feet of the proposed Project. (Eversource 1, Vol. 1, p. ES-10; Eversource 3, pp. 35-36)

20. Eversource sponsored two Community Open House events held on September 29 and 30, 2015 at the Northfield Volunteer Fire Department building in Litchfield and the Thomaston Town Hall. Both of the open houses included project information displays as well as public comment kiosks. Notice of the open house events were provided in mailings to properties along the proposed route and by publication of notice in area newspapers. (Eversource 1, Bulk File i; Eversource 3, p. 37)

21. Eversource responded to written public comments received at the open house presentations and forwarded a copy of the written public comments to the respective Towns. (Eversource 1, Bulk File j)

22. The MCF was posted on Eversource's website and was made available in the respective Town libraries. (Eversource 1, Vol. 1, p. ES-11)

23. The Council did not receive any correspondence from any of the Project municipalities. (Record)

State Agency Comment

24. Pursuant to C.G.S. § 16-50j (g), on January 22, 2016 and March 2, 2016, the following State agencies were solicited by the Council to submit written comments regarding the proposed facility: Department of Energy and Environmental Protection (DEEP); Department of Public Health (DPH); Council on Environmental Quality (CEQ); Public Utilities Regulatory Authority (PURA); Office of Policy and

Management (OPM); Department of Economic and Community Development (DECD); Department of Agriculture (DOAg); Department of Transportation (DOT); Connecticut Airport Authority (CAA); Department of Emergency Services and Public Protection (DESPP); and State Historic Preservation Office (SHPO). (Record)

25. The Council received a response from the DOT's Bureau of Engineering and Construction on February 22, 2016 indicating that a Highway Encroachment Permit would be required if any work, including project access, is conducted within a State right-of-way. (DOT Comment dated February 19, 2016)

26. The Council received a response from the DPH Drinking Water Section on January 15, 2016 indicating that the proposed Project does not appear to be located in a public water supply source water area. (DPH Comment dated January 15, 2016)

27. The Council received a response from DEEP on March 1, 2016 that contained a field description of the Project route, presented comment regarding the Project crossing of two DEEP properties (Mattatuck State Forest and Black Rock State Park) and applicable DEEP permit requirements. A revised Natural Diversity Database letter was attached to the DEEP comments approving the protection strategies for five State-listed species occurring along the Project route. (DEEP Comment received March 1, 2016)

28. The following agencies did not respond with comment on the application: CEQ, PURA, OPM, DECD, DOAg, CAA, DESPP, and SHPO. (Record)

System Planning and Mandatory Reliability Standards

29. The Federal Energy Policy Act of 2005 required the Federal Energy Regulatory Commission (FERC) to designate an Electric Reliability Organization (ERO) to develop and enforce a system of mandatory reliability standards for planning and operations of the bulk power electric system. Compliance with the standards is mandatory under federal law and violations are punished by fines. (Eversource 1, Vol. 1, p. 2-2)

30. FERC designated the North American Electric Reliability Corporation Inc. (NERC) to be ERO. As the ERO, NERC is charged with improving the reliability of the bulk-power electric system by developing mandatory reliability standards for planning and operations. (Eversource 1, Vol. 1, p. 2-2)

31. The Northeast Power Coordinating Council (NPCC) is a regional reliability council that was established to improve the reliability of the interconnected bulk power system in New York, the six New England states, and eastern Canadian provinces. The US systems of the NPCC formed two regional reliability councils to ensure the reliability of their portions of the interconnected bulk-power electric system - ISO-NE, and New York Independent System Operator (NYISO). (Eversource 1, Vol. 1, p 2-2)

32. ISO-NE is responsible for power system planning, as well as grid operation and market administration in the six New England States. ISO-NE uses a ten-year planning horizon. It has adopted planning standards, criteria and procedures consistent with the standards and criteria established by NERC and the NPCC, designed to ensure that New England's electric system will provide adequate and reliable electric power. (Eversource 1, Vol. 1, p. 2-2, Vol. 4, ISO-NE Transmission Planning Technical Guide)

33. ISO-NE is responsible for the reliable and economical operation of New England's electric power system, which includes managing the comprehensive, long-term planning of the regional power system to identify the region's electricity needs and plans for meeting those needs. The planning process involves the preparation of an annual Regional System Plan (RSP) that provides forecasts of annual energy use and peak loads for a ten-year planning horizon; information about amounts, locations, and characteristics of market responses; and descriptions of transmission projects for the region that could meet the identified needs, as summarized in the RSP Project List. (Eversource Administrative Notice Item 3; Eversource Administrative Notice Item 4)

34. The RSP Project List is a summary of needed transmission projects for the region and includes the status of reliability transmission upgrades, market efficiency transmission upgrades, elective transmission upgrades and generator interconnection upgrades. The proposed project is identified on the RSP Project List as a planned reliability transmission upgrade that received Proposed Plan Application/I.3.9 Approval from ISO on April 16, 2015 with a projected in service date of December 2018. (Eversource Administrative Notice Item 4)

35. As a transmission owner in New England, Eversource must comply with the reliability standards and criteria adopted by NERC, NPCC, and ISO-NE. These standards and criteria establish a set of performance tests or contingency simulations under which Eversource's electric transmission system must perform without experiencing overloads or voltage problems. (Eversource 1, Vol. 1, pp. 2-2 to 2-5, 2-15)

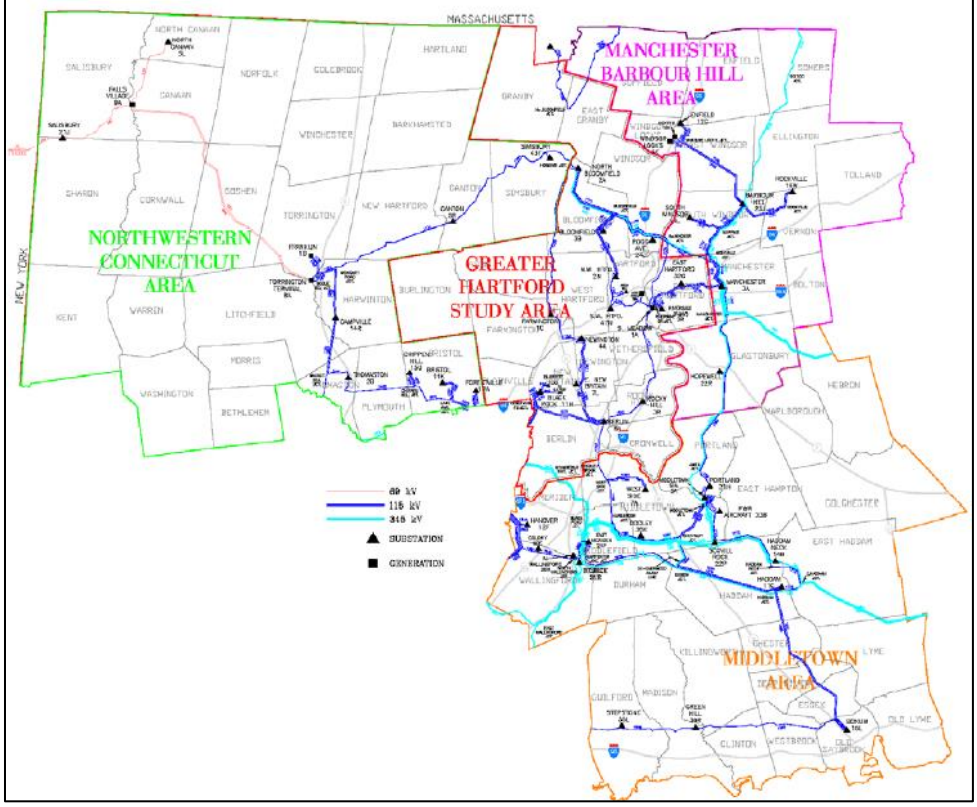
Project Need

36. The electric transmission needs addressed by the Project were identified by numerous ISO-NE planning studies that began in 2005 initially focused on potential future criteria violations on the 115-kV electric transmission system in the Greater Hartford area, ultimately resulting in the New England East-West Solution Plan (NEEWS), a comprehensive set of 345-kV transmission line improvements in CT, RI, and MA, including the Central Connecticut Reliability Project (CCRP). (Eversource 1, Vol. 1, p. 2-6)

37. In 2011, ISO-NE reconfigured the geographical scope of the Greater Hartford study by separating the area into four sub-areas: the Greater Hartford, Manchester – Barbour Hill, Middletown, and Northwestern Connecticut (NWCT) sub-areas. The study was re-named the Greater Hartford and Central Connecticut (GHCC) study area that consists of about 35 percent of CT electric load. The sub areas are shown below. (Eversource 1, Vol. 1, p. 2-6, 2-7, Vol. 4, ISO-NE GHCC Needs and Solutions Studies; Eversource Administrative Notice Item 4, p. 104)

(continued next page)

Figure 2-1: Greater Hartford Central Connecticut Study Area



(Eversource 1 Vol. 1, p. 2-7)

38. To study the four sub-areas within the GHCC, ISO-NE formed a working group of transmission planners from ISO-NE, Eversource, and the United Illuminating Company. (Eversource 1, Vol. 1, p. 2-7)

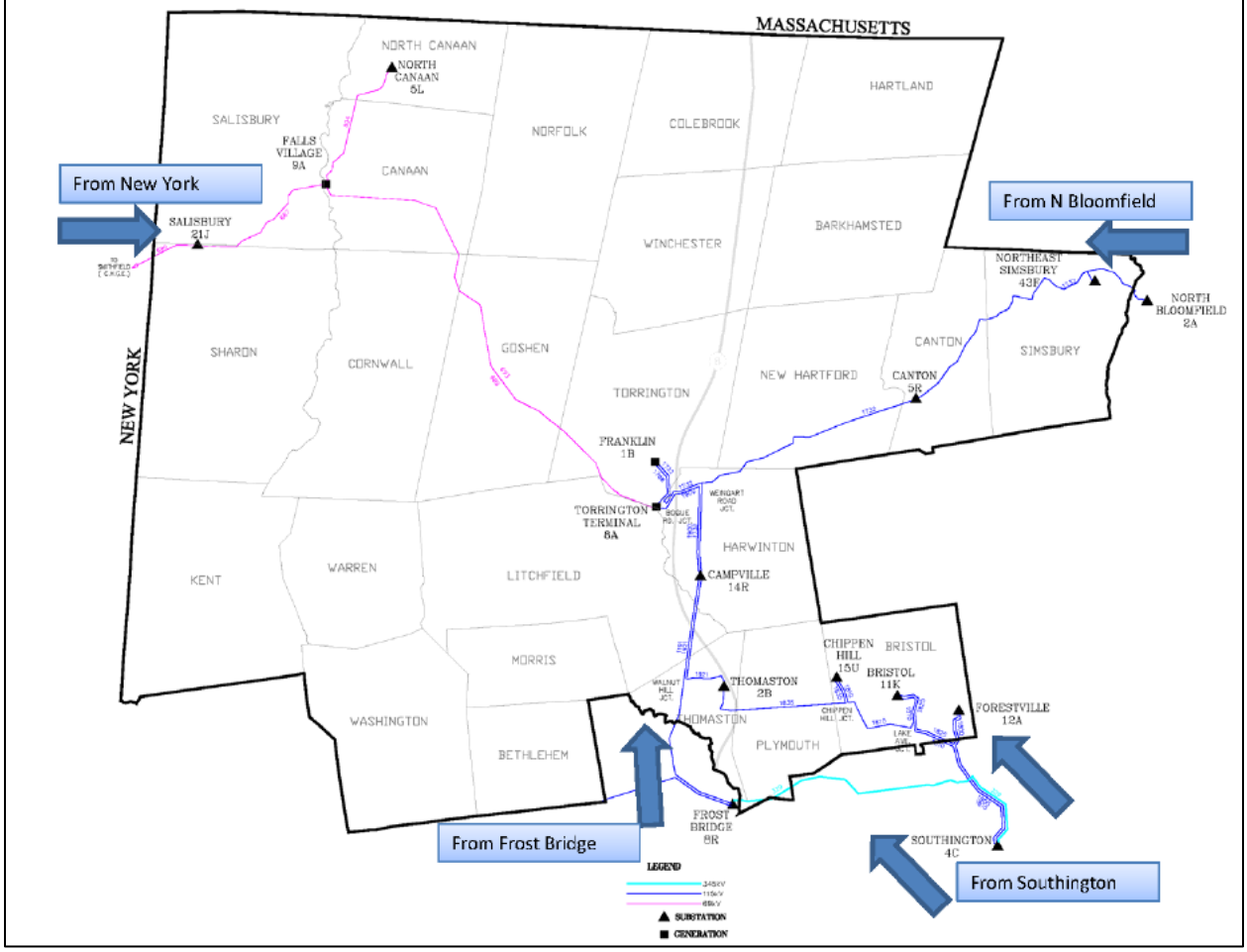
39. The grouping of the sub-area needs into a single study was to assure that identified needs and solutions were sufficiently examined in a cost efficient and coordinated manner. (Eversource 1, Vol. 1, p. 2-14)

40. The GHCC studies considered potential interdependencies in the load serving needs and potential solutions for the four sub-areas. ISO-NE published the results of the needs assessment study in May 2014 (GHCC Needs Report), which considered electric system needs in each sub-area in study year 2022 consistent with ISO-NE's ten year planning horizon. (Eversource 1, Vol. 1, p. 2-8, Vol. 4 Needs Study)

41. The GHCC Needs Report determined that the solutions for the sub-areas could be analyzed independently because the needs in each sub-area were largely driven by criteria violations following the loss of critical 115-kV sources into each sub-area. (Eversource 1, Vol. 4 Needs Study)

42. The GHCC needs report identified the NWCT sub-area as a load pocket which is an area that has insufficient generation and/or transmission to serve its electric load. The NWCT sub-area is a net importer of electricity as it relies on the surrounding areas to serve its local electric load, as shown in the figure below. (Eversource 1, Vol. 1, p. 2-9, Vol. 4 Needs Study)

Figure 2-2: Northwest Connecticut Sub-Area



The above diagram shows transmission connections to the NWCT sub-area load pocket (blue arrows). Three 115-KV connections occur from the south and east (blue lines). One 69-kV connection is from New York, west of the area (pink line). (Eversource 1, Vol. 1, p. 2-10)

43. The GHCC studies revealed criteria violations in the NWCT sub-area load pocket. ISO-NE calculates a year of need for system improvements by estimating when the critical load level, the level at which criteria violations begin to occur, will be reached. The projected year 2022 NWCT sub-area net load without demand sources is approximately 509 MW. (Eversource 1, Vol. 1, p. 2-9 to p. 2-12)

44. The GHCC Needs Report determined the existing electric system is insufficient to reliably serve peak load customer demands in the NWCT load pocket under contingency events. The study identified failures in reliability for various transmission elements and facilities, leading to thermal overloads and voltages falling below acceptable limits. The worst-case condition was identified as the loss of two or more electric import paths into the NWCT sub-area. (Eversource 1, Vol. 1, p. 2-12)

45. In early 2015, ISO-NE published the GHCC Solutions Report to address the electric system deficiencies identified in the GHCC Needs Report that are largely driven by load-serving issues following the loss of critical 115-kV sources into each sub-area. (Eversource 1, Vol. 1, pp. 2-8, 2-14, 10-2; Eversource 3, p. 17)

46. The proposed Project would implement an important component of long-range plans for the expansion of Connecticut's electric power grid in the GHCC study area as the proposed Project is an outgrowth of the NEEWS studies that began in 2006 and of the Greater Hartford area study that began in 2010. The need for the Central Connecticut Reliability Project of NEEWS and the load serving needs of the Greater Hartford, Manchester-Barbour Hill, Middletown and NWCT sub-areas were examined together in the GHCC Needs Analysis. Furthermore, ISO-NE has been examining transmission needs in Southwest Connecticut (SWCT) and has coordinated the GHCC and SWCT studies to avoid redundant solutions. Together, these studies provide solutions for Connecticut's transmission system that will comply with reliability requirements through 2022 and that form a part of the ISO RSP. (Eversource 1, p. 2-14)

47. The GHCC Solutions Study identified the addition of a 115-kV line between Frost Bridge and Campville substations, the separation of the 115-kV lines between Frost Bridge and Campville and from Campville to Thomaston and the addition of a 115-kV breaker at Campville Substation as preferred solutions for the NWCT subarea. (Eversource Administrative Notice Item 4, p. 104)

48. For the NWCT sub-area, a new 115-kV transmission source into the area was identified as the preferred solution to address the worst case thermal and voltage violations that resulted from the loss of two transmission sources into the sub-area. (Eversource 1, Vol. 1, pp. 2-13, 10-2)

49. The proposed Project would bring a new source of power from a substation outside of the load pocket (Frost Bridge Substation) to a substation within the load pocket (Campville Substation). This additional import source would allow for the re-distribution and supply of power into the sub-area if other electrical system elements fail. (Eversource 1, Vol. 1, p. 2-13; Eversource 3, pp. 15-16)

50. The proposed Project would also eliminate a potential single contingency from the loss of two existing transmission lines that share a common structure (double circuit tower line) where they cross the Naugatuck River at the town boundary of Litchfield and Harwinton. The river crossing would be reconfigured by installing new poles so that each line is supported by its own set of structures. (Eversource 1, Vol. 1, pp. 2-13 to p. 2-15)

51. The Project would address identified violations of reliability criteria and assist in maintaining the reliability of the Connecticut bulk electric transmission system in accordance with mandatory federal and regional standards and criteria. (Eversource 1, Vol. 1, p. 2-15)

52. After a review of the Solutions Report by the Reliability Committee, on April 16, 2015, ISO-NE issued a technical approval of the preferred solutions contained within the report including transmission improvements to the NWCT sub-area. (Eversource 1, Vol. 1, p. 2-8)

53. The proposed Project was listed in Eversource's *2015 Forecast of Loads and Resources for the Period 2015-2024* as a proposed 115-kV transmission line from Frost Bridge Substation to Campville Substation. (Eversource Administrative Notice Items 40 -43 – Eversource Forecast Reports)

54. The proposed Project was listed in the Council's *2014/2015 Review of the Ten Year Forecast of Connecticut Electric Loads and Resources* as a proposed 10.4 mile 115-kV transmission line from Frost Bridge substation to Campville substation with an in service date of 2017. (Council Administrative Notice Item 30, Appendix B)

55. The Project is consistent with the *Conservation and Development Policies Plan for Connecticut 2013-2018*. It will serve a public need for a reliable source of electricity to support development in Connecticut's

Regional Centers. Torrington and Bristol are Regional Centers within the Northwest Connecticut Sub-Area. (Council Administrative Notice Item 48; Eversource 1, Vol. 1, p. 5-35)

56. Two regional planning agencies, the Naugatuck Valley Council of Governments and the Northwest Hills Council of Governments, have member municipalities served by the Project. The Project is consistent with the goals of these agencies by providing a reliable electric system to the region. (Eversource 1, Vol. 1, p. 5-35)

57. Connecticut's Comprehensive Energy Strategy (CES) proposes further investments in grid reliability and identifies three important components to grid reliability: resource adequacy, transmission security and distribution resiliency. (Council Administrative Notice Item 40, pp. 71, 97)

Project Cost

58. The estimated capital cost of the Project is $51 million, with the transmission line accounting for $46 million and the substation modifications $5 million. (Eversource 1, Vol. 1, p. 3-23)

59. The cost of the Project is anticipated to be regionalized with Connecticut ratepayers paying approximately 25 percent of the Project cost. Any additional cost incurred for local requirements would be expected to be paid by Connecticut ratepayers. (Eversource 3, p. 17)

60. The life-cycle cost for the transmission line portion of the Project would be $76.4 million. This total would include annual carrying charges of the capital cost, annual operation and maintenance costs, cost of energy losses, and cost of capacity. (Eversource 1, Vol. 1, p. 3-23)

61. Project construction is anticipated to begin in the second quarter of 2017. The tentative in-service date is June 2018. (Eversource 3, p. 17)

Project Alternatives

62. A "no-action" alternative would not improve the reliability of the electric system in the NWCT sub-area, subjecting the area to continued risk of electric outages as well as undermining ISO-NE long range reliable transmission planning for Connecticut and New England. Eversource could be fined by FERC for failure to correct the identified criteria violations. (Eversource 1, Vol. 1, p. 10-1)

63. In addition to the proposed Project, two other alternative 115-kV overhead solutions were studied to bring power into the NWCT sub-area: North Bloomfield to Campville and North Bloomfield to Canton. (Eversource 1, Vol. 1, p. 10-2)

64. The North Bloomfield Substation to Campville Substation alternative was rejected early in the alternative route analysis due to its 25 mile length which would be more costly and cause more environmental impact than the proposed Project. (Eversource 1, Vol. 1, p. 10-4)

65. The North Bloomfield Substation to Canton Substation alternative was examined in more detail due its relatively similar length to the proposed Project route, 12.8 miles to 10.4 miles, respectively. Ultimately, this alternative was rejected given its cost, estimated to be $23 million higher than the proposed Project. The higher cost was due to its longer length and the greater number of environmental resources that would be impacted when compared to the proposed route. Additionally, more costly substation improvements would be required to improve voltage conditions. (Eversource 1, Vol. 1, pp. 10-4 to 10-6)

66. An 11.2 mile underground 115-kV transmission cable system alternative route that followed existing roadways between the Frost Bridge and Campville Substations was examined and rejected due to an estimated project cost of $328 million. In addition, the estimated life-cycle cost for the underground line is $432 million whereas the estimated life-cycle cost of proposed Project is $76.4 million. (Eversource 1, Vol. 1, p. 3-23; Eversource 3, pp. 19-20)

67. A hybrid 7.8 mile underground/2.0 mile overhead alternative route using roadways and existing transmission right-of-way between the Frost Bridge and Campville Substations was examined and rejected due to an estimated project cost of $264 million. (Eversource 3, pp. 19-20)

68. Non-transmission alternatives were examined including the addition of gas-fired turbines within the load pocket, energy storage, fuel cells and energy efficiency measures. The best non-transmission alternative solution to meet the identified need within the load pocket is the construction of a 180 MW combined-cycle natural gas fueled turbine generator at Campville Substation and the installation of 54 MW of peaking generation units at Torrington Substation. This potential solution was rejected due to its high cost to Connecticut ratepayers, estimated to be at least eight times greater than the cost of the proposed Project. (Eversource 1, Vol. 1, pp. 10-8 to 10-9; Eversource 3, p. 23)

Project Description

69. The proposed Project entails the installation of a new 115-kV electric transmission line, designated as Line 1304, and related improvements as listed below:
    a) modifications of the Frost Bridge Substation in Watertown;
    b) installation of a 0.1 mile 115-kV underground transmission cable exit at the Frost Bridge Substation;
    c) installation of a 10.3 mile long 115-kV overhead transmission line within existing Eversource right-of-way in Watertown, Thomaston, Harwinton and Litchfield to the Campville Substation in Harwinton and reconfiguration of existing electric transmission line support structures that span the Naugatuck River at the Litchfield and Harwinton town line; and
    d) modifications to the Campville Substation;

    Detail of each portion of the Project is described in the following subsections. (Eversource 1, Vol. 1, p. 3-1)

Frost Bridge Substation Modifications

70. The existing Frost Bridge Substation is located on a 128-acre parcel owned by Eversource in eastern Watertown. The existing developed substation area is 5.7 acres. (Eversource 1, Vol. 1, p. 3-17)

71. Eversource proposes to modify the substation by expanding the existing one-position 115-kV bay to a two-position 115-kV bay, install a new 115-kV circuit breaker, two switches, three lightning arrestors, three capacitor voltage transformers and one wave trap. New equipment would also be installed within the existing control house. These modifications would be performed within the existing fenced area of the substation. (Eversource 1, Vol. 1, p. 3-17)

72. A 76-foot tall steel 115-kV transition structure would be installed adjacent to the east and outside of the substation fence to connect the new transmission line to an existing terminal structure. (Eversource 1, Vol. 1, p. 3-17; Eversource 1, Vol. 5, Appendix 4B)

73. A second steel terminal structure, 106 feet tall, would be installed outside of the west substation fence to carry the new transmission line over Frost Bridge Road and Route 8 to the existing right-of-way. (Eversource 1, Vol. 1, p. 3-17; Eversource 1 Vol. 5, Appendix 4B)

Proposed 115-kV Underground Transmission Cable

74. The proposed single-circuit underground 115-kV transmission system would consist of three cables (phases). Each phase would consist of one 5000-kcmil copper conductor cable surrounded by cross-linked polyethylene (XLPE) insulation. (Eversource 1, Vol. 1, p. 3-3)

75. The cables would be installed within polyvinyl chloride (PVC) ducts encased in concrete. A fourth duct would be installed to allow for future use by a replacement cable if the need arises. (Eversource 1, Vol. 1, p. 3-4)

76. Three fiber optic cables would be installed within the duct bank for transmission cable protection, control and monitoring. (Eversource 1, Vol. 1, p. 3-2, 3-4)

77. The line would be installed in two sections and joined at an underground splice vault. The underground splice vault would be installed on Eversource property and would allow the cable to be joined together and allow cable segments to be pulled through the conduit. (Eversource 1, Vol. 1, pp. 3-4 to 3-5)

78. The underground transmission line would extend from the proposed transition structure adjacent to the east side of the substation, traverse the southern portion of the substation compound, then extend along the western edge of the substation to the west transition structure (refer to Attachment 1). (Eversource 1, Vol. 5, Appendix 2B)

Proposed Overhead 115-kV Transmission Line

79. The proposed 115-kV overhead transmission line would consist of three sets of 1,590-kcmil phase conductors installed on weathering steel monopoles. The monopoles would typically be embedded into the ground. (Eversource 1, Vol. 1, p. 3-3, p. 3-6)

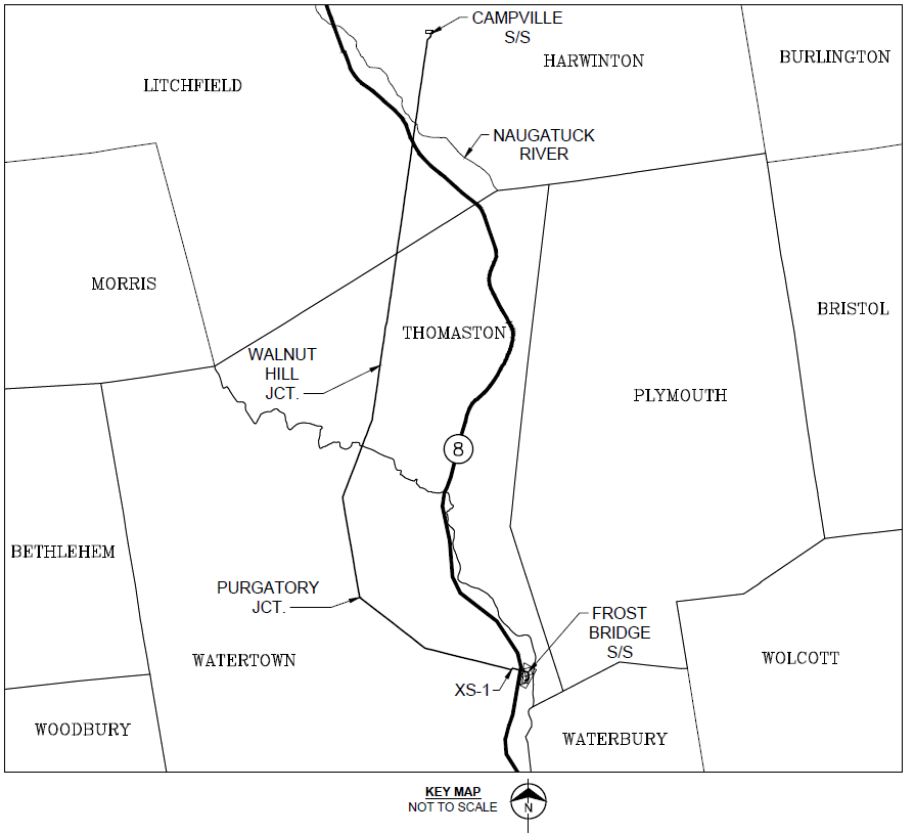
80. Most of the new monopoles would support conductors arranged in a delta configuration. Some areas would use a vertical configuration depending on existing right-of-way characteristics (refer to Attachment 2). (Eversource 1, Vol. 1, p. 3-6)

81. In general, the new monopoles would be 90 feet in height for the delta configuration and 105 feet in height for the vertical configuration. Local topography and area land use would account for variation in the final pole height. (Eversource 1, Vol. 1, p. 3-6; Eversource 1, Vol. 5 Appendix 4B)

82. The new monopoles generally would be installed in line with other existing Eversource structures in the right-of-way. The final location of the new poles would be determined by in-field conditions such as work area access, subsurface conditions or the presence of sensitive environmental features. (Eversource 1, Vol. 1, p. 3-6, 3-8)

83. The proposed transmission line would be located within existing Eversource right-of-way through the Towns of Watertown (4.5 miles), Thomaston (2.6 miles), Litchfield (1.8 miles), and Harwinton (1.3 miles). (Eversource 3, p. 7)

84. Sections of the right-of-way include Frost Bridge Road to Purgatory Junction in Watertown, Purgatory Junction to Walnut Hill Junction in Thomaston, and Walnut Hill Junction to Campville Substation in Harwinton, as shown below. (Eversource 1, Vol. 1, pp. 3-2, 3-5)



Frost Bridge Substation to Purgatory Junction

85. The existing right-of-way from Frost Bridge Road to Purgatory Junction is 400 feet wide and entirely cleared. This section of right-of-way extends for approximately 2.5 miles through Watertown. (Eversource 1, Vol. 1, p. 3-13; Eversource 1, Vol. 5, Appendix 1B)

86. The right-of-way contains three separate Eversource transmission lines, Line 352, a 345-kV transmission line attached to H-frame structures running along the north side of the right-of-way; Line 1191, a 115-kV transmission line mounted on H-frame structures installed near the center of the right-of-way, and Line 1238, a 115-kV transmission line mounted on steel monopoles running along the south side of the right-of-way. (Eversource 1, Vol. 1, p. 3-15; Eversource 1, Vol. 5, Appendix 1B)

87. In this section, Eversource proposes to install the new transmission line on 22 new vertical monopole structures located between Line 352 and Line 1191. (Eversource 1, Vol. 1, p. 3-15; Eversource 1, Vol. 5, Appendix 1B)

88. The new structures would range in height from 75 feet to 125 feet with a typical height of 105 feet. (refer to Attachment 3). (Eversource 1, Vol. 1, p. 3-15)

89. No clearing of mature forest areas would be required to install the new transmission line in this segment. (Eversource 1, Vol. 5, Appendix 1B)

90. Land use adjacent to the right-of-way includes commercial and industrial areas, agricultural land, a town park, and some residential development. The right-of-way traverses Route 8, Route 6, and various local roads. (Eversource 1, Vol. 1, p. 5-31)

Purgatory Junction to Walnut Hill Junction

91. The existing right-of-way from Purgatory Junction to Walnut Hill Junction is 250 feet wide and is cleared to a width of 90 feet. This section of right-of-way is 3.8 miles in length and extends through Watertown and Thomaston. (Eversource 1, Vol. 1, p. 3-15; Eversource 1, Vol. 5, Appendix 1B)

92. The right-of-way contains Line 1191 mounted on H-frame structures along the west side of the right-of-way. (Eversource 1, Vol. 1, p. 3-15; Eversource 1, Vol. 5, Appendix 1B)

93. The existing H-frame structures have a typical height of 50 feet. (Eversource 1, Vol. 5, Appendix 1B)

94. In this section, Eversource proposes to install the new transmission line on 39 new monopole structures south of Line 1191. The new line would typically be arranged in a delta configuration. (Eversource 1, Vol. 5, Appendix 1B)

95. The structures would range in height from 45 feet to 125 feet with a typical height of 90 feet. (refer to Attachment 4). (Eversource 1, Vol. 1, p. 3-15; Eversource 3, p. 3, Attachment 1)

96. To accommodate the new line, the width of the cleared area of the right-of-way would be expanded by 45 feet. (Eversource 1, Vol. 5, Appendix 1B)

97. Land use adjacent to the right-of-way includes single family residences, undeveloped woodland, Mattatuck State Forest, Black Rock State Park, Thomaston Fish and Game Club, and the Crest Brook Country Club. The right-of-way crosses Route 109 and local roads. (Eversource 1, Vol. 1, p. 5-32; Eversource 1, Vol. 5, Appendix 1B)

Walnut Hill Junction to Campville Substation

98. The existing right-of-way from Walnut Hill Junction to Campville is 250 feet wide and is cleared to a width of 140 feet with the exception of the Naugatuck River crossing where the cleared width is 115 feet. This section of right-of-way is 3.9 miles in length and extends through Thomaston, Litchfield, and Harwinton. (Eversource 1, Vol. 1, p. 3-15; Eversource 1, Vol. 5, Appendix 1B)

99. The right-of-way contains Line 1191 mounted on H-frames structures and Line 1921, a 115-kV transmission line mounted on delta monopole structures that joins the right-of-way at Walnut Hill Junction. (Eversource 1, Vol. 1, pp. 2-10, 3-15; Eversource 1, Vol. 5, Appendix 1B)

100. The existing H-frame structures and the delta monopole structures have a typical height of 55 feet and 75 feet, respectively. (Eversource 1, Vol. 5, Appendix 1B)

101. In this section, Eversource proposes to install the new transmission line on 32 new delta configuration monopole structures located south of Line 1921. (Eversource 1, Vol. 5, Appendix 1B)

102. The structures would range in height from 70 feet to 120 feet with a typical height of 90 feet (refer to Attachment 5). (Eversource 3, p. 3)

103. To accommodate the new transmission line, the width of the cleared area of the right-of-way would be expanded by 40 feet. (Eversource 1, Vol. 5, Appendix 1B)

104. At the Naugatuck River, two existing 155-foot lattice structures, one on each side of the river, would be removed. The structures support Line 1191 and Line 1921. To accommodate removal of the structures and the installation of new 155-foot monopole structures to support each line independently, the cleared area of the right-of-way the would be expanded by 70 feet (refer to Attachment 6). (Eversource 1, Vol. 1, p. 2-13, XS-5)

105. Land use adjacent to the right-of-way includes single family residences, flood control property, undeveloped woodland and agricultural land. The right-of-way crosses Route 8, Route 254, local roads, and a railroad right-of-way along the Naugatuck River used for seasonal scenic train excursions. (Eversource 1, Vol. 1, p. 5-32, p. 5-33; Eversource 1, Vol. 5, Appendix 1B; DEEP comments received March 1, 2016)

Campville Substation Modifications

106. The existing Campville Substation is located on a 42.3-acre parcel owned by Eversource in the southwest section of Harwinton. The existing developed substation area is 1.7 acres and is accessed off Wildcat Hill Road. (Eversource 1, Vol. 1, p. 3-18)

107. Eversource proposes to modify the substation by expanding the substation fenceline by 90 feet to the east, increasing the fenced substation area by approximately 0.4 acre. The existing topography in the expansion areas ranges by five feet and grading of the area would be required to create a level surface for new equipment (refer to Attachment 7). (Eversource 2, R. 14; Tr. 2. pp. 34-35)

108. Major Project related work at the substation involves the following:
- Expansion and modification of the ring bus to accommodate five new 115-kV breakers and one new transmission line terminal position.
- Installation of a new 68-foot high terminal structure to connect the proposed Line 1304 to the line position.
- Installation of a motor operated disconnect switch, one ground switch, three lightning arrestors, three capacitor voltage transformers, cabling and one wave trap.
- Installation of four 115-kV disconnect switches, aluminum tube conductor, six 115-kV breakers, two 60-foot tall lightning masts.
- Installation of expansion area fencing, stormwater management controls, steel support structures and foundations
- Installation of a new substation enclosure for batteries and equipment boards.

(Eversource 3, p. 13; R. 14; Tr. 2. pp. 31-32)

General Project Construction Procedures

109. The following subsections describe the general construction procedures for each portion of the project. If the Project was approved, Eversource intends to submit two Development and Management Plans for the Project; one that details the construction of both the underground and overhead sections of the transmission line and one for the modifications to both substations. (Eversource 1, Vol. 1, p. 3-3)

Frost Bridge Substation and Campville Substation Modifications

110. Eversource would install material staging areas on Eversource property and establish temporary access as necessary for heavy vehicles. (Eversource 1, Vol. 1, p. 4-35)

111. Prior to construction, Eversource would install soil erosion and sedimentation controls, as necessary, and would maintain these areas for the duration of the Project. (Eversource 1, Vol. 1, p. 4-35)

112. Vegetation within the expansion area at the Campville Substation would be removed and the site graded. (Eversource 1, Vol. 1, p. 4-35)

113. Excavated soils would be characterized for reuse or disposal. (Eversource 1, Vol. 1, p. 4-35)

114. Once constructed, new equipment would be tested prior to commencement of operation. (Eversource 1, Vol. 1, p. 4-36)

Proposed 115-kV Underground Transmission Cable

115. Eversource would conduct pre-construction surveys to identify any existing underground facilities along the cable route. (Eversource 1, Vol. 1, p. 4-23)

116. Eversource would install material staging areas on Eversource property and establish work zones and temporary access as necessary for heavy vehicles. (Eversource 1, Vol. 1, p. 4-23)

117. Prior to construction, Eversource would install soil and sedimentation controls, as necessary, and would maintain these controls until soil stabilization and re-vegetation. (Eversource 1, Vol. 1, p. 4-23)

118. Eversource would excavate a trench approximately 6 to 10 feet deep and five feet wide to install the duct bank. (Eversource 1, Vol. 1, p. 4-23)

119. The duct bank would consist of eight-inch PVC pipe for the XLPE conduits, two-inch PVC conduits for the ground continuity conductors and sensing fiber, and three-inch PVC conduits for fiber optic and sensing fiber. The PVC conduits would be installed in 10 to 20 foot sections. (Eversource 1, Vol. 1, p. 4-24)

120. Any open portions of trench would be covered with plywood or steel plates after work hours to prevent fall hazards. (Eversource 1, Vol. 1, p. 4-24)

121. The splice vault would be approximately 24 feet long by eight feet wide by eight feet high. The vault would be approximately 30-inches below grade and once constructed, would be accessible via two access manholes. (Eversource 1, Vol. 1, pp. 3-5, 4-25)

122. After conduits have been installed, they would be tested with a mandrelling procedure, in which a "pig" (a cylindrical object slightly smaller in diameter than the conduit) is pulled through the conduit to verify that the conduit has not been crushed, damaged, or installed improperly. (Eversource 1, Vol. 1, p. 4-25)

123. When conduits have been successfully installed and tested, cable would be pulled through them using truck-mounted winches and cable handling equipment. (Eversource 1, Vol. 1, p. 4-25)

124. Completed portions of the trench and concrete casing would be backfilled with appropriate materials, and the surface cover would consist of gravel or seeded, depending on the location. (Eversource 1, Vol. 1, p. 4-24)

125. Any groundwater that is encountered would be dewatered as necessary in accordance with applicable regulations. (Eversource 1, Vol. 1, p. 4-26)

126. Any subsurface rock would be removed by mechanical methods; blasting is not anticipated. (Eversource 1, Vol. 1, p. 4-24)

Proposed Overhead 115-kV Transmission Line

127. Eversource would conduct pre-construction surveys to demarcate right-of-way boundaries, sensitive environmental features, vegetation clearing limits and proposed structure locations. (Eversource 1, Vol. 1, p. 4-2)

128. Eversource would establish temporary storage and staging areas for construction support. If Eversource-owned property is not available or suitable for storage or staging areas, Eversource would investigate the use of suitable private property as close to the Project area as possible. (Eversource 1, Vol. 1, p. 4-5)

129. Temporary storage areas require approximately two to five acres and are used to temporarily store construction materials, equipment, supplies, mobile construction offices, parking of personal vehicles of construction crew members, parking construction vehicles and equipment, and performing minor maintenance on construction equipment. (Eversource 1, Vol. 1, p. 4-5)

130. Staging areas typically require less than two acres and are used for temporarily stockpiling materials for transmission line construction, such as erosion and sedimentation control materials, and for temporarily stockpiling materials removed during construction. Staging areas could be within or off the right-of-way. As construction progresses, staging areas would be relocated to be near construction work. (Eversource 1, Vol. 1, p. 4-6)

131. Once a storage/staging area is no longer needed, it would be restored pursuant to the land use agreement with the underlying landowner. (Eversource 1, Vol. 1, p. 4-5)

132. Access to the right-of-way would utilize existing access roads to the greatest extent possible. (Eversource 1, Vol. 1, p. 4-13)

133. A large network of access roads already exists along a majority of the entire right-of-way. Most of the existing access roads would have to be improved, widened, or modified to accommodate construction equipment. To ensure safe vehicle access, access road grades cannot exceed ten percent. (Eversource 1, Vol. 1, p. 4-14)

134. Existing access roads would be restored with gravel and widened to a travel surface of 16-20 feet. (Eversource 1, Vol. 1, p. 4-14)

135. In areas where terrain and the presence of environmental features make linear use or construction of an on-right-of-way access road difficult, off-right-of-way access roads would be constructed to bypass these areas. Off-right-of-way access roads would typically originate from public roads or from existing access roads on private property. (Eversource 1, Vol. 1, p. 4-13)

136. Culverts and timber mats would be used where the access roads traverse wetlands and watercourses to minimize permanent impacts to these features. (Eversource 1, Vol. 1, p. 4-14)

137. Vegetative clearing would occur in designated areas both in the right-of-way areas and along access roads to the right-of-way. Equipment for clearing would include flatbed trucks, brush hogs, skidders, bucket trucks, log trucks and wood chippers. (Eversource 1, Vol. 1, p. 4-8, p. 4-9)

138. Generally, tall tree species would be removed from the right-of-way expansion area. Smaller tree species and shrubs would be retained in areas outside of the conductor zones (an area 15 feet from the conductors). (Eversource 1, Vol. 1, p. 4-11)

139. Stumps would only be removed from the cleared areas to facilitate construction or rehabilitation of access roads and the installation of work pads. Stumps that are removed would be hauled off-site or chipped for use as ground cover in the right-of-way, where appropriate. (Eversource 2, R. 7)

140. Clearing in sensitive areas, such as wetland areas or along stream banks, would be minimized to the extent practical. (Eversource 1, Vol. 1, p. 4-11, p. 4-12)

141. Eversource would coordinate with respective property owners regarding disposition of logged trees along the right-of-way. Eversource would leave timber portions of the trees on the landowner's property if requested, stacked in upland areas. If the landowner does not want the timber, the timber would become property of the land clearing contractor and removed from the property. (Eversource 1, Vol. 1, p. 4-11)

142. If a "hazard" tree (one that is weak, broken, decaying) is found on or off-right-of-way that could threaten the integrity of the transmission lines it would be removed or pruned as necessary. Eversource's ability to remove these trees in off-right-of-way areas is predicated on the language in the right-of-way easement agreement. If the language does not give Eversource permission to remove hazard trees from outside of the easement area, the company would seek permission from the property owner. (Eversource 1, Vol. 1, p. 4-12)

143. Temporary erosion and sedimentation (E&S) controls would be installed as practicable prior to and/or during vegetation clearing in compliance with the *2002 Connecticut Guidelines for Soil Erosion and Sedimentation Control* and Eversource's *Best Management Practices Manual: Construction and Maintenance Environmental Requirements for Connecticut*. Temporary controls include silt fence, hay/straw bales, and filter socks to be used during any construction that involves soil disturbance. (Eversource 1, Vol. 1, p. 4-7)

144. Additional E&S controls may be used after vegetation removal to demarcate limits of work within environmentally sensitive areas. (Eversource 1, Vol. 1, p. 4-7)

145. Work pads would be established at each proposed transmission structure location to provide a level work area for construction equipment used to erect the transmission structure. Typical work pads would consist of gravel and measure 100 feet by 100 feet for a tangent structure and 200 feet by 100 feet for a dead-end structure. (Eversource 1, Vol. 1, p. 4-15, p. 4-16)

146. Work pad construction includes the removal of vegetation, grading to create a level area, removal of topsoil and layering of a filter fabric and rock base. A roller is typically used to flatten and compact the pad. In wetland areas, removable timber mats may be used to allow water to flow beneath the pad. As an alternative to timber mats, a large rock base may be used to allow water flow with smaller rock layered on top and a layer of gravel intermixed with soil on top of that. (Eversource 1, Vol. 1, p. 4-16)

147. Transmission structures would be delivered to the work pad in sections, then assembled and installed with a crane. (Eversource 1, Vol. 1, p. 4-17)

148. Tangent structures would be directly embedded into the ground. Dead-end angle structures would have a drilled shaft foundation. Excavations for foundations would be accomplished by mechanical means. If blasting is required based on soil borings at each structure location, a certified blasting contractor would develop a controlled drilling and blasting plan in compliance with state and local regulations, including notification to adjacent residents. (Eversource 1, Vol. 1, p. 4-17)

149. Excess concrete used of any foundation work would be disposed of in upland areas, away from any delineated wetlands. (Tr. 2, pp. 60-61)

150. Overhead conductors would be installed using pulling and tensioning equipment placed at one to three mile intervals along the route. Gravel pull pads measuring 100 feet wide by 100 to 300 feet long would be constructed for the staging and operation of the pulling equipment. Helicopters may also be used for installation of the pulling lines. Once the conductors are pulled into place, linemen in bucket trucks would complete the conductor installation at each structure location. (Eversource 1, Vol. 1, p. 4-19)

151. Gravel pads would be installed adjacent to roads to provide locations for temporary guard structures used to provide line clearance over roadways during pulling. (Eversource 1, Vol. 1, p. 4-17)

152. The existing lattice structures (#3171 and #3174) that carry Line 1191 and Line 1921 over the Naugatuck River would be dismantled using a crane. The associated foundations would be removed to below grade, then covered with soil and seeded. (Eversource 1, Vol. 1, p. 4-18; Tr. 2, p. 68)

153. Based on initial review, private structures that would need to be removed from the right-of-way include a portion of fencing in Litchfield and an abandoned shed in Thomaston. Several greenhouses in the right-of-way in Watertown can remain in place as they are far enough from the proposed work area. (Eversource 2, R. 6; Tr. 2 p. 33)

154. Traffic impacts during construction are expected to be minimal as most of the Project area is sparsely populated. Eversource would consult with the affected Towns and the DOT to minimize traffic congestion and resolve potential Project access issues during construction. (Eversource 1, Vol. 1, p. 4-22)

155. Upon completion of the transmission line installation, work pads would remain in place unless directed by the landowner or if the work pad is located within a sensitive environmental area. Access roads in upland areas would remain in place to facilitate future maintenance activities. Pull pads and guard pads would be removed. (Eversource 1, Vol. 1, p. 4-16, p. 4-17)

156. Following construction of the proposed project, construction debris and temporary access roads would be removed, final grading of areas affected by construction would occur, if applicable, and the disturbed areas stabilized through re-vegetation, installation of water bars, and/or other measures. (Eversource 1, Vol. 1, p. 4-20)

157. Post-construction right-of-way vegetation management includes the removal of targeted species such as tall growing trees and State-listed invasives, encouraging the growth of native shrub and small tree species. (Eversource 1, Vol. 1, p. 4-36)

158. Vegetation management within the right-of-way is typically performed every four years, while side-trimming of vegetation encroaching on the edge of the managed portion of the right-of-way occurs every ten years. (Eversource 1, Vol. 1, p. 4-36)

159. Vegetation management would be conducted in accordance with Eversource's *Specifications for Rights-of-Way Vegetation Management* document. (Eversource 1, Vol. 1, p. 4-36)

160. Eversource anticipates developing a Wetland Invasives Species Control Plan for right-of-way management upon consultation with various state and federal entities. (Eversource 1, Vol. 1, p. 4-36)

Environmental Resources

161. The proposed Project is located within the Northwest Hills physiographic region of Connecticut, generally characterized by hilly, glacial influenced terrain with shallow till on bedrock. Some locations in the Project area have extensive deep till and glacial outwash deposits. (Eversource 1, Vol. 1, pp. 5-2 to 5-4)

162. Elevations along the right-of-way range from 300 feet above mean sea level in Watertown to 800 feet above mean sea level in Litchfield. (Eversource 1, Vol. 1, p. 5-2)

Watercourses

163. The proposed Project is located within the Naugatuck River regional drainage basin. (Eversource 1, Vol. 1, p. 5-5)

164. The proposed Project crosses a total of 58 watercourses/waterbodies. Of these, 14 are perennial streams or rivers, 6 are ponds and 38 are intermittent watercourses. (Eversource 1, Vol. 1, p. 5-6)

165. Three of the perennial streams are greater than 20 feet wide, including Branch Brook, Northfield Brook and the Naugatuck River. (Eversource 1, Vol. 1, p. 5-6)

166. The proposed route extends across 100-year flood zones associated with Branch Brook, Northfield Brook and the Naugatuck River. No existing or proposed structures would be within the designated flood zones. (Eversource 1, Vol. 1, p. 5-12)

167. None of the rivers or streams along the route are designated as or considered for designation as a National Wild and Scenic River. (Eversource 1, Vol. 1, p. 5-6)

168. All of the watercourses and waterbodies along the Project route are already spanned by transmission lines. (Eversource 1, Vol. 1, p. 5-6, p. 5-7)

169. DEEP noted that watercourse D-5, located on the Thomaston Fish and Game Club (TFGC) property, is a high quality stream and the stream bottom should be preserved through proper engineering methods such as an oversized culvert or bridging. (DEEP comments received March 1, 2016)

170. The Naugatuck River is designated by DEEP as a Trout Management and Salmon Broodstock area. The proposed transmission line crossing in this location would be well above the river and would not affect the riparian forest immediately adjacent to the river. (Eversource 1, Vol. 1, p. 5-16)

171. The proposed Project would not impact any fisheries. (Eversource 1, Vol. 1, p. 6-20)

Wetlands

172. A total of 91 wetland areas were delineated within the existing right-of-way using State and Federal criteria. In addition, four wetlands were delineated adjacent to proposed Project access roads in off-right-of-way areas. (Eversource 1, Vol. 1, p. 5-7)

173. Clearing in the right-of-way may affect 48 of 95 delineated wetlands. (Eversource 1, Vol. 1, p. 5-7)

174. A majority of the wetlands along the Project route are classified as scrub-shrub and emergent wetlands. Most are maintained as such through ongoing right-of-way maintenance activities. Most of these wetlands extend into non-maintained areas, transitioning into forested wetlands. (Eversource 1, Vol. 1, p. 5-10)

175. Development of the Project would convert approximately 6.7 acres of forested wetlands to scrub-shrub or emergent marsh wetlands by clearing the right-of-way for the new transmission line. (Eversource 1, Vol. 1, p. 6-10)

176. Portions of two wetlands on the east side of the Naugatuck River would be permanently filled for access roads, as follows; approximately 1505 square feet in designated wetland W-F11 and approximately 232 square feet in designated wetland W-F12. (Eversource 2, R. 11; Eversource 1, Vol. 5, Appendix 2B, Sheet 32)

177. A new transmission structure (no. 95) would be installed in wetland W-F15 in Harwinton. Approximately 28 square feet of this wetland would be permanently filled. Due to the extensive wetlands in this area of the Project route, wetland impact cannot be avoided. (Eversource 1, Vol. 1, p. 6-10; Eversource 2, R. 11; DEEP comments received March 1, 2016)

178. The Project would temporarily affect 27 wetlands though the development, widening, restoration and use of access roads and work pads within wetlands to construct the transmission structures and clear the affected areas of right-of-way. Approximately 117,500 square feet of wetlands would be temporarily disturbed primarily through the use of construction matting or gravel placed on top of geotextile fabric. (Eversource 1, Vol. 1, p. 6-9, p. 6-10; Eversource 2, R. 11)

179. Compensatory wetland mitigation may be required depending on permit requirements from DEEP and the USACE and could include wetland restoration and/or enhancement, wetland preservation payment, and/or conservation restrictions. (Eversource 1, Vol. 1, p. 6-13)

180. Approximately 21 vernal pools are located along the Project route. Fifteen of the pools were considered high value and three were considered decoy pools formed from impoundment through existing access road use. (Eversource 1, Vol. 1, p. 6-21, p. 6-22)

181. To avoid impacts to vernal pools, Eversource would locate new structures, access roads and work areas outside of vernal pools to the extent practical. One vernal pool, located adjacent to proposed Structure 39, would be partially filled to create a work pad. Eversource would attempt to relocate the work pad out of the vernal pool during the D&M phase of the project. (Eversource 1, Vol. 1, p. 6-22; Eversource 3, Table 2)

182. Eversource removed the potential pull pad adjacent to vernal pool D4-1, between structures 53 and 54 in Thomaston, from the design of its project to reduce the potential for disturbance to that vernal pool. A potential pull pad located between structures 52 and 53 would be used instead. (Eversource 2, R. 12)

183. Generally, vernal pool protective measures would include retaining as much of the low growing vegetation in and around each pool as possible, leaving tree stumps in place to minimize disturbance, minimize the use of gravel within 100 feet of vernal pools, and the use of appropriate erosion and sedimentation controls to prevent sediment from accumulating in the pools as well as maintaining access ways and migratory pathways for vernal pools species to use adjacent upland areas. (Eversource 1, Vol. 1, p. 6-22)

184. For Project activities adjacent to vernal pools (within 100 feet) that occur during amphibian migration periods, site specific measures would be undertaken such as elevated construction matting to provide unencumbered amphibian access to and from vernal pools. (Eversource 1, p. 6-22)

185. The Project route does not traverse any aquifer protection areas. The nearest aquifer protection area is approximately 0.5 mile east the proposed transmission line route where it crosses Route 109 in Thomaston. (Eversource 1, Vol. 1, p. 5-12)

186. The Project is not near any public water supply watershed areas. The nearest public water supply watershed is approximately one mile west of the proposed transmission line route where it crosses Black Rock State Park in Thomaston. (Eversource 1, Vol. 1, p. 5-11)

187. If groundwater is encountered during any Project excavations, dewatering would be performed in accordance with authorizations from applicable regulatory agencies. (Eversource 1, Vol. 1, p. 4-34)

Wildlife

188. The expansion of the Campville Substation would require the removal of 0.4 acre of woodland. (Eversource 1, Vol. 1, p. 6-44; DEEP comments received March 1, 2016)

189. Development of the new transmission line would require the clearing of 42.2 acres of forested upland in the existing right-of-way. An estimated 7,000 trees with a diameter six inches or greater at breast height would be removed. (Eversource 1, Vol. 1, p. 6-15)

190. Some of the clearing would occur along the edge of two core forest blocks in the Black Rock State Park and Mattatuck State Forest area of Watertown. However, the clearing would not reduce the size of either core forest block below 250 acres, the minimum size required to maintain habitat for interior forest birds. (Eversource 3, Exhibit 2, p. 5-2, p. 5-3, Figure 1)

191. Once the Project is complete, cleared areas would revert to scrub-shrub habitat benefiting many species that depend on this type of habitat, including species that are in decline in New England such as the prairie warbler and the blue-wing warbler. (Eversource 1, Vol. 1, pp. 6-16, 6-25)

192. Shrubland and edge habitats support a high biodiversity, especially among birds, reptiles and invertebrates. Due to land use patterns, shrubland and old field areas are in rapid decline and managed right-of-way is now an important source of this habitat. (Eversource 1, Vol. 1, p. 6-20, 6-25)

193. Based on review of Natural Diversity Database for state endangered, threatened or special concern species and ongoing consultations with DEEP, five state listed species were identified as potentially occurring in the Project area: wood turtle, smooth green snake, spotted turtle, northern spring salamander, and the frosted elfin butterfly. (Eversource 4, p. 18; DEEP comments received March 1, 2016)

194. Upon consultation with DEEP, Eversource has developed DEEP-approved protection strategies for each of these species. These strategies would be implemented as part of the D&M Plan for the Project. (Eversource 3, p. 18; DEEP comments received March 1, 2016)

195. Although the Project area may contain suitable forest habitat for the northern long-ear bat, a Federally-listed threatened species, Eversource and DEEP concluded there in no nearby bat hibernacula to support bat populations in the area. Eversource is consulting with the USFWS for a final Project impact determination regarding this species. (Eversource 2, R. 9)

Scenic, Historic and Recreation Areas

196. The Project would not affect any previously identified historic sites, archeological sites, or properties listed on the National Register of Historic Places. Eversource would conduct further subsurface archeological field investigations during final project design. If significant archeological deposits are found, Eversource would relocate temporary and permanent Project infrastructure to the greatest extent possible. (Eversource 1, Vol. 1, p. 6-39, p. 6-45)

197. The portion of the Project that crosses through the TFGC property is near several old stone walls and stone dams. The landowner and DEEP requested that these features be preserved to the greatest extent possible. (Eversource Bulk File comments from Thomaston Fish and Game Club; DEEP Comments received March 1, 2016)

Visibility

198. The Project is not located within or near any State designated heritage areas. (Eversource 1, Vol. 3, Visual Resource Analysis, p. 4)

199. The Project would not be visible from DOT designated Scenic Land Strips. (Eversource 1, Vol. 3, Visual Resource Analysis, p. 4)

200. The Project right-of-way traverses two DEEP properties, Mattatuck State Forest and Black Rock State Park. In Mattatuck State Forest, the new transmission line would be constructed between two existing transmission lines in a cleared right-of-way, with construction temporarily affecting one hiking trail. The section in Black Rock State Park would require clearing in the existing right-of-way, temporarily affecting two hiking trails in a remote section of the park. (Eversource 1, p. 6-34, p. 6-35; DEEP comments received March 1, 2016)

201. The Project right-of-way traverses Northfield Brook Lake, a USACE flood control property developed with a recreational trail. Construction along the right-of-way would temporarily affect access to this trail. (Eversource 1, Vol. 1, p. 6-34)

202. Eversource would coordinate with DEEP and the USACE regarding temporary trail closures and other aspects of the Project in these areas. (Eversource 1, Vol. 1, p. 6-35)

203. The Project is adjacent to Veterans Memorial Park in Watertown but no impact on park recreational facilities are expected. (Eversource 1, Vol. 1, p. 6-34)

204. The visual impact of the Project on State, Federal and Town public recreation facilities and properties would be minimal given the presence of the existing managed right-of-way adjacent to and within these areas. Most visibility from recreational resources would be where hiking trails intersect with the

existing right-of-way. The Project would also be visible from the top of the Black Rock Dam, a USACE facility. (Eversource 1, Vol. 1, Volume 3, pp. 11-15, Exhibit 5)

205. The Project would not be visible from the Black Rock viewpoint in Black Rock State Park. (Council Administrative Notice Item 69; Eversource 1, Vol. 3, pp. 11-15; Vol. 5 Appendix 1B , Sheet 4)

206. In general, the visibility impact of the new transmission line would be incremental as it is being installed within an existing right-of-way that already contains transmission line structures. To minimize the visual effect of new transmission structures, Eversource would install the structures in line with existing structures to the greatest extent practical. (Eversource 1, Vol. 1, pp. 3-8, p. 11-7)

207. During the MCF process, the Town of Thomaston and the TFGC requested that shorter transmission line structures be used between proposed Structures 50 to 60 to reduce visual impacts in this area. This section of the right-of-way is approximately one mile in length and traverses property primarily owned by TFGC. (Eversource 1, Vol. 1, p. 12-9)

208. The existing right-of-way in this area has a managed width of 90 feet and contains H-frame structures ranging in height from 50 to 80 feet that support Line 1191. (Eversource 1, Vol. 1, p. 12-9; Eversource 1, Vol. 5, Appendix 1B)

209. Eversource proposes to install steel delta structures in this area that range in height from 66 to 108 feet, eight to 24 feet higher than the existing H-frame structures, and widen the cleared area of the right-of-way by 40 feet. (Eversource 1, Vol. 1, p. 12-10)

210. Eversource examined the possibility of using H-frame structures along this one-mile segment. If H-frames were used, they would range in height from 52-90 feet. Five of the H-frame structures would be below the existing tree line. (Eversource 1, Vol. 1, p. 12-10)

211. The use of H-frames structures would require the clearing of an additional 10 feet of forest along the east side of the right-of-way in order to maintain adequate vegetative clearance. The additional clearing, totaling approximately one-acre, would occur in four wetland areas, along two forested streams, and within a high quality vernal pool that supports the only known population of marbled salamander in Thomaston. (Eversource 1, Vol. 1, p. 12-10, p. 12-11; Eversource 3, p. 6-1; Tr. 2, p. 30)

212. The estimated cost of using H-frame structures in this area is an additional $700,000. (Eversource 1, Vol. 1, p. 12-11)

Noise

213. Eversource expects only short-term and highly localized construction-related noise effects from the Project. Most construction related noise would occur during normal work hours of 7 AM to 7 PM Monday through Saturday. Construction may occur beyond these times to accommodate electric outages or the installation of certain facilities. (Eversource 1, Vol. 1, pp. 6-40, 6-41, 6-46)

214. During the development of access roads or the installation of some of the proposed steel monopole structures, rock may be encountered. Whereas mechanical methods are the preferred method for removing rock, in some areas, controlled blasting may be required. If blasting is required, Eversource would develop a Blasting Control Plan in compliance with state, industry, and Eversource standards. Potential impacts from rock removal may include dust, vibration, and noise. (Eversource 1, Vol. 1, p. 6-40; Eversource 4, p. 33)

215. Once completed, operation of the Project facilities would result in a minimal change in the existing ambient noise environment and would meet applicable state regulations. (Eversource 1, Vol. 1, p. 6-46)

Electric and Magnetic Fields

216. Electric fields (EF) and magnetic fields (MF) are two forms of energy that surround an electrical device. Transmission lines are a source of both EF and MF. In North America, electric utilities provide power at 60 hertz (oscillates 60 times per second). (Eversource 1, Vol. 1, p. 7-1)

217. Electric fields result from voltages applied to electrical conductors and equipment. Appliances within homes and the workplace are the major sources of electric fields indoors, and power lines are the major sources of electric fields outdoors. EF levels decrease rapidly with distance from the source, diminishing even faster when interrupted by conductive materials, such as buildings and vegetation. The scientific community does not regard EF levels to be a concern to the general public and thus studies of health effects from electrical transmission lines and equipment has focused on MF. (Council Administrative Notice Item 29; Eversource 1, Vol. 1, p. 7-1)

218. Magnetic fields are produced by the flow of electric currents. The level of a magnetic field is commonly expressed as magnetic flux density in units called gauss (G), or in milliGauss (mG). The magnetic field level at any point depends on characteristics of the source, which can include the arrangement of conductors, the amount of current flow through the source, and its distance from the point of measurement. MF levels decrease rapidly with distance from the source but are not easily interrupted as they pass through most materials. (Council Administrative Notice Item 29; Eversource 1, Vol. 1, p. 7-1)

219. In the United States, no state or federal exposure standards for 60-hertz MF based on demonstrated health effects have been established. Nor are there any such standards established world-wide. However, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) has established a level of 2,000 mG, based on extrapolation from scientific experimentation, and the International Committee on Electromagnetic Safety (ICES) has calculated a guideline of 9,040 mG for exposure to workers and the general public. (Council Administrative Notice Item 29; Eversource 1, Vol. 1, p. 7-17)

220. In accordance to the Council's *Electric and Magnetic Fields Best Management Practices for the Construction of Electric Transmission Lines in Connecticut* guidelines (EMF BMP), Eversource is required to provide an analysis of recent scientific literature regarding MF exposure, an analysis of pre and post construction MF levels, and investigate 'no cost" and "low cost" transmission line design alternatives to reduce MF levels at the edge of a right-of-way and in areas of particular interest, as long as such designs do not compromise system reliability or worker safety, or environmental and aesthetic project goals. (Council Administrative Notice Item 29)

221. As required by the Council's EMF BMP's, Eversource provided an analysis of recent scientific literature regarding MF exposure and determined there were no relevant changes in current research conclusions or the recommended exposure standards established by ICES and ICNIRP. (Eversource 3, pp. 27-28)

222. As required by the Council's EMF BMP, Eversource examined the project route to determine the location of any schools, daycare facilities, playgrounds, hospitals, and residential areas, as defined under C.G.S. § 16-50p(a)(3)(D), for specific MF analysis. Eversource located three areas, referred to as

Focus Areas, as follows; the ball field in Veterans Memorial Park in Watertown, a residential area on Walnut Hill Road in Thomaston with 12 residences and a residential area on Campville Road in Litchfield with 19 residences. (Eversource 3, pp. 28-29)

223. Field measurements of existing, preconstruction MF and EF were taken at each Focus Area, as follows:

Measured Electric and Magnetic Fields

Location	Magnetic Field (mG)	Electric Field (kV/m)
Veteran's Memorial Park, Watertown	1.00	0.00
Walnut Hill Road, Thomaston	12.33-15.95	0.075-0.332
Campville Road, Litchfield	5.11-30.11	0.096-0.932

These field measurements represent only the MF and EF levels at the time of measurement. MF levels vary constantly depending on the amount of power flowing through the line whereas EF remains somewhat constant over time. (Eversource 3, p. 30)

224. Eversource conducted an analysis of pre and post construction MF levels at the edge of the right-of-way under average transmission line load conditions. As shown in the table below, generally, MF levels would decrease except for an increase along the right edge of the right-of-way from Walnut Hill Junction to the Campville Substation.

Table 7-3: Summary of Magnetic Field Calculations

Magnetic Field Calculation Summary (Average Annual Loads, field in mG)				
Section	Left Edge of ROW		Right Edge of ROW	
	Pre	Post	Pre	Post
Frost Bridge S/S to Purgatory Junction	23.9	23.5	41.3	40.9
Purgatory Junction to Walnut Hill Junction	7.3	4.2	6.1	3.9
Walnut Hill Junction to Campville S/S	20.5	12.8	0.6	1.4

*Left and right edges of ROW are defined by looking from Frost Bridge Substation to Campville Substation

All pre and post-construction values are a fraction of the ICNIRP and ICES recommended exposure guidelines. (Eversource 1, Vol. 1, p. 7-10)

225. The EMF BMP directs an Applicant to initially develop a baseline Field Management Design Plan that incorporates "no-cost" MF mitigation design features. The Applicant shall then study potential design alternatives by adding "low-cost" MF mitigation design features specifically where portions of the project are adjacent to residential areas, public or private schools, licensed child day-care facilities, licensed youth camps, or public playgrounds. The overall cost of "low-cost" design features are to be calculated at four percent of the initial Field Management Design Plan. The four percent guideline for "low-cost" mitigation should aim at a magnetic field reduction of 15 percent or more at the edge of the utility's ROW. This 15 percent reduction should relate specifically to those portions of the project where the expenditures would be made. (Council Administrative Notice Item 29)

226. Eversource's base Field Management Design Plan incorporates "no cost" magnetic field reduction measures, consistent with the Council's EMF BMP, through the use of delta structure design where possible and arranging the conductor phases to achieve optimum MF cancellation from other MF

sources in the existing transmission line right-of-way. This "no cost" design was used to develop the pre and post project MF calculations. (Eversource 1, Vol. 1, Appendix 7B)

227. Although the post construction MF levels at the edge of the right-of-way are small compared with the guidelines from ICNIRP and ICES, Eversource examined "low cost" methodologies to reduce MF along the sections the right-of-way abutting the identified Focus Areas. (Eversource 1, Vol. 1, Appendix 7B; Eversource 3, p. 32)

228. As part of the "low cost" modification to the Field Management Design Plan, Eversource examined the feasibility of installing the transmission line underground near the Focus Areas to reduce MF but determined this method would not decrease the MF levels at all three Focus Areas by the recommended 15 percent. Additionally, the cost of underground transmission line installation would exceed the recommend four percent cost allocation to achieve MF reduction. (Eversource 1, Vol. 1, Appendix 7B)

229. In addition to the new transmission line, the transformers and other equipment within the Frost Bridge and Campville Substations are other potential EMF sources. These sources, however, would be expected to cause little or no exposure to the general public because the strength of fields from typical substation equipment decreases rapidly with distance and reaches very low levels at relatively short distances beyond the substation perimeter fence. (Eversource 3, p. 28)

Public Safety

230. The proposed Project would be constructed in full compliance with the National Electric Safety Code, standards of the Institute of Electrical and Electronic Engineers, and the American National Standards Institute, good utility practice and applicable PURA regulations regarding the methods and manner of transmission line construction. (Eversource 1, Vol. 1, p. 4-37)

231. Protective relaying equipment would be incorporated into the new transmission line and substation designs to automatically detect abnormal operational conditions. Circuit breakers would automatically be triggered to isolate the faulted section of the transmission system. (Eversource 1, Vol. 1, pp. 4-37 to p. 4-39)

232. Protective relay mechanisms include redundant primary and back up equipment to ensure continuous operational monitoring if some of the monitoring equipment was out of service. (Eversource 1, Vol. 1, p. 4-38)

233. The new transmission line design includes fiber optic strands installed within the lightning shield wires above the new overhead transmission line to allow for protective relay system communication. (Eversource 1, Vol. 1, p. 4-37)

234. The substations would be remotely controlled and monitored by the Connecticut Valley Electric Exchange System Operator using digital metering systems and a Supervisory Control and Data Acquisition system. (Eversource 1, Vol. 1, p 4-38)

235. Fire and smoke detection systems would be installed within the new Campville Substation control house. These systems already exist at the Frost Bridge Substation control house. If triggered, these detection systems would automatically activate an alarm at the Connecticut Valley Electric Exchange System, a central monitoring installation, where further appropriate action would be taken such as dispatch of personnel to the substation. (Eversource 1, Vol. 1, p. 4-37 to p. 4-39)

236. To deter unauthorized entry to the substations, the existing substations are enclosed by a seven-foot high chain link fence topped with barbed wire. The new fence around the expansion area at the Campville Substation would match existing fencing. Access to the substation compound is through a locked gate. Appropriate signage is in place around each substation indicating the presence of high-voltage equipment. (Eversource 1, Vol. 1, p. 4-39)

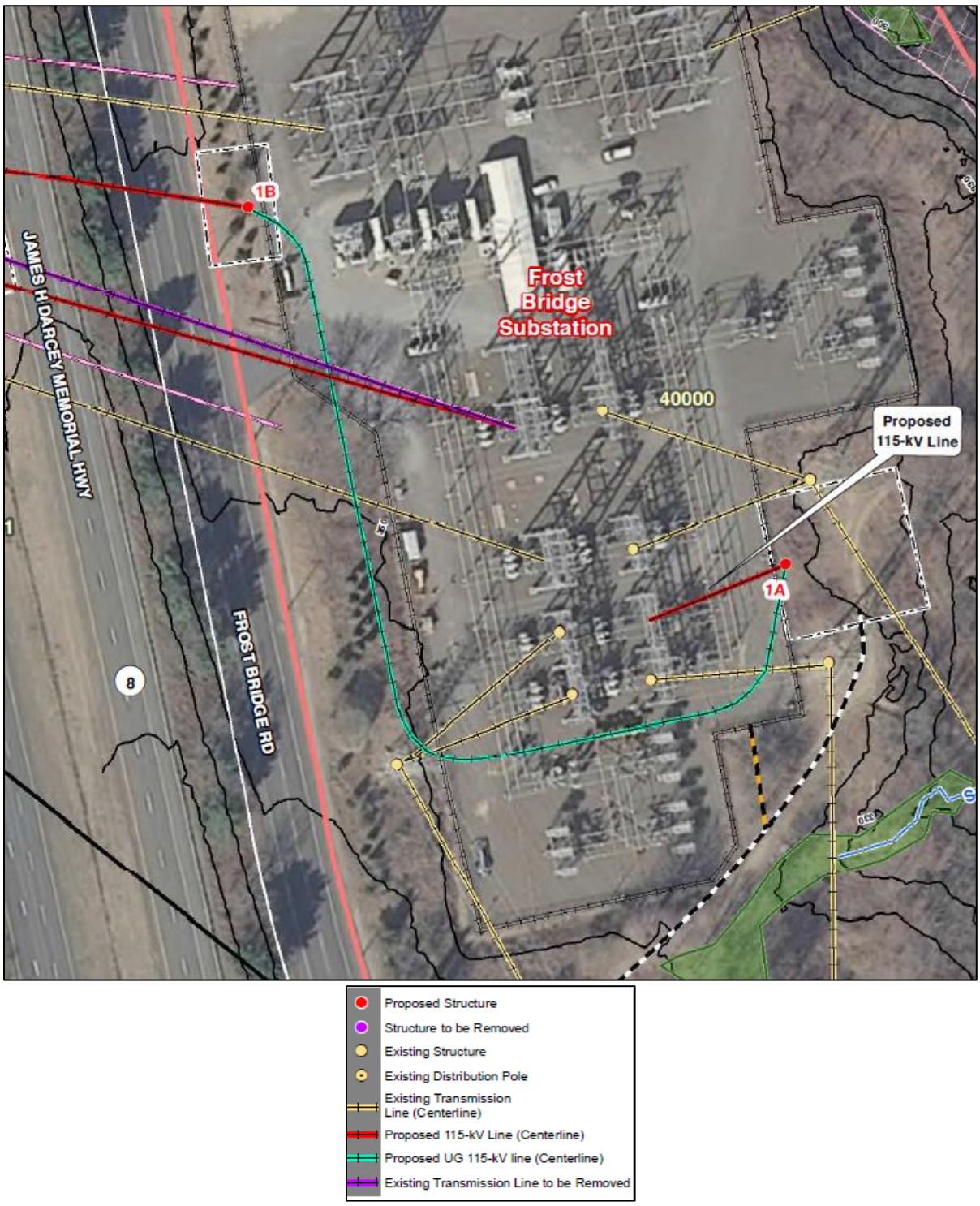
237. Physical security at both the Frost Bridge and Campville Substations is consistent with the Council's *White Paper on the Security of Siting Energy Facilities*. The white paper guidelines focused on security issues related to intentional physical destruction of substation equipment. (Council Administrative Notice Item 31; Eversource 1, Vol. 1, p. 4-39)

238. Lighting is installed in and around each substation for safety and security concerns. Additional lighting is present to facilitate emergency night work. (Eversource 1, Vol. 1, p. 4-39)

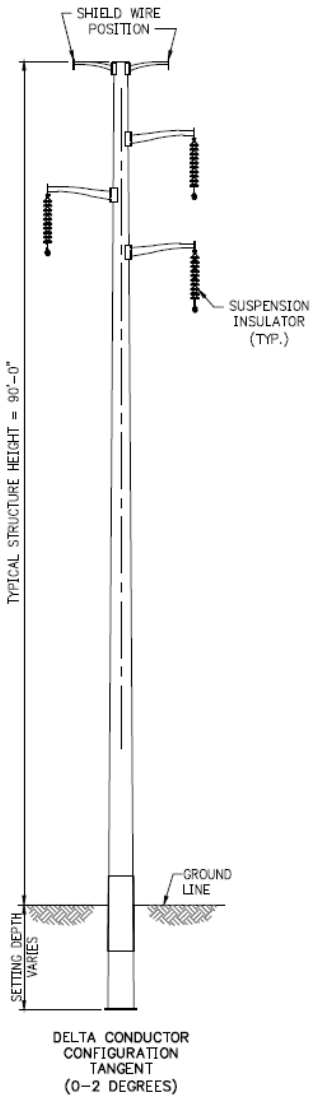
239. Unauthorized access onto the transmission line right-of-way by third-party off road vehicles is discouraged to the greatest extent practical. Typically, Eversource would install a gate where a right-of-way access road intersects with a public roadway to deter access. Additional gates, berms, and fences would be installed upon consummation with the underlying landowner. (Eversource 1, Vol. 1, p. 6-37; Tr. 2, p. 70)

240. Signs are installed in the right-of-way warning the public of the presence of high-voltage transmission lines. (Eversource 1, Vol. 1, p. 6-37)

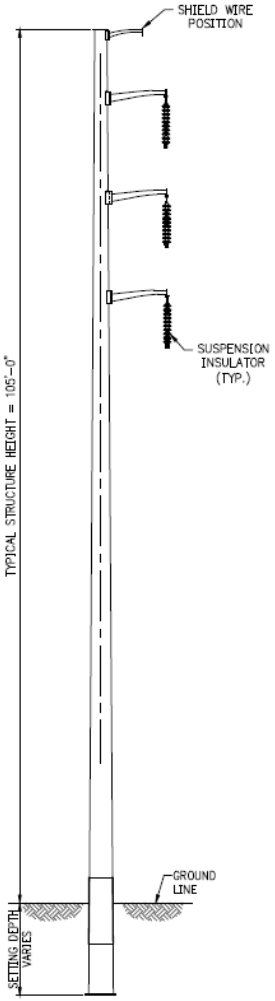
Attachment 1- Aerial Photograph of Frost Bridge Substation (Eversource 1, Vol. 1, p. 3-19)



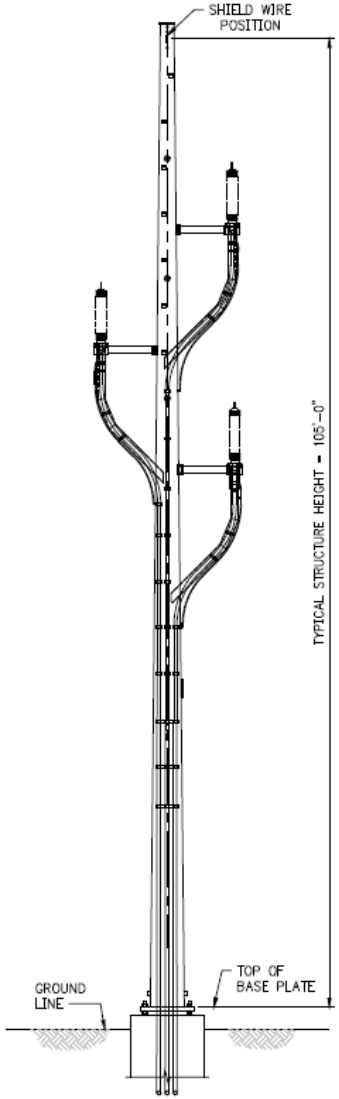
Attachment 2 – Types of Transmission Structures Proposed for the Project (Eversource 1, Vol. 1, App. 3B)



DELTA CONDUCTOR CONFIGURATION TANGENT (0–2 DEGREES)

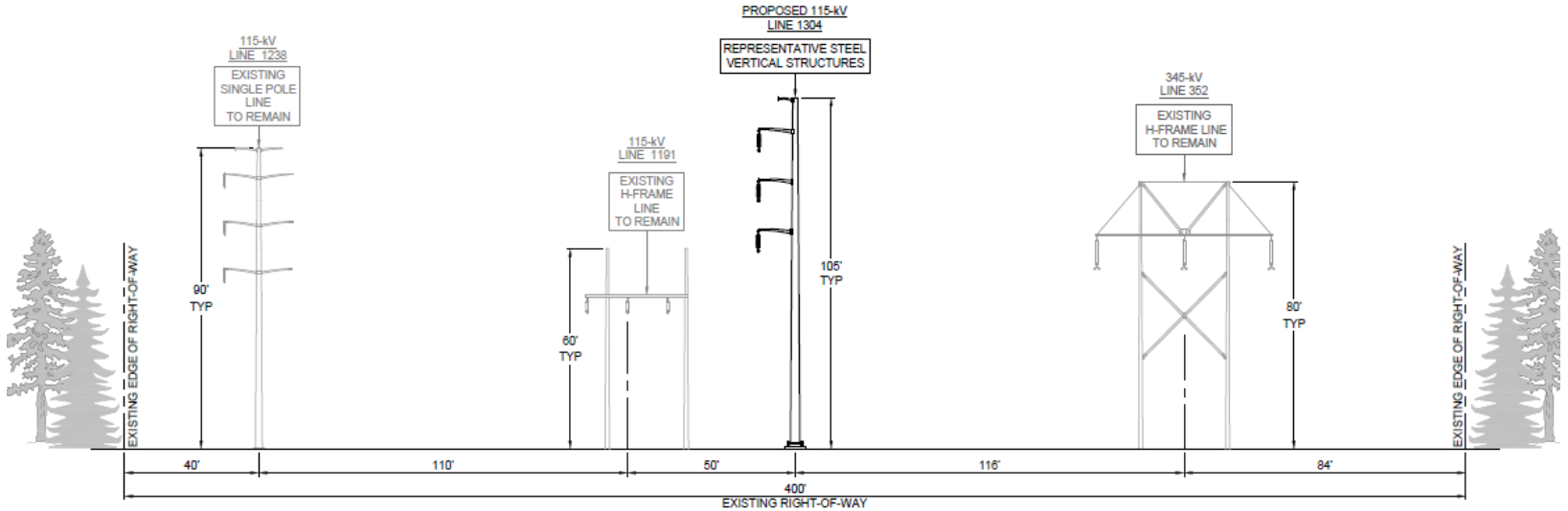


VERTICAL CONDUCTOR CONFIGURATION TANGENT (0–2 DEGREES)



VERTICAL CONDUCTOR CONFIGURATION DEADEND

Attachment 3 – Frost Bridge to Purgatory Junction Cross Section (Eversource 1, Vol. 1, XS-2)



PROPOSED CONFIGURATION
VERTICAL DESIGN

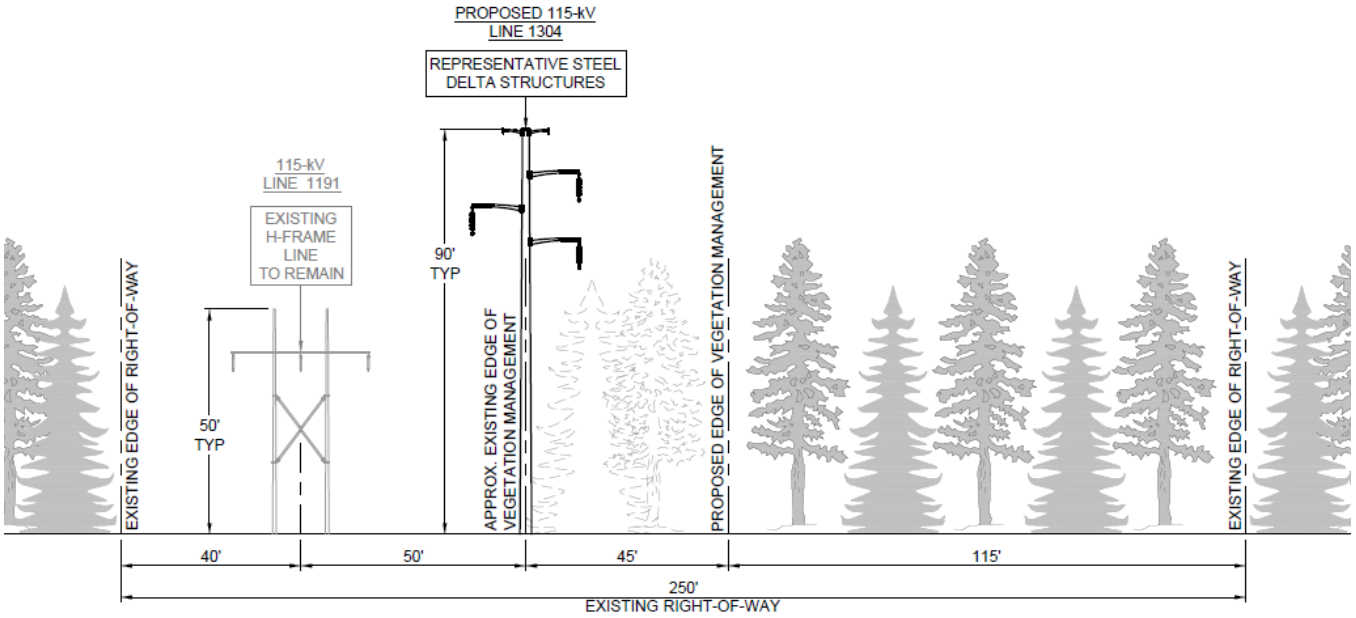
FROST BRIDGE SUBSTATION LINE EXIT
TO
PURGATORY JUNCTION

IN THE TOWN OF
WATERTOWN

LOOKING
WEST

(2.5 MILES)

Attachment 4 – Purgatory Junction to Walnut Hill Junction Cross Section (Eversource 1, Vol. 1, XS-3)



PROPOSED CONFIGURATION
DELTA DESIGN

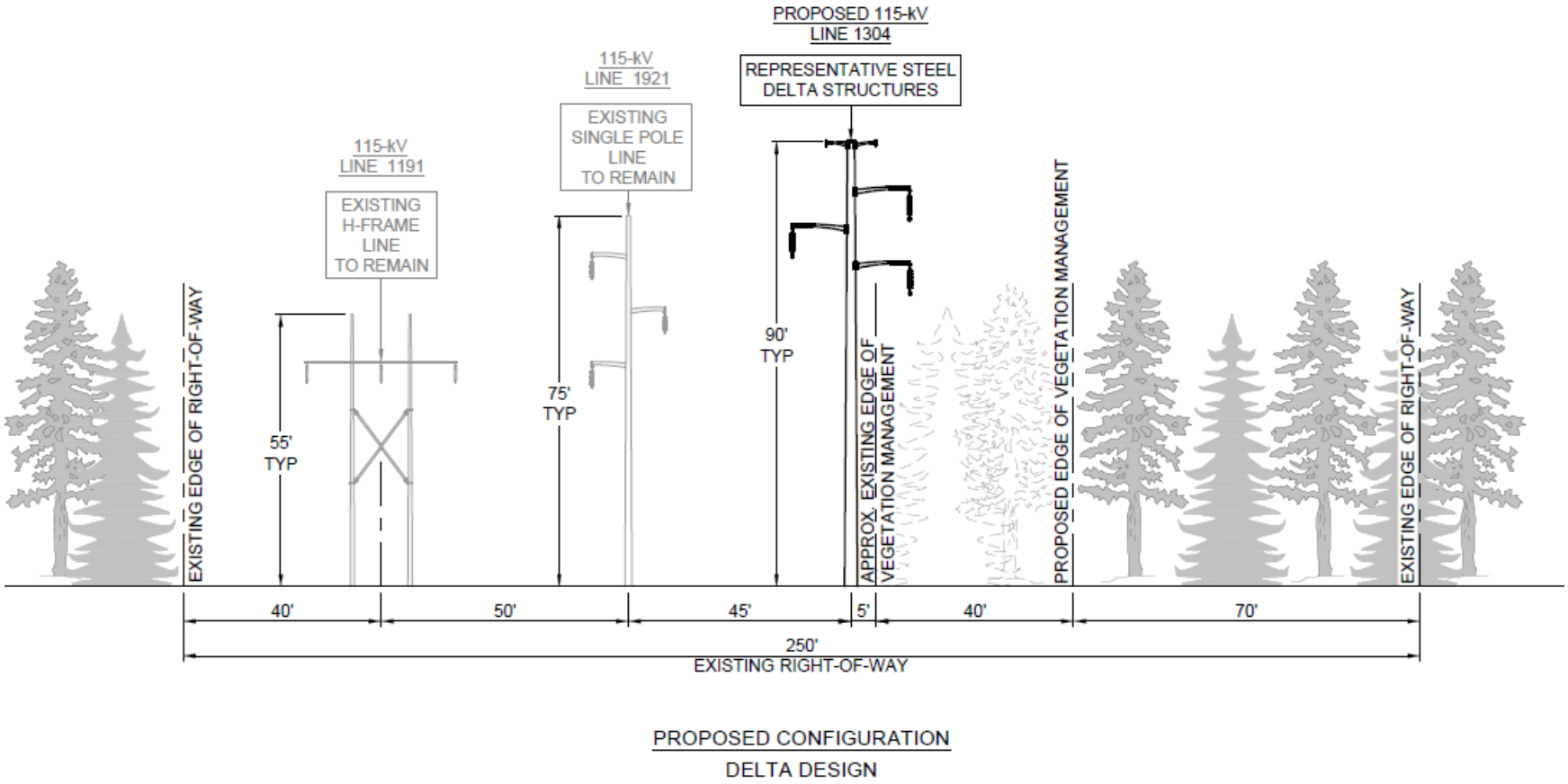
PURGATORY JUNCTION
TO
WALNUT HILL JUNCTION

IN THE TOWNS OF
WATERTOWN & THOMASTON

LOOKING
NORTH

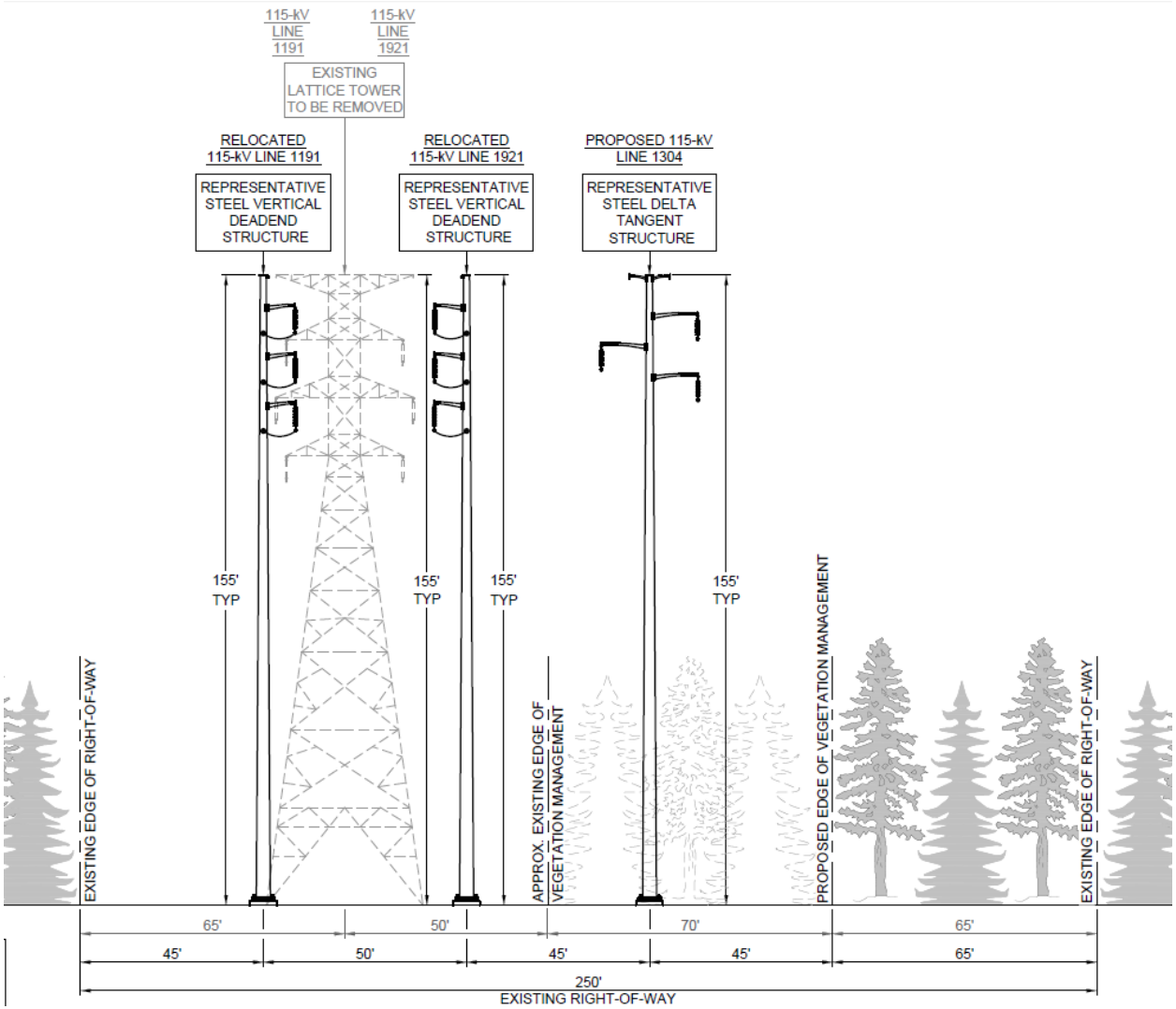
(3.8 MILES)

Attachment 5 – Walnut Hill Junction to Campville Substation Cross Section (Eversource 1, Vol. 1, XS-4)



PROPOSED CONFIGURATION
DELTA DESIGN

Attachement 6 – Nagutuck River Crossing Cross Section (Eversource 1, Vol. 1, XS-5)



Attachment 7 - Aerial Photograph of Campville Substation (Eversource 1, Vol. 1, p. 3-21)