STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

DOCKET NO. 468 - The Connecticut Light & Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Southwest Connecticut Reliability Project that traverses the municipalities of Bethel, Danbury, and Brookfield, 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 3.4 miles between Eversource's existing Plumtree Substation in the Town of Bethel to its existing Brookfield Junction in the Town of Brookfield; (b) reconfiguration of two existing 115-kV double-circuit electric transmission lines at Eversource's existing Stony Hill Substation in the Town of Brookfield; and (c) related substation modifications	**DOCKET NO. 468** September 15, 2016

DIRECT TESTIMONY OF RAYMOND GAGNON, ALLEN SCARFONE, FARAH OMOKARO, AND CHRISTOPHER SODERMAN ON BEHALF OF THE CONNECTICUT LIGHT AND POWER COMPANY DOING BUSINESS AS EVERSOURCE ENERGY CONCERNING ENGINEERING, DESIGN, ROUTE SELECTION, PROJECT NEED, CONSTRUCTION, EMF CHARACTERISTICS, AND OUTREACH FOR THE SOUTHWEST CONNECTICUT RELIABILITY PROJECT

TABLE OF CONTENTS

1. INTRODUCTION

Q. Please identify yourselves.

A. [Mr. Gagnon] I am Raymond Gagnon, Director - Transmission Projects, employed by Eversource Energy Service Company (Eversource Service), an affiliated company that provides services to The Connecticut Light and Power Company doing business as Eversource Energy (Eversource).

[Mr. Scarfone] I am Allen Scarfone, Manager – Transmission System Planning, employed by Eversource Service.

[Mrs. Omokaro] I am Farah Omokaro, Senior Engineer- Transmission Planning & Siting, employed by Eversource Service.

[Mr. Soderman] I am Christopher Soderman, Senior Engineer- Transmission Line Engineering, employed by Eversource Service.

Our professional qualifications and experience are set out in our respective resumes provided in a separate volume along with this testimony.

Q. What is the relationship of Eversource Service to the applicant, Eversource?

A. Eversource Service provides administrative and engineering services to Eversource and the other Eversource Energy subsidiaries. Eversource Service has provided the "in-house" resources for the development of the Southwest Connecticut Reliability Project (Project).

Q. Does Eversource expect to call on any other personnel to respond to planning, engineering or other technical issues?

A. David Coleman of Eversource Service may be called upon to respond to questions relating to analytical, system planning, or engineering design topics, while Anthony Johnson of Eversource Service may be called to answer questions concerning vegetation management. In addition, Dr. Gabor Mezei of Exponent, Inc. will be available to respond to questions concerning his report, *Research on Extremely Low Frequency Electric and Magnetic Fields and Health, August 1, 2012 – July 31, 2015,* a copy of which was submitted as Exhibit 7D to the Application. Their resumes and the resumes of other potential witnesses are provided to the Council in a separate volume.

Q. What responsibility have you had in connection with the Application to the Siting Council?

A. We have supervised the preparation and submission of the Application and interrogatory responses. The Application was compiled under our supervision by Eversource Service staff and engineering and environmental consultants.

Q. Do you have any additions or corrections to make to any of the information in the Application?

A. Yes, we have some minor additions and clarifications. We inadvertently omitted data regarding our calculations of post-Project electric fields along the Project right-of-way (ROW) from Table 7C-1 on page 7C-3 of Appendix 7C. Attachment 1 to this testimony contains a replacement page 7C-3 that adds the omitted information to Table 7C-1.

In addition, we should clarify that, in our discussion of electric and magnetic fields in the Application, we referred to one of the Focus Areas in section 7 of the Application as "Hearthstone Drive in Bethel" (pp. 7-7, 7-8), and then referred to the same Focus Area in Appendix 7B as the "Chimney Drive Focus Area" (pp. 7B-8, 7B-9). These terms refer to the same focus area in Bethel, which includes portions of both Hearthstone Drive and Chimney Drive.

Finally, page 5-46 of the Application incorrectly states that the existing Stony Hill Substation occupies 3.2 acres of a 24.0-acre parcel. The correct figures are that the existing Stony Hill Substation occupies approximately 1.7 acres of an 18.8-acre Eversource parcel, as correctly reflected on page 12-1 of the Application.

Q. What is the purpose of your testimony?

A. The purpose of our testimony is to provide a high-level summary of the Project. We will cover the following topics:

1. Overview and General Location of the Project;
2. Modifications to Substations and Reconfiguration of 115-kV lines;
3. Need for the Project;
4. Cost and Schedule;
5. Route Selection;
6. System Alternatives;
7. Construction;
8. Electric and Magnetic Fields;
9. Safety and Security;
10. Municipal Consultations & Outreach; and

11. Statutory Compliance.

In addition, Eversource's environmental consultants, Louise Mango of Phenix Environmental, Inc. and Paul Knapik of BSC Group, are filing Direct Testimony regarding environmental matters concerning the Project, while Julia Frayer of London Economics International is filing Direct Testimony regarding her analysis of non-transmission alternatives. The resumes of these witnesses are also included in the separate volume.

2. OVERVIEW AND GENERAL DESCRIPTION OF THE PROJECT

Q. Please describe the Project.

A. The Project consists of a new, approximately 3.4-mile 115-kilovolt (kV) overhead electric transmission line from Eversource's existing Plumtree Substation in the Town of Bethel, through the eastern portion of the City of Danbury, to Brookfield Junction[1] in the Town of Brookfield. The new 115-kV line will be connected to Plumtree Substation within the existing substation fenceline, and minor modifications will be made at that substation. Eversource also proposes to reconfigure existing 115-kV line interconnections at its existing Stony Hill Substation, also located in the Town of Brookfield, and to make modifications at Stony Hill Substation. All of the proposed Project facilities and modifications would be accommodated within Eversource's existing transmission line ROWs or on Eversource-owned property.

Q. Please briefly describe the purpose of the Project.

A. These proposed electric transmission system upgrades are required to improve the reliability of the 115- kV electric system in the Southwest Connecticut (SWCT) area generally and in the Housatonic Valley-Norwalk–Plumtree sub-area of

[1] A transmission system "junction" is a location where different transmission lines intersect.

SWCT (referred to herein as the Housatonic Valley sub-area) in particular. Figure ES-1 from the Application, provided as Attachment 2 to this testimony, illustrates the existing electric transmission system in SWCT, including the Housatonic Valley sub-area. By bringing a new transmission source into the Housatonic Valley sub-area, the Project will address thermal overloads and voltage violations identified in studies conducted by Independent System Operator New England, Inc. (ISO-NE), the independent regional system planning authority for the New England states.

Q. Please indicate the location of the new 115-kV line.

A. Figure 1-1 from the Application, provided as Attachment 3, illustrates the Proposed Route for the new 115-kV line, as well as the location of Brookfield Junction and Stony Hill Substation. The Proposed Route begins at the existing Plumtree Substation in Bethel and traverses in roughly a northerly direction as it crosses through Bethel, the eastern portion of Danbury, and back into Bethel before entering Brookfield and ending at Brookfield Junction. All of the proposed Project facilities would be accommodated within Eversource's existing transmission line ROW or on Eversource-owned property. This ROW has been devoted to utility use for decades.

Q. How much of the Proposed Route is in each of the three towns traversed by the Project.

A. The table on the next page shows the portion of the Project in each of these towns:

ROW Length and Width by Municipality

Municipality	Eversource ROW Characteristics	
	Length (Approx. Miles)	Width Range (Feet, Typical)
Bethel	2.2	175-225
Danbury	0.9	175
Brookfield	0.3	175
Total	**3.4**	

Q. Describe the existing transmission lines in the ROW, and the changes in the ROW that will occur as a result of the construction of the new 115-kV line.

A. The Proposed Route for the new 115-kV transmission line would be entirely within Eversource's existing approximately 175-to-225-foot-wide transmission line ROW, adjacent to two existing overhead lines (a 115-kV line [the 1770 Line] and a 345-kV line [the 321 Line]), which are supported together on double circuit structures. The 1770 and 321 lines are supported on steel lattice or monopole structures that are approximately 85 feet tall near Plumtree Substation, but are typically 150 feet in height along the majority of the ROW.

The proposed new overhead 115-kV line would be aligned east of the existing lines on weathering steel monopole structures in a vertical configuration. The new monopole structures would have typical structure heights of 95-135 feet above ground, depending on terrain, with the exception of the first segment of the new line just west of Plumtree Substation, where four three-pole weathering steel structures in a horizontal configuration approximately 30-40 feet in height would be installed. Thus, depending on terrain, the new 115-kV structures would typically be

substantially shorter than the existing double-circuit 345-kV/115-kV transmission line structures on the ROW.

Q. Will the existing structures in the ROW have to be relocated or rebuilt to allow for construction of the new 115-kV line?

A. No. The existing Eversource ROW is sufficiently wide to accommodate the new monopoles without requiring the relocation or rebuilding of any existing structures.

Q. Will the Project require acquisition of additional property rights to expand the ROW or the acquisition of additional property at Plumtree or Stony Hill Substations?

A. No, the existing ROW will not have to be expanded, and Eversource will not need to acquire any property at Plumtree or Stony Hill Substations. No additional easements would be required for the Project, with the possible exception of off-ROW road easements for access.

3. MODIFICATIONS TO SUBSTATIONS AND RECONFIGURATION OF 115-kV LINES

Q. Briefly describe the existing Plumtree Substation.

A. Plumtree Substation, which was built approximately 44 years ago, is located at 16 Walnut Hill Road in the western portion of the Town of Bethel. The developed (fenced) substation occupies approximately 4.6 acres of a 13.8 acre-Eversource property that is otherwise characterized as predominantly forested. Five 115-kV and two 345-kV transmission lines presently connect to the substation.

Q. What modifications to Plumtree Substation are planned?

A. At Plumtree Substation, the new 115-kV transmission line would connect to a spare position, which currently includes equipment and structures to accommodate the new line. The new 115-kV line would be terminated on the existing steel A-frame structure and would tie into the substation between two existing 115-kV circuit breakers. Terminal equipment, including the line disconnect switch and wave trap, would be upgraded to meet the new 115-kV line capacity requirements. In addition, new protection, control, and indication equipment would be installed.

Q. Would all of the modifications at Plumtree Substation take place within the existing fenced-in area at Plumtree Substation?

A. Yes. There is no need to expand the substation's fenced-in area.

Q. Briefly describe the existing Stony Hill Substation.

A. Stony Hill Substation, which is located at 49 Stony Hill Road in the southern portion of the Town of Brookfield, is situated adjacent to the existing 115-kV 1770 / 1887 line ROW, approximately 0.8 mile east of Brookfield Junction. The property is bordered to the north by a railroad, to the west by Stony Hill Road, to the south by Deer Trail Drive, and to the east by undeveloped land. The existing (fenced) substation occupies approximately 1.7 acres of an 18.8-acre Eversource property that is otherwise characterized as predominantly forested. The substation was constructed approximately 27 years ago. The substation property is presently accessible via an access road off Stony Hill Road on the northern portion of the Eversource property.[2]

[2] As part of modifications to the Stony Hill Substation that are part of a separate submission to the Council (Petition 1230), Eversource proposed to expand the substation and to develop a new access road to the station. The Siting Council approved this petition on June 23, 2016. The precise location of this new access road has not yet been determined.

On-ROW existing access roads continue eastward along the existing 1770 and 1887 lines corridor and to the south along the railroad. The surrounding land use is characterized by forested and residential areas. Two 115-kV lines presently connect to the substation.

Q. What modifications to Stony Hill Substation and existing 115-kV interconnections at the substation are planned for the Project?

A. Modifications will be made to both equipment within Stony Hill Substation and to two existing 115-kV transmission lines (i.e., the 1770 Line and the 1887 Line) that presently connect to the substation. The proposed work will be performed on Eversource property within or adjacent to the substation. The work within the fenceline includes: (1) connecting an existing 115-kV capacitor bank to a different bus; and (2) reconfiguring two existing overhead 115-kV lines, both of which presently connect to the substation.

Q. Please describe the modification to the existing 115-kV interconnections at Stony Hill Substation in greater detail.

A. Eversource proposes to reconfigure the existing three-terminal 1770 Line that extends into Plumtree Substation from Bates Rock Substation (in the Town of Southbury) into separate two-terminal lines, one between Plumtree and Stony Hill substations and the other between Stony Hill and Bates Rock substations. After this reconfiguration, the1770 Line would be re-numbered (although no physical changes would be made to the line other than at Stony Hill Substation). Thus, from Plumtree to Stony Hill substations, the existing 1770 Line would be re-designated the 1268 Line, whereas the portion of the 1770 Line connecting Stony Hill and Bates Rock substations

would become the 1485 Line. In addition, we would reconfigure the existing 1887 Line into a three-terminal line between Plumtree, West Brookfield, and Shepaug substations. The existing 1887 Line interconnection to Stony Hill Substation would be eliminated. Thus, after the proposed reconfiguration, the 1887 Line would bypass Stony Hill Substation.

The reconfiguration work would include the removal of three existing structures associated with the existing 1770/1887 line interconnections to the substation. The structures to be removed are wood poles with typical heights of approximately 85 feet that are located on Eversource property north of the substation fence. Two new structures would be installed to re-connect Stony Hill Substation to the 1770 Line (which then would be re-designated as the 1268 and 1485 lines). One of these structures, which would support the newly-designated 1268 Line and consist of an approximately 85-foot-tall direct embedded weathering steel structure, whereas the structure that would support the newly-designated 1485 Line would be an approximately 70-foot-tall engineered steel pole on a caisson foundation.

Q. Why is Eversource reconfiguring these 115-kV lines at Stony Hill Substation?

A. The reconfiguration of the 115-kV line connections at Stony Hill Substation is part of a cost effective reliability solution in that this work eliminates the need to perform other system upgrades that would otherwise be necessary. Specifically, the reconfiguration work will avoid the need to reconductor other existing 115-kV transmission lines and install additional reactive compensation in the local area.

Q. Describe the modifications that Eversource is proposing within the fenceline of Stony Hill Substation?

A. Within the substation, the existing 22K 115-kV capacitor bank connection to Bus A1 would be removed and the capacitor bank would instead be connected to existing Bus A3. This work would include the removal of existing bus-related equipment and support structures and the installation of new bus equipment and support facilities. Lightning arrestors would also be installed at the ends of the new underground cable for the electrical relocation of the capacitor bank.

Q. What access road will be used for the work at Stony Hill Substation?

A. Eversource expects to use the existing access road off Stony Hill Road on the northern portion of the Eversource property. In addition, Eversource may also use a new access road that may be constructed in connection with the substation expansion approved in Petition 1230. In Petition 1230, Eversource proposed to construct the new access road off Stony Hill Road on the western portion of the Eversource property. The Siting Council has requested that Eversource evaluate constructing this access road off of Deer Trail Drive on the southern portion of the property. Therefore, there is a potential, if this access road is constructed as part of Petition 1230, it may be used for work associated with SWCT Project work at Stony Hill Substation as well.

4. NEED FOR TRANSMISSION UPGRADES IN THE HOUSATONIC VALLEY SUB-AREA

Q. What was the process by which the need for the Project was determined?

A. The need for the Project was identified by a working group (the Working Group) led by ISO-NE, which consisted of members from ISO-NE, Eversource and The

United Illuminating Company (UI). The Working Group was formed to prepare a "10-year look ahead" evaluating the reliability of the transmission system serving the SWCT study area for the projected system conditions in 2022.

The SWCT study area includes the following sub-areas:

- Housatonic Valley-Norwalk-Plumtree sub-area (the location of the upgrades proposed in this Application);
- Frost Bridge-Naugatuck Valley sub-area;
- New Haven-Southington sub-area;
- Bridgeport sub-area;
- Glenbrook-Stamford sub-area.

The findings and conclusions of the Working Group regarding the SWCT study area are set forth in two reports, *SWCT Connecticut Area Transmission 2022 Needs Assessment* (*SWCT Needs Report*) and *SWCT Connecticut Area Transmission 2022 Solutions Study Report* (*SWCT Solutions Report*). (Copies are these reports are included in Volume IV of the Application.) These reports identified, respectively, the need for upgrades to resolve reliability problems throughout SWCT, and the specific solutions designed to address these needs, including the upgrades in the Housatonic Valley sub-area that are the subject of this Application.

Q. What were the conclusions of the Working Group regarding the need for transmission upgrades in the Housatonic Valley sub-area?

A. The planning studies conducted by the Working Group showed that there were violations of both thermal and voltage criteria in the Housatonic Valley sub-area. The electric system in the Housatonic Valley sub-area load pocket is subject to overloads when the system attempts to serve peak load under contingent conditions. All of the

criteria violations for the Housatonic Valley sub-area were related to serving load *within* the pocket, as opposed to power transferring through the sub-area to serve another part of the system. The Working Group determined that, when contingencies removed one or more transmission supplies to this load pocket, the remaining transmission connections and local generation in the Housatonic Valley sub-area were insufficient to serve the load, resulting in thermal overloads and severe low voltage conditions.

Q. Did ISO-NE consider the need for transmission improvements in each of the SWCT sub-areas separately?

A. Yes. Although the Working Group considered potential interdependencies in the load serving needs and potential solutions for all of the SWCT sub-areas, the study did evaluate needs and solutions that were specific to each sub-area, including the Housatonic Valley sub-area. The Working Group combined the Housatonic Valley sub-area and the Frost Bridge-Naugatuck Valley sub-area to evaluate possible interactions between these sub-areas, and then considered both "local" and "global" solutions to the reliability issues in these two sub-areas. The two "local solutions" that were developed and evaluated for the Housatonic Valley sub-area were designed to solve the violations in each individual load pocket separately, while the two potential "global solutions" considered for the Housatonic Valley sub-area and the Frost Bridge-Naugatuck Valley sub-area were intended to provide an additional transmission line linking these two sub-areas that would be mutually beneficial. The Working Group ultimately determined that the optimal solution for the Housatonic Valley sub-area was a "local" solution (referred to as "Local 2") that would address the reliability needs in the Housatonic Valley sub-area separately from those in the Frost Bridge-Naugatuck Valley sub-area.

Q. Had the need for the Project been identified in prior planning studies conducted by ISO-NE prior to the formation of the Working Group?

A. Yes. In studies conducted over 15 years ago that led to the construction of major projects approved by the Council in Docket 217 (Bethel - Norwalk 345-kV line), Docket 272 (Middletown - Norwalk 345-kV line), and Docket 292 (Glenbrook - Norwalk 115-kV cables), transmission planners noted that several 115-kV lines within SWCT were near or above their thermal loading limits, that some 115-kV substations in the SWCT area had low voltage issues, and that these issues would not be fully resolved by construction of the 345-kV loop. At that time, transmission planners determined that the region's 345-kV projects would move forward, and that follow-up studies would be performed to identify and then correct any local criteria violations in SWCT. The SWCT Reliability Project arose out of these follow-up studies.

Q. How does the proposed 115-kV line and the other work described in the Application improve the reliability of the transmission system in the Housatonic Valley sub-area?

A. The planning studies demonstrated that thermal and voltage violations occurred following the loss of one or more transmission sources that feed the Housatonic Valley sub-area load pocket. Therefore, the Working Group determined that a new supply source into the sub-area was needed. The proposed 115-kV line will bring in a new transmission source to serve the Housatonic Valley sub-area.

The new 115-kV line would be an extension of the 1887 Line, so that when this Project is completed, the 1887 Line will be a three-terminal line connecting Plumtree Substation, West Brookfield Substation, and Shepaug Substation. (See Attachment 4 for

diagrams included in the Application that show the pre-Project and post-Project configuration of the 1887 line and 1770 lines, and how the new line coupled with the reconfiguration work will provide a new 115-kV source into the Housatonic Valley sub-area.) This new 115-kV line, which will be available to serve the reliability needs of all customers in the load pocket, including those in municipalities of Bethel, Danbury, and Brookfield, provides: (1) an additional system element to share the load that is automatically redistributed upon the failure of other system elements; and (2) a source to help maintain continuity of supply to the load from external sources in such an event.

Q. Why does Eversource propose to reconfigure the capacitor bank bus connections at Stony Hill Substation?

A. There are currently three capacitor banks in Stony Hill Substation, two rated at 37.8 MVAR (mega volt amps (reactive)) and one rated at 25.2 MVAR. The two 37.8 MVAR capacitor banks are connected to the "A1" 115-kV bus, while the 25.2 MVAR capacitor bank is connected to the "A2" 115-kV bus. The SWCT planning studies showed that there are contingencies involving these capacitors that would cause low voltage violations at several substations. Reconfiguring one of Stony Hill Substation's 37.8 MVAR capacitor banks to the same side as the 25.2 MVAR capacitor bank will improve the post-contingent voltage in the area.

Q. Is the Project part of a long-range plan for expansion of Connecticut's power grid that serves the public need for adequate, reliable and economic service?

A. Yes. The Project is a key component of a set of transmission improvements in Connecticut coordinated by ISO-NE that are included in ISO-NE's

346 Regional System Plan and that will ensure compliance with reliability criteria through
347 2022.

348 **Q. Are there other improvements to the transmission system in the**
349 **Housatonic Valley Sub-area that Eversource is planning?**

350 A. Yes. There are other improvements in the Housatonic Valley sub-area
351 referenced in the *SWCT Solutions Report* that are being implemented separately from the
352 Project. These projects include: (i) installing a synchronous condenser at Stony Hill
353 Substation; (ii) reconductoring the 1887 Line in Brookfield between West Brookfield
354 Substation and West Brookfield Junction; (iii) installing two 14.4 MVAR capacitor banks
355 at West Brookfield Substation; (iv) rebuilding a portion of the 115-kV 1682 Line
356 between Wilton Substation in Wilton and Norwalk Substation in Norwalk; (v)
357 reconductoring the 115-kV 1470-1 Line from Wilton Substation to Ridgefield Junction in
358 Redding; and (vi) reconductoring the 1470-3 Line from Peaceable Substation in Redding
359 to Ridgefield Junction. All of these improvements will be completed prior to or
360 contemporaneous with the in-service date of the Project.

361 These other improvements, which provide independent reliability benefits to the
362 region, are the subject of separate filings with the Siting Council in the form of petitions
363 for declaratory rulings or notices of exempt modifications, and these filings are either
364 currently pending before the Council or will be filed in the near future.

365 **5. <u>COST AND SCHEDULE</u>**

366 **Q. What is the estimated cost of the Project?**

367 A. The estimated capital cost of the Project is approximately $24.4 million.

Q. Does Eversource expect that the costs of the Project will be "regionalized"?

A. ISO-NE makes the determination of whether all costs of a project are regionalized. As currently designed, we expect that all costs of the Project would be subject to regional cost support. However, if ISO-NE were to determine that the Project, as built, includes some costs that are incurred to satisfy "local" requirements, such costs would likely be localized.

Q. If the costs are regionalized, then what share would Connecticut's electricity customers pay?

A. Connecticut's electricity customers (not just Eversource customers) would pay approximately 25% of the Project costs, assuming all costs were to be regionalized.

Q. What is the anticipated timetable for construction?

A. Project construction is anticipated to begin in the first quarter of 2018.

Q. What is the tentative in-service date for the Project?

A. The tentative in-service date is December, 2018.

6. ROUTE SELECTION

Q. What were the primary objectives of the routing and configuration process used by Eversource to develop and analyze potential alternatives before deciding on the Proposed Route?

A. The primary objectives of this process were to: (1) select a cost-effective and technically feasible solution to achieve the required transmission system reliability improvements and to interconnect the specified substations; and (2) avoid, minimize, or

mitigate adverse environmental and cultural effects and minimize impacts to the community to the extent possible.

Q. What were the primary criteria considered by Eversource in selecting the Proposed Route and the primarily overhead configuration?

A. Eversource applied the following factors in its evaluation process:

- Comply with all statutory requirements, regulations, and state and federal siting agency policies;
- Maximize the reasonable, practical, and feasible use of existing linear corridors (e.g., transmission line, highway, railroad, pipeline ROWs);
- Minimize adverse effects to sensitive environmental resources;
- Minimize adverse effects to significant cultural resources (archaeological and historical);
- Minimize adverse effects on designated scenic resources;
- Minimize conflicts with local, state and federal land use plans and resource policies;
- Minimize the need to acquire property by eminent domain;
- Maintain public health and safety;
- Achieve a reliable, operable and cost-effective solution.

Q. How many route alternatives did Eversource investigate?

A. Eversource investigated and evaluated ten route alternatives. These alternatives included the proposed all-overhead route along Eversource's existing ROW, five all-overhead route alternatives, one all-underground route alternative, and three combination overhead/underground route alternatives. Specifically, the route alternatives considered were:

- Proposed Route – Along Eversource's existing ROW
- Alternative 1 – Old Sherman Turnpike to Greenfield ROW to Railroad Route
- Alternative 2 – West on Greenfield ROW to Railroad Route
- Alternative 3 – Utility ROW West to Railroad Route

- Alternative 4– Utility ROW West to Greenfield ROW to Railroad Route
- Alternative 5 – U.S. Route 6/I-84 West to Railroad Route
- Alternative 6 – Utility ROW East to Old Hawleyville Road to Railroad Route
- Alternative 7 – East on U.S. Route 6 and Roads to Greenfield ROW Route
- Alternative 8 – U.S. Route 6 East to Greenfield ROW to Railroad Route
- Alternative 9 – All Underground Route aligned predominantly within Road ROWs

These route alternatives are discussed in detail in Section 11 of Volume 1 of the Application and are illustrated on the map at Attachment 5 (Figure 11-2 from the Application).

Q. Please provide a comparative summary of the alternative routes considered and the principal characteristics of such routes (including total route length, overhead and underground components).

A. The tables on the next page provide a "high level" comparison of the characteristics of the Proposed Route, as compared to the route alternatives that were considered and subsequently eliminated.

Summary and Comparison of All-Overhead Route Alternatives Considered and Eliminated

Route Alternative Characteristic	Route Alternative (Number)					Proposed Route
	1	2	3	4	5	
LENGTH*						
Total Length (Miles)	3.66	3.63	5.50	4.36	4.79	3.34
Length, by Municipality (Miles):						
• Bethel	0.63	2.12	0.51	0.51	1.63	2.16
• Danbury	2.59	1.07	4.55	3.41	2.72	0.85
• Brookfield	0.44	0.44	0.44	0.44	0.44	0.34
ROW CHARACTERISTICS						
Length within Transmission Line ROWs (miles)	1.33	2.47	1.70	0.46	2.23	3.34
Length along Local/State Road ROWs (miles)	0.59	0	0	0	0.59	0
Length along RR Corridors (miles)	1.11	0.34	3.72	2.36	1.40	0
Length of greenfield ROW (miles)	0.51	0.82	0	1.53	0	0
Need to Acquire New ROW	Yes	Yes	Yes	Yes	Yes	No

*Length totals may not be exact due to rounding of segment lengths

Summary and Comparison of Underground Route Alternative and Combination Underground/Overhead Route Alternatives Considered and Eliminated

Route Alternative Characteristic	Route Alternative				Proposed Route
	6	7	8	9	
LENGTH*					
Total Length (Miles)	5.60	3.82	4.82	3.46	3.34
• Miles Above Ground	2.30	3.32	3.92	0	3.34
• Miles Underground	3.30	0.50	0.90	3.46	0
Length, by Municipality:					
• Bethel	4.11	2.46	2.80	2.30	2.16
• Danbury	0	0.85	0.85	0.81	0.85
• Brookfield	1.46	0.51	1.16	0.34	0.34
ROW CHARACTERISTICS					
Length within Transmission Line ROWs (miles)	1.54	2.23	2.23	1.34	3.34
Length along Local/State Road ROWs (miles)	3.28	1.04	0.61	2.11	0
Length along RR Corridors (miles)	0.70	0	0.47	0	0
Length of greenfield ROW (miles)	0	0.55	1.51	0	0
Need to Acquire New ROW	Yes	Yes	Yes	Yes	No

*Length totals may not be exact due to rounding of segment lengths

Q. Why did Eversource ultimately reach the decision to select the all-overhead route on the existing ROW as the Proposed Route over the other route alternatives described above?

A. All of the route alternatives were evaluated based on Eversource's criteria and objectives for overhead and underground transmission lines. The Proposed Route

within Eversource's existing ROW, using an all-overhead transmission line design, was determined to be the preferred alternative. The Proposed Route and overhead line design represent the optimal Project configuration for the following reasons:

- The new overhead 115-kV line would be located entirely within Eversource's existing ROW, which is already devoted to utility use and has sufficient unutilized space to accommodate the new line without requiring relocation of the existing lines or the acquisition of additional easements. The co-location of the new line within this existing ROW also would be consistent with federal policies regarding linear energy facility siting, as well as with Eversource objectives.
- Although unavoidable temporary effects and minor long-term impacts to site-specific environmental resources would occur as a result of the construction and operation of the proposed 115-kV transmission line within Eversource's existing ROW, the development of the Project along Eversource's existing ROW would be consistent with state and local land use policies and would minimize long-term adverse environmental impacts to the maximum extent practical. Further, because the new 115-kV line structures would typically be substantially shorter than the existing transmission line structures on the ROW, the overall visual effects would be minor and inconsequential.
- The Proposed Route and overhead line design represent the most cost-effective alternative to Connecticut consumers and offer the optimal solution to bring a new 115-kV source to the Housatonic Valley sub-area.

Q. Did Eversource consider alternative configurations for the overhead - 115-kV line within the existing ROW?

A. Yes. During the Municipal Consultation Filing period that Eversource conducted as part of the Council's pre-filing process, certain landowners and representatives of the Town of Bethel requested that Eversource evaluate "shifting" the location of the new transmission line to the west/north side of the existing 321/1770 line, rather than the east/south side (as proposed in the Application). This configuration option was suggested to avoid forest vegetation clearing near certain residences. Eversource investigated this potential line design, taking into consideration engineering, environmental impacts, and cost. However, because the 321/1770 line structures are not centered within the ROW, there is less "un-used" space on the west/north side of the ROW to accommodate the new 115-kV line. As a result, the use of this configuration variation would require the acquisition of new easements from private property owners along the ROW. Based on this evaluation, Eversource determined that, compared to the Proposed Route, this configuration would increase costs and social impacts (from additional property acquisition) and would not result in any environmental, engineering, or constructability benefits.

7. SYSTEM ALTERNATIVES

Q. Did Eversource consider a "no action" alternative?

A. Yes, but a "no action" alternative was rejected because doing nothing to eliminate violations of national and regional reliability standards and criteria would not address the risk of system failures under certain contingency conditions and would be inconsistent with Eversource's obligation to provide reliable electric service.

Q. Were any transmission alternatives considered and evaluated?

A. Yes, as discussed in detail in the *SWCT Solutions Report,* the Working Group considered three other transmission alternatives, including one "local" alternative that – like the proposed Project – involved only upgrades in the Housatonic Valley sub-area, and two "global" alternatives that addressed the reliability issues in both the Housatonic Valley sub-area and the Frost Bridge-Naugatuck sub-area through combined solutions. The Working Group compared these four alternatives based on system performance, estimated cost, and other key factors such as ease of permitting, constructability, and expandability. The proposed Project was chosen as the preferred solution for the Housatonic Valley sub-area because it:

(1) Resolves all thermal and voltage criteria violations in the 10-year planning horizon;

(2) Provides the least-cost alternative to resolve the criteria violations in the sub-area; and

(3) Minimizes environmental and social impacts by focusing the 115-kV transmission upgrades within existing ROWs and on or in the vicinity of existing substations.

Q. Did Eversource consider non-transmission alternatives?

A. Yes, as discussed in Section 10 of the Application and in the Prefiled Testimony of Julia Frayer, Eversource retained London Economics International, LLC (LEI) to prepare a comprehensive analysis of non-transmission alternatives that could address the need served by the transmission solution. As outlined in detail in LEI's report (see Volume 4 of the Application) and summarized in the Application and Ms. Frayer's testimony, LEI concluded that an NTA solution – whether solely consisting of new generation or new generation in combination with demand reduction - would be far more costly than the Project and therefore economically impractical.

8. CONSTRUCTION

Q. What construction steps would be followed for the installation of the new overhead 115-kV line?

A. The primary activities involved in the construction of the overhead transmission line would include the following:

- Survey to stake the vegetation clearing boundaries and proposed structure locations;
- Mark the boundaries of previously delineated wetland and watercourse areas, as well as areas to be avoided or where site-specific mitigation measures will apply (e.g., sensitive cultural or environmental resource areas);
- Establish construction field office(s) and material staging sites (e.g., storage, staging and laydown areas) to support the construction effort. The preferred locations for such areas are typically in the vicinity of the ROW;
- Perform vegetation clearing along those portions of the ROW to be used for the construction of the transmission line;
- Install erosion and sedimentation (E&S) controls in accordance with best management practices;
- Construct new access roads (and/or improve existing roads) and work pads for structure and conductor installation;
- Construct foundations and erect/assemble new structures;
- Install conductors and shield wires;
- Restore disturbed sites.

Q. What construction activities will occur at Plumtree Substation?

A. The construction of the proposed Project modifications to the Plumtree Substation would involve connecting the new 115-kV transmission line to existing equipment within the substation yard, as well as replacing and upgrading an associated line disconnect switch and wave trap. No site preparation activities would be required for this work. Standard construction procedures for the line connection and equipment installation would be followed.

Q. What types of activities will occur at Stony Hill Substation and the adjacent ROW in connection with the proposed modifications to the substation and the reconfiguration of 115-kV interconnections at Stony Hill Substation.

A. The modifications within the Stony Hill Substation would involve standard construction procedures (e.g., site preparation, implementation of erosion and sedimentation (E&S) controls, modifications to equipment and structures, and site stabilization with crushed stone or equivalent). The reconfiguration of the existing 1770 and 1887 lines would entail procedures similar to those described for the construction of the new 115-kV line, except that three existing wood pole structures, located within the Eversource ROW adjacent to the substation, would be removed and properly disposed of. Two new structures would be installed to complete the line reconfigurations.

Q. Has Eversource identified potential storage and staging areas?

A. As described in Section 4.1.2 of Volume I of the Application, Eversource has identified potential material storage or staging sites on Eversource-owned properties in the vicinity of the Project ROW. However, the construction contractor(s) that Eversource selects for the Project would make final decisions regarding whether these or other staging areas would be used. Thus, because the location of the storage and staging sites would not be finalized until after a construction contractor is selected, final locations would be identified in the Development and Management ("D&M") Plan or submitted directly to the Council for approval before use.

Q. How would construction vehicles and equipment access the Project ROW?

A. Construction vehicles would access the Project ROW using the existing public road network along the route.

9. ELECTRIC AND MAGNETIC FIELDS

Q. What are Electric and Magnetic Fields?

A. Electric fields ("EF") are produced when a voltage is applied to a conductor. The level of an electric field at a given location near to a power line depends on the magnitude of the voltage applied, the arrangement and spacing of the line conductors and the distance from the conductors to the location.

Magnetic Fields ("MF") are produced when electric current flows on a conductor. The level of a magnetic field at a given location near to a power line depends on the magnitude of the current, the arrangement and spacing of the line conductors, and the distance from the conductors to the location.

EF and MF are collectively referred to as "EMF". Levels of each field fall off quickly as the distance from the conductor source is increased. Objects such as trees or building walls weaken or block electric fields, but magnetic fields are not affected by most materials. In the case of parallel lines of circuit conductors, the levels of EF and MF also depend upon the phasing of the circuit conductors and the directions of current flow.

Q. Has Eversource evaluated the effect of the Project on the current range of levels of EF and MF along the Proposed Route?

A. Yes. Section 7 (Volume I) of the Application (including the appendices to that section) provides a thorough analysis of the effect of the Project on EF and MF levels.

Q. Has Eversource considered the Council's EMF Best Management Practices in designing the Project?

A. Yes. The design of the Project is consistent with the Connecticut Siting Council's Electric and Magnetic Field Best Management Practices ("BMP"), as revised on February 20, 2014.

Q. What do the EMF BMP require?

A. Among other things, the BMP require transmission line applicants to adopt "no cost" line designs for lowering magnetic fields from new or reconstructed lines, and to identify "low cost" opportunities for making further reductions. The BMP establish a "benchmark" for "low cost" field reduction measures of 4% of the project cost, including substation costs. "Low cost" measures for reducing magnetic fields are required to achieve at least a 15% reduction in the fields that would be associated with the "base line" construction, consistent with standard good utility practice and incorporating no-cost field reduction measures.

Another requirement is that an applicant for an electric transmission line needs to present evidence of any new developments in scientific research addressing the potential health effects of transmission line magnetic fields or changes in scientific consensus group positions regarding them.

Q. Has Eversource provided an analysis of new developments in scientific knowledge concerning potential health effects of MF or position changes regarding MF in its Application?

A. Yes. Eversource retained scientists at Exponent, Inc. ("Exponent") to perform such analysis. Appendix 7D to the Application includes a report from Exponent with a systematic literature review critical evaluation of epidemiology and *in vivo* studies published from August 1, 2012 to July 31, 2015.

Q. What was Exponent's conclusion?

A. Exponent concluded that no recent studies that would alter the conclusions the Council has reached in its EMF Best Management Practices and in its recent transmission line dockets: the scientific evidence does not establish that EMF exposure is the cause of cancer or any other disease process at the levels we encounter in our everyday environment.

Q. What would be the major sources of EMF along the ROW once the Project is completed?

A. The multiple existing transmission lines on the existing ROW and the proposed 115-kV line would be the major sources of EMF. On the ROW from Plumtree Substation to Brookfield Junction, the proposed new line would be adjacent to the existing 345-kV 321 Line, a heavily-loaded circuit that is now and would remain the dominant magnetic field source on the ROW. In addition, the new line would be built adjacent to the existing 115-kV 1770 Line, and would share with that line the load transmitted between Plumtree Substation and Brookfield Junction. As a result, the addition of the proposed new 115-kV line to the Plumtree Substation to Brookfield

641 Junction ROW would have very little effect on the magnetic fields as compared to the
642 pre-existing edge of ROW magnetic fields.
643 Transformers and other equipment within the Plumtree and Stony Hill Substations
644 are also potential EMF sources, but would cause little or no exposure to the general
645 public. The strength of fields from equipment inside a typical substation decreases
646 rapidly with distance, and reaches very low levels at relatively short distances beyond
647 substation perimeter fences. The exception is where transmission and distribution lines
648 enter the substation property.
649 **Q. Did Eversource take measurements of existing electric and magnetic**
650 **field levels along the Proposed Route, as required by the BMP?**
651 A. Yes. Spot measurements of electric and magnetic fields were taken by
652 Eversource representatives on May 12 and 20, 2016 at two locations along the Proposed
653 Route. The Council's *Application Guide* requires measurements of existing EMF at the
654 boundaries of adjacent schools, daycare facilities, playgrounds, hospitals, youth camps,
655 and residential areas. There are no schools, daycare facilities, playgrounds, hospitals, or
656 youth camps adjacent to the ROW within which the new 115-kV line would be located.
657 However, there are two groups of homes that might be considered to be residential areas
658 adjacent to the ROW.
659 Accordingly, measurements were taken across the ROW, including at boundaries
660 of adjacent properties, at two locations where houses are closest to the ROW, specifically,
661 on Hearthstone Drive in Bethel and in the Lexington Meadows condominium complex
662 near the Danbury/Bethel line. These areas are referred to as "Focus Areas." The
663 measurements near each of these Focus Areas were taken at a height of 1 meter (3.28

feet) above ground, in accordance with the industry standard protocol for taking measurements of EMF near power lines.

The measurements are set forth in the table below.

Measured Electric and Magnetic Fields

Location	Magnetic Field (mG)	Electric Field (kV/m)
Hearthstone Drive, Bethel	22.33	2.3
Lexington Meadows, Bethel/Danbury	3.2	0.03

Q. What type of information do these measurements provide?

A. The measurements of MF are only a snapshot of conditions at a single moment in time at a specific location. Within a day, and over the course of days, months, and seasons, the MF level changes at any given location, depending on the amount and patterns of power supply and demand within the state and surrounding region. In contrast, the EF is quite stable over time.

Q. Did Eversource provide calculated estimates of EF and MF along the Project route before and after the proposed construction, as required by the Council's BMP?

A. Yes, this information can be found in Table 7C-1 on page 7C-3 of Appendix 7C. As discussed earlier, Attachment 1 to this testimony contains a replacement page 7C-3 that adds certain information inadvertently omitted from Table 7C-1 in the Application.

Q. How were MF and EF calculated for this purpose?

A. As described more fully in Section 7.3.2 of the Application and Appendix 7C (Volume I), Eversource estimated (1) annual peak load (APL) conservatively from ISO-NE's projected 90/10 system peak loads, (2) peak-day average loads (PDAL) over

687 24 hours at 85% of the system's hourly peak load (based on the 90/10 peak-load days)
688 and (3) annual average loads (AAL) based on the annual hourly average.
689 The Application presents calculations of magnetic field levels at 25-foot intervals
690 for the base design and alternative designs at AAL, APL and PDAL, together with
691 associated electric field levels. We consider the AAL case to be most useful reference for
692 predicting field levels for any 'typical' day. Accordingly, we used these levels to develop
693 the profiles and tables presented in the Application.
694 As required by the EMF BMP, loads projected for the year 2018 (the first summer
695 when the new line would be in service) were used for the "before construction"
696 calculations, and loads projected for 2023 (five years after the line will have been in
697 service) were used for the "after construction" calculations.
698 **Q. How do the estimated pre-Project electric and magnetic field levels**
699 **compare to the estimated post-Project electric and magnetic fields?**
700 A. As shown in the tables below and the graphs in Section 7.3.2 of the
701 Application (Volume I), the calculations based on projected average annual loading
702 conditions (which best represents the time weighted average of exposure) demonstrate
703 that the addition of the new 115-kV line will not substantially increase electric and
704 magnetic fields at the edge of the ROW, and will decrease electric fields in some
705 locations, compared to existing conditions.
706

Summary of Magnetic Field Calculations

Magnetic Field Calculation Summary (Average Annual Loads, field in mG)	Left Edge of ROW		Right Edge of ROW	
	Pre	Post	Pre	Post
	9.85	12.91	12.24	14.02

*Left and right edges of ROW are defined by looking from Plumtree Substation to Brookfield Junction

Summary of Electric Field Calculations

Electric Field Calculation Summary (Field in kV/m)	Left Edge of ROW		Right Edge of ROW	
	Pre	Post	Pre	Post
	0.17	0.16	0.17	0.22

Q. What is a Field Management Design Plan?

A. Under the EMF BMP guidelines, the Council requires an applicant proposing to build an overhead electric transmission line to develop and present a Field Management Design Plan that identifies design features to mitigate MF that would otherwise occur along an electric transmission ROW, particularly where the ROW is near certain land uses, such as playgrounds, residential areas, schools, and licensed day-care facilities.

Q. Did Eversource provide a Field Management Design Plan in the Application, as required by the Council's BMP?

A. Yes, Eversource's Field Management Design Plan is included in Section 7 of the Application at Appendix 7B. In accordance with the BMP guidelines, the proposed new 115-kV line has been designed so that it will have very little effect on magnetic field levels within and along the ROW. The Project's base overhead design incorporates "no cost" magnetic field reduction measures. Specifically, the base design incorporates

730 "optimum phasing", i.e., arranging the phases of the new 115-kV line to achieve better
731 cancellation with the magnetic field from the existing transmission lines on the ROW.

732 **Q. Did Eversource also consider "low cost" magnetic field mitigation**
733 **measures at the two Focus Areas, specifically, along Hearthstone and Chimney**
734 **Drives in Bethel and at the Lexington Meadows condominium complex along the**
735 **Bethel/Danbury line?**

736 A. Eversource reviewed other mitigation measures for these two Focus Areas
737 in developing the Field Management Design Plan, including the installation of an
738 underground segment at these locations, split phasing, an increase in structure height, and
739 shifting the new 115-kV line to the other side of the ROW. However, none of the
740 measures considered were "low cost" options, and only one of the measures (the split
741 phase design) would achieve substantial reduction in MF levels. Utilizing a split phase
742 design along Hearthstone and Chimney Drives and at the Lexington Meadows
743 condominium complex would increase the Project cost by a total of $3.92 million and
744 $3.22 million, respectively. Both of these expenditures would significantly exceed the
745 Council's guideline of 4% of total project costs (approximately $1 million for this
746 Project) for "low cost" mitigation measures. Therefore, Eversource does not recommend
747 the use of any additional MF mitigation measures at either of these Focus Areas,
748 particularly given that the projected increase in MF levels along the ROW is not
749 substantial.

750

Q. Has Eversource complied with all of the requirements in the relevant provisions of the statutes concerning EMF and the Council's BMP?

A. Yes, Section 7 of the Application and the documents in Appendix 7 fully comply with all of the requirements in the relevant provisions of the statutes concerning EMF and the Council's BMP.

Q. Please summarize Eversource's efforts to comply with the statutory and BMP requirements concerning EMF.

A. Eversource has complied with the statutory and the BMP requirements regarding EMF by:

- providing an update of scientific research and authoritative positions concerning potential adverse health effects of MF;
- providing measurements and calculations that were developed in accordance with the BMP; and
- preparing a Field Management Design Plan with a base design that incorporates standard utility practice with no-cost/low cost MF mitigation design features as applicable.

Q. Has Eversource complied with published MF guidelines?

A. Yes, the IEEE International Committee for Electromagnetic Safety (ICES) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) have issued guidelines for long-term public exposures to MF. The ICES reference level is 9,040 mG, and the ICNIRP reference level is 2,000 mG. Projected MF levels for the Project are well below these guideline levels.

10. SAFETY AND SECURITY

Q. Would the proposed new 115-kV line, substation modifications, or reconfiguration of existing 115-kV interconnections pose any safety risk to the public?

A. No. The construction of the proposed line, the modifications to Plumtree and Stony Hill substations, and the reconfiguration of existing 115-kV interconnections at Stony Hill Substation would not pose a safety threat or create any undue hazard to the general public, including persons or property. All work would be designed and constructed in accordance with all applicable national, electric utility industry, state and, to the extent practical, local codes.

Q. What would happen if an outage or fault occurred on the transmission or substation equipment?

A. High-speed protective relaying equipment would automatically detect abnormal system conditions (e.g., a faulted overhead transmission line that causes an outage) and would send a protective trip signal to circuit breakers to isolate the faulted section of the transmission system. Protection would also be provided by a Supervisory Control and Data Acquisition system (SCADA). The SCADA system allows for remote control and equipment monitoring by the Connecticut Valley Electric Exchange (CONVEX) System Operator.

Q. What fire protection systems are maintained at Plumtree and Stony Hill substations?

A. Smoke detection equipment would automatically activate an alarm at CONVEX and the system operators would then take appropriate action.

Q. Would the physical security of the Plumtree and Stony Hill Substations, as modified by this Project, be consistent with the Council's *White Paper on the Security of Siting Energy Facilities,* initially adopted in the Council's Docket 346, as amended (White Paper).

A. Yes. As explained in detail in the Application, the Project modifications would be consistent with the Council's *White Paper* Guidelines, including the focus on security issues associated with planning, preparedness, response, and recovery.

11. MUNICIPAL CONSULTATIONS AND OUTREACH

Q. Has Eversource complied with the municipal consultation requirement of section 16-50*l*(e) of the General Statutes?

A. Yes. Initial briefings were provided to the first selectmen of the Towns of Bethel and Brookfield and the mayor of the City of Danbury in March of 2016. Eversource initiated the formal municipal consultation process with these municipalities on April 14, 2016, more than 60 days before the Application filing.

Q. Has there been any dialogue with the municipal representatives after the municipal consultation filing?

A. Yes. Eversource received feedback from representatives of the towns during this period, including the request from Bethel representatives to evaluate a configuration alternative, as discussed above.

Q. Please summarize Eversource's contacts with Connecticut stakeholders, including government entities, interested organizations, landowners, and other individuals interested in or concerned about the Project, since you began your public outreach efforts.

A. Over the past year, Eversource has implemented a comprehensive outreach strategy to inform elected federal, state, and local officials, municipal department heads, municipal Commissions and Agencies, residents, business organizations and other stakeholders about the Project and to solicit feedback. This outreach has included group and individual meetings and presentations, written communications, phone calls, and an open house.

Q. What federal and state agencies has Eversource consulted with in connection with the Project?

A. In connection with the permits and approvals that would be required for the construction and operation of the Project, Eversource consulted, and is continuing to consult with, the following federal and state agencies:

- U.S. Fish and Wildlife Service
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- Connecticut Department of Energy and Environmental Protection
- Connecticut State Historic Preservation Office
- Native American Tribal Historic Preservation Office

12. STATUTORY COMPLIANCE

Q. What measures were undertaken by Eversource to inform the public and property owners along the route of the Project and adjacent to the substations, and to obtain their input?

A. Eversource sponsored an open house on May 4, 2016 at the Bethel CJH Municipal Center. As required by section 16-50*l*(b) of the Connecticut General Statutes,

bill inserts with Project information were mailed to customers. Notices were provided to community organizations and water companies as required by the Council's Application Guide, and to abutters of the Plumtree and Stony Hill substations, as required by section 16-50*l*(b). Legal notices of the Application were published in the Danbury News-Times, as required by section 16-50*l*(b). Copies of the Municipal Consultation Filing were placed in the local libraries and on the Project website www.eversource.com. Finally, a project hotline (1-800-793-2202) and a transmission project email address (TransmissionInfo@eversource.com) were established through which residents and other stakeholders can communicate with Project management.

Q. How was information presented at the open house?

A. The information was presented using a series of informational kiosks. The Project team subject matter experts were present to address questions from attendees about the proposed Project.

Q. Were signs posted informing the public of the Council's public hearing to be held on September 22, 2016, in advance of the hearing?

A. Yes. On September 6 , 2016, 4-foot by 6-foot signs notifying the public of the hearing were posted by members of the Project team at the locations below: (See Attachment 6)

Bethel:

- Plumtree Substation - Walnut Hill Road;
- Eversource Property - Payne Road
- Eversource Property - Hearthstone Drive
- Eversource Property - Chimney Drive
- Eversource Property - Sky Edge Lane
- Stony Hill Road/U.S. Route 6 (Line List 218)

Danbury:

- Eversource Property - Shelter Rock Road

Brookfield:

- Stony Hill Substation: 49 Stony Hill Road

13. CONCLUSION

Q. Please summarize your testimony.

A. Eversource proposes to construct the Project in compliance with all statutory requirements, the Council's regulations and applicable industry codes and standards. The Project will strengthen the reliability of the electric transmission system serving the Housatonic Valley sub-area of SWCT and would be constructed within an existing ROW and existing substation properties, thereby minimizing the impacts of the Project.

Q. Does this conclude your testimony?

A. Yes.

Docket No. 468 Southwest Connecticut Reliability Project

Direct Testimony of Raymond Gagnon, Allen Scarfone, Farah Omokaro, and Christopher Soderman

Attachments

Attachment 1 – Replacement Page for page 7C-3 of Application re: Calculations of Pre-Project and Post-Project Magnetic Fields

Attachment 2 – SWCT Electric Transmission System (Figure ES-1 from Application)

Attachment 3 – Proposed Route (Figure 1-1from Application)

Attachment 4 – Diagrams showing Reconfiguration of 1887 and 1770 115kV lines (Figures 2-3 and 2-4 from Application)

Attachment 5 – Map of Overhead and Underground Route Alternatives (Figure 11-2 from Application)

Attachment 6 – Notice Sign for September 22, 2016 Public Hearing

ATTACHMENT 1

Tabulated Results of Calculated Magnetic and Electric Fields

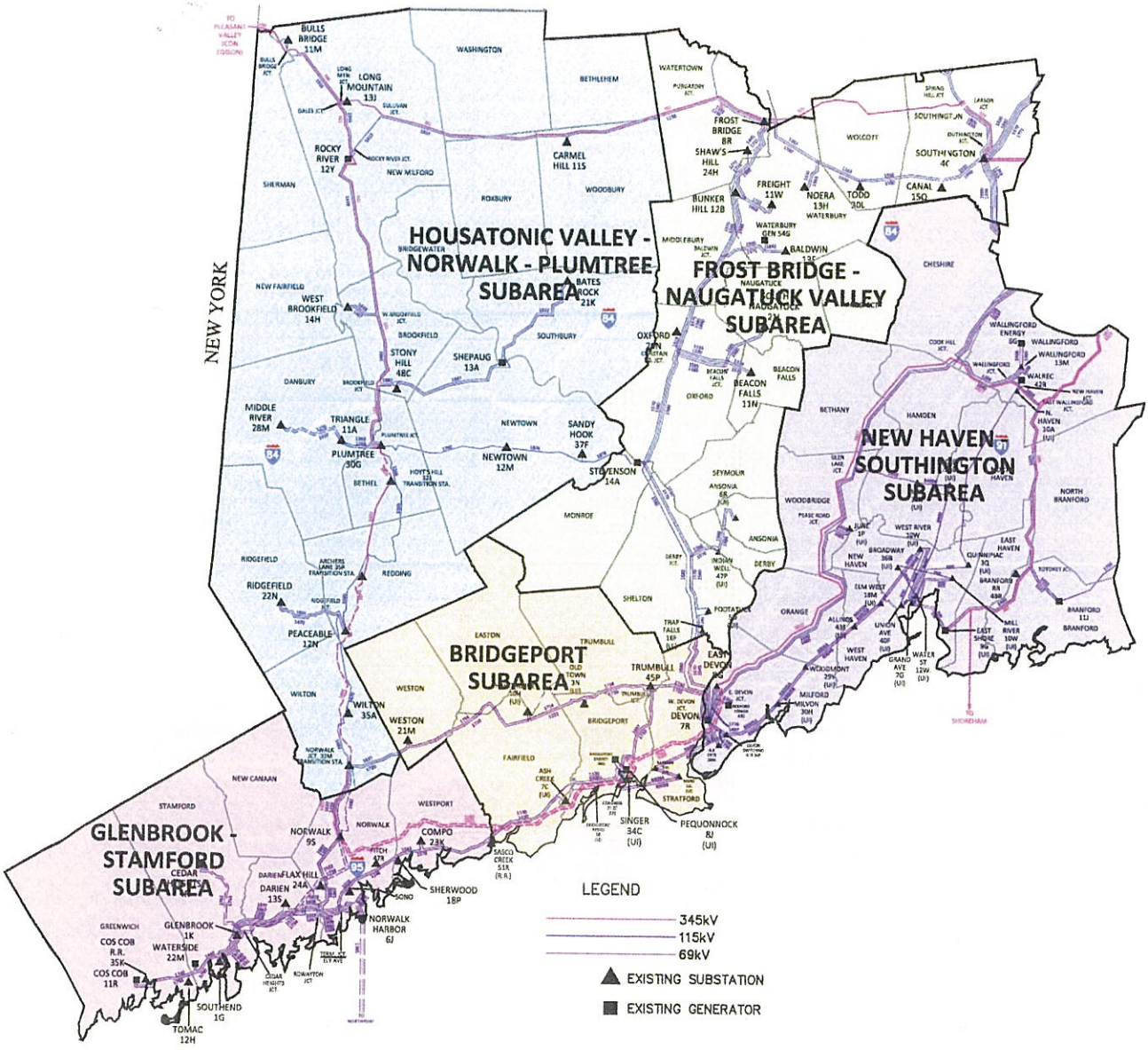
This appendix includes tabulated results for calculated electric and magnetic fields during annual peak load and the projected seasonal maximum 24-hour average load for pre- and post- construction. This is required in accordance with section IV.A of the Connecticut Siting Council Best Management Practices. Also included are results for the Average Annual Load, which serves as a surrogate that best represents the time weighted average of exposure from the proposed facilities.

Table 7C-1: Calculated EMF During Annual Peak Load (Pre- and Post-Construction)

Distance from Proposed Transmission Line	Pre-Construction				Post-Construction			
	Electric Field	Magnetic Fields			Electric Field	Magnetic Fields		
		Average Annual Load	Peak Day Average Load	Annual Peak Load		Average Annual Load	Peak Day Average Load	Annual Peak Load
(feet)	(kV/m)	(mG)			(kV/m)	(mG)		
-300	0.08	1.4	2.1	2.8	0.08	2.1	1.3	2.1
-275	0.09	1.7	2.6	3.6	0.09	2.5	1.7	2.6
-250	0.11	2.1	3.4	4.5	0.10	3.1	2.1	3.3
-225	0.13	2.7	4.5	6	0.12	3.9	2.8	4.3
-200	0.15	3.5	6.2	8.2	0.15	5.1	3.9	5.9
-175	0.17	4.8	9	11.9	0.16	7	5.6	8.3
-150	0.18	7.3	14	18.2	0.17	10	8.7	12.5
-125	0.20	12.4	23.3	29.8	0.18	15.6	14.6	20
-100	0.72	24.7	40.7	50.8	0.71	27.7	25.9	33.2
-75	1.80	48.8	57.4	69.1	1.77	52.8	37.9	43.3
-50	4.33	65.5	43.5	50.2	4.14	77.8	33.1	29.3
-25	3.00	48.3	21.6	27.1	2.20	62.4	26.3	28.3
0	0.73	27.4	11.9	16.4	0.66	32.3	17.6	30.4
25	0.07	16.2	7.8	10.9	0.30	18.1	8.6	18.2
50	0.20	10.3	5.5	7.7	0.20	12	5.1	10.8
75	0.22	7	4.1	5.7	0.18	8.4	3.4	7
100	0.19	5	3.1	4.3	0.16	6.2	2.5	4.9
125	0.16	3.7	2.5	3.4	0.13	4.7	1.9	3.6
150	0.14	2.9	2	2.8	0.11	3.6	1.5	2.8
175	0.11	2.3	1.6	2.3	0.10	2.9	1.2	2.2
200	0.10	1.8	1.4	1.9	0.08	2.4	1	1.8
225	0.08	1.5	1.2	1.6	0.07	2	0.8	1.5
250	0.07	1.3	1	1.4	0.06	1.7	0.7	1.3
275	0.06	1.1	0.9	1.2	0.05	1.4	0.6	1.1
300	0.05	0.9	0.7	1	0.05	1.2	0.5	0.9

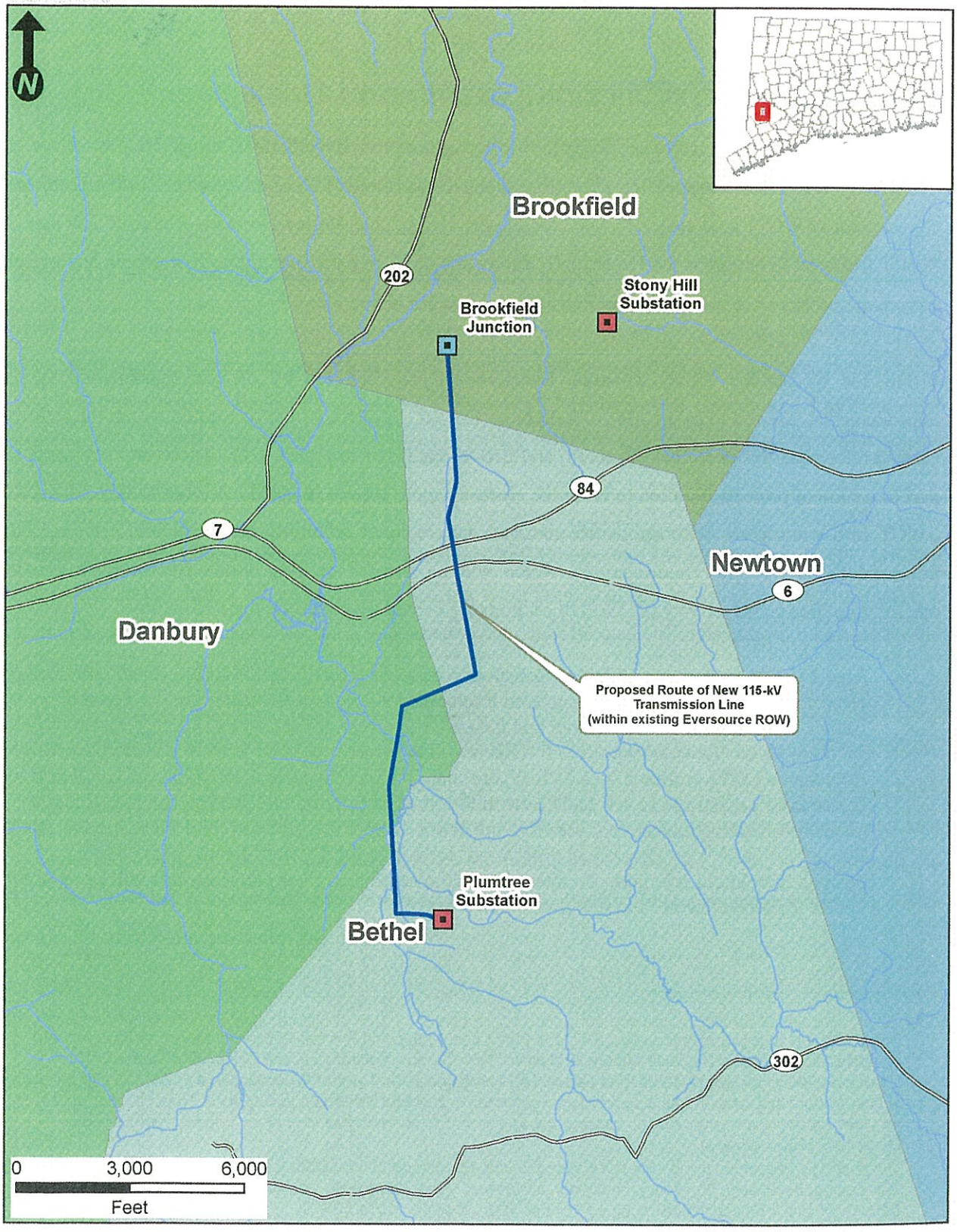
ATTACHMENT 2

Figure ES- 1: SWCT Region



ATTACHMENT 3

Figure 1-1: Proposed Project Location



ATTACHMENT 4

Figure 2-3: "Pre-Project" Configuration of the 1887 and 1770 Lines

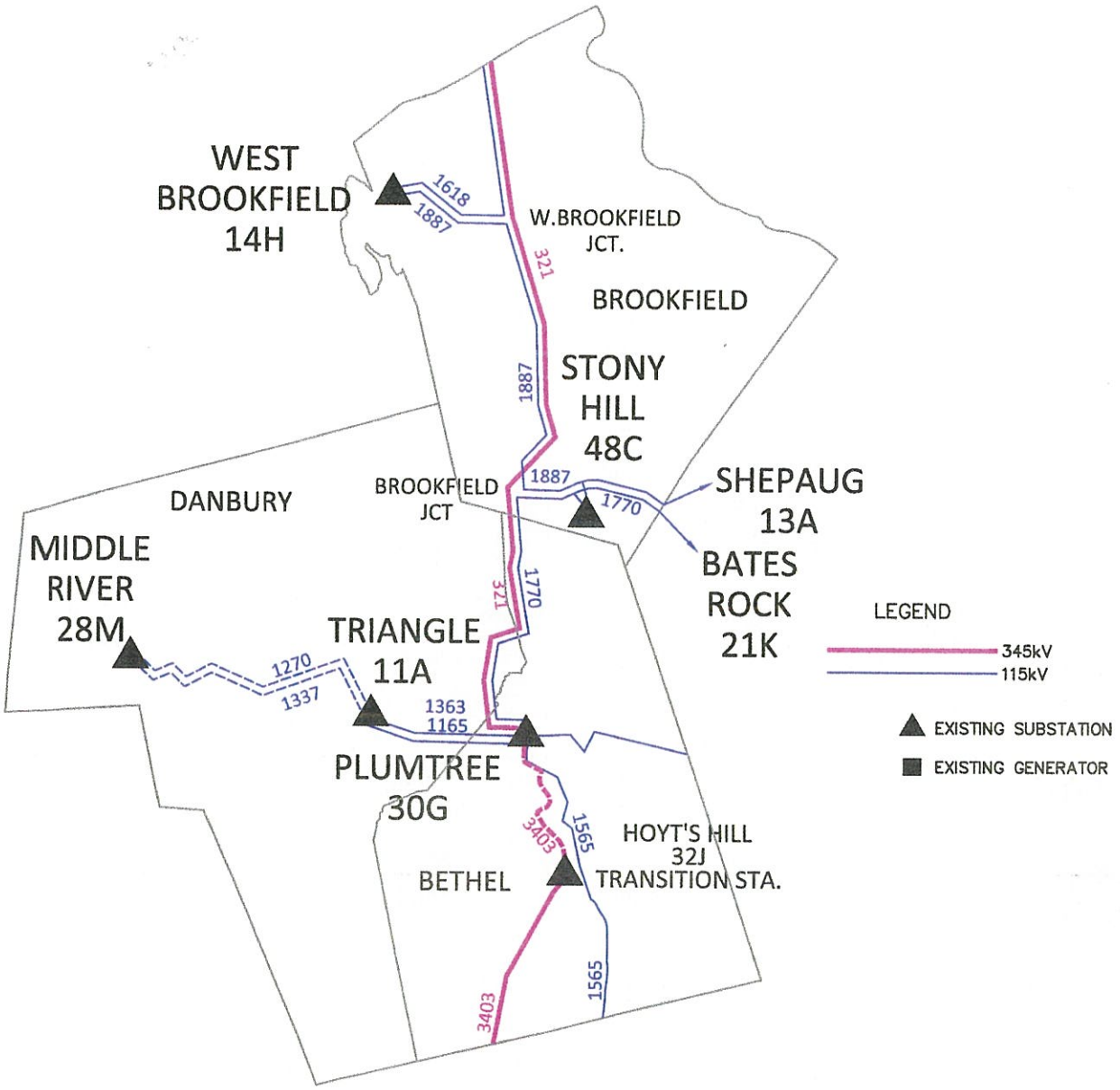
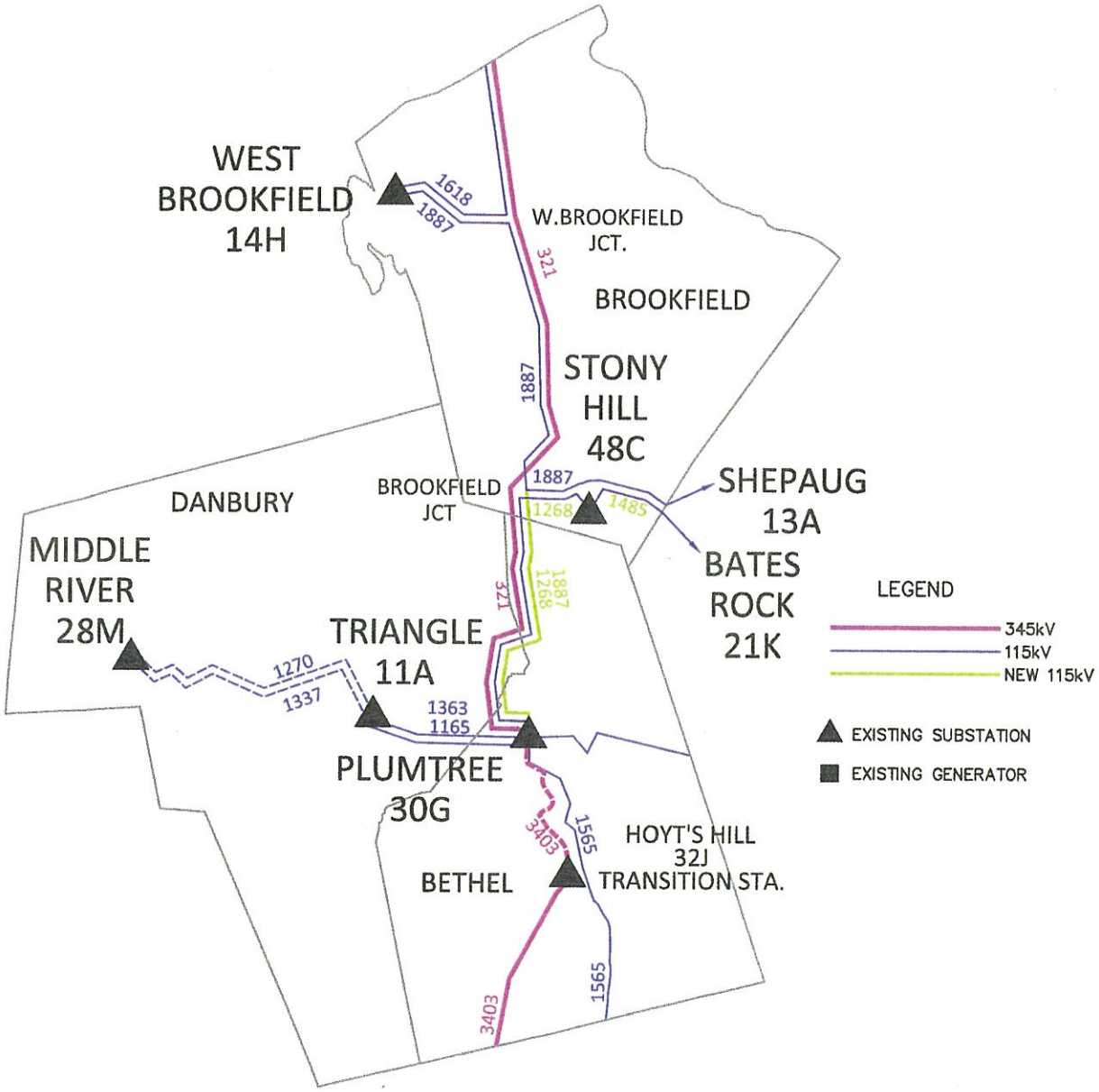


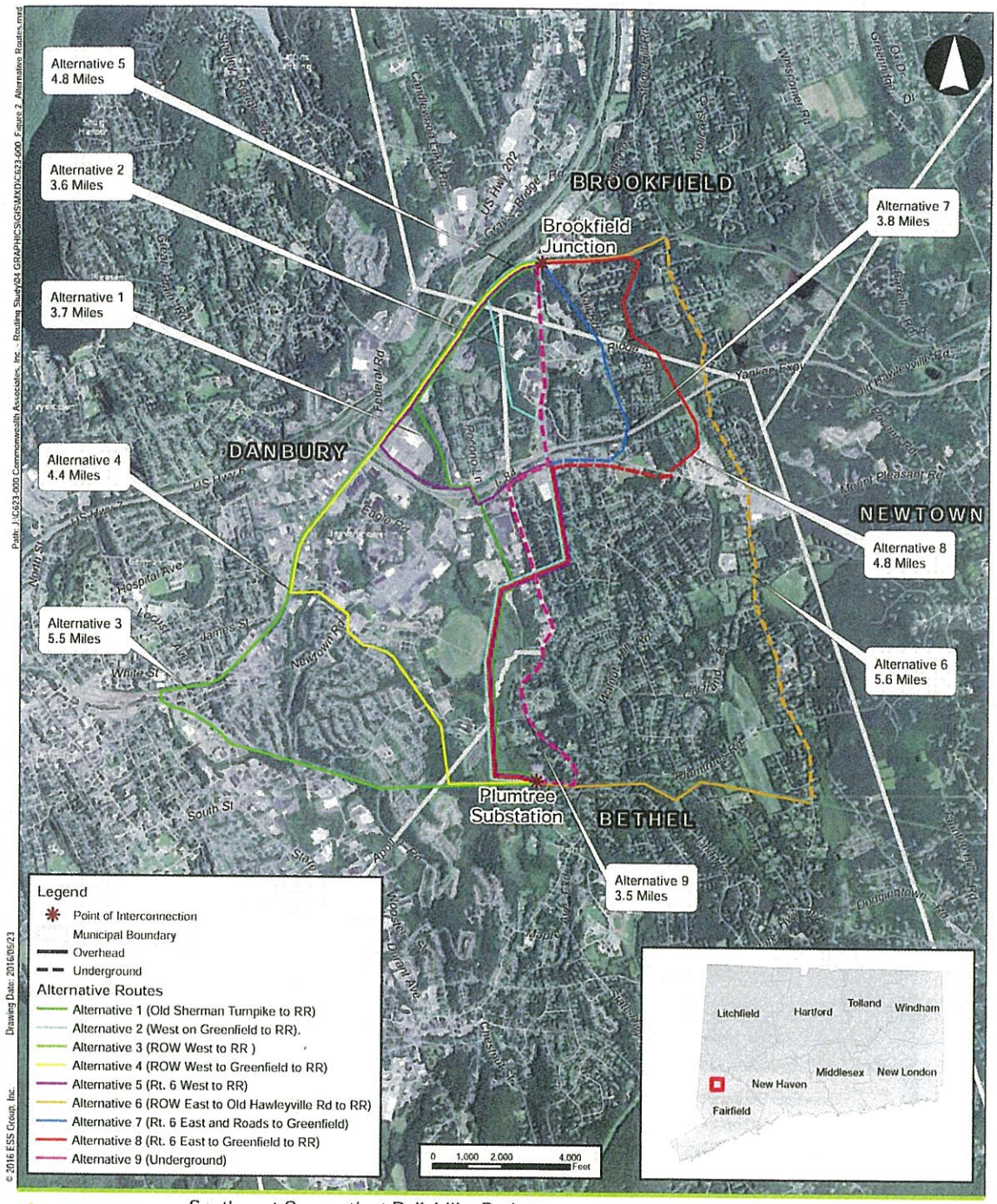
Figure 2-4: "Post-Project" Configuration of the 1887 and 1770[24] Lines



[24] The 1485 and 1268 lines, shown as "new" 115-kV lines, represent Eversource's planned re-numbering of the existing 1770 Line.

ATTACHMENT 5

Figure 11-2: Alternative Route Map: Aerial Based Map



Southwest Connecticut Reliability Project
Fairfield County, Connecticut

Alternative Routes

Scale: See Graphic Scale

Source: 1) USGS, 2013

ATTACHMENT 6


PUBLIC NOTICE
Applicant: The Connecticut Light and Power Company
doing business as Eversource Energy
Type of Facility: Electric Transmission Line
Public Hearing Date:
Thursday, September 22, 2016
3:00 PM and 7:00 PM
Bethel Municipal Center - General Purpose Room
1 School Street
Bethel, CT 06801
Applicable Documents for the Southwest Connecticut Reliability Project are available at
http://www.ct.gov/csc under Pending Proceedings - Docket 468
or the Town Halls in Bethel, Danbury, and Brookfield.
Connecticut Siting Council information:
(860)827-2935 or http://www.ct.gov/csc or siting.council@ct.gov
10 Franklin Square, New Britain, Connecticut 06