

**STATE OF CONNECTICUT  
CONNECTICUT SITING COUNCIL**

<p><b>DOCKET NO. 474</b> - The Connecticut Light &amp; Power Company d/b/a Eversource Energy application for a Certificate of Environmental Compatibility and Public Need for the Greater Hartford-Central Connecticut Reliability Project that traverses the municipalities of Hartford, West Hartford, and Newington, which consists of (a) construction, maintenance and operation of a new 115-kilovolt (kV) electric transmission line within existing Eversource, Amtrak and public road rights-of-way and associated facilities extending overhead approximately 2.4 miles and underground approximately 1.3 miles between Eversource's existing Newington Substation in the Town of Newington and existing Southwest Hartford Substation in the City of Hartford; (b) modifications to a .01 mile section within existing Eversource right-of-way of the existing overhead 115-kV electric transmission line connection to the Newington Substation (Newington Tap); and (c) related modifications to Newington Substation and Southwest Hartford Substation.</p>	<p style="text-align:center"><b>DOCKET NO. 474</b></p> <p style="text-align:center">August 15, 2017</p>
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**DIRECT TESTIMONY OF**

**KENNETH BOWES 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**

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1     **1. INTRODUCTION**

2           **Q. Please identify yourselves.**

3           A. [Mr. Bowes] I am Kenneth Bowes, Vice President, Transmission  
4 Performance for Eversource Energy, employed by Eversource Energy Service Company  
5 (Eversource Service), an affiliated company that provides services to The Connecticut  
6 Light and Power Company doing business as Eversource Energy (Eversource).

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

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

11           **Q. Please introduce the other members of your witness panel.**

12           A. With us are Eversource Service employees Robert Russo, Manager  
13 Transmission System Planning, who may respond to questions concerning the need for  
14 the proposed Project and the studies performed under the leadership of the Independent  
15 System Operator – New England (ISO-NE); J. Patrick Holmes of Burns & McDonnell  
16 who is the Project Manager of this Project, and Louise Mango of Phenix Environmental,  
17 Inc. who has submitted separate testimony concerning the environmental effects of the  
18 Project. In addition, Christopher Newhall, a Senior Environmental Scientist with  
19 AECOM, will be available to respond to questions concerning environmental effects,  
20 particularly concerning wetlands; Dr. Gabor Mezei of Exponent, Inc. will be available to  
21 respond to questions concerning his report, *Research on Extremely Low Frequency*  
22 *Electric and Magnetic Fields and Health, August 1, 2012 – August 31, 2016*, a copy of

23 which was submitted as Exhibit 2.C.2 to the Application; and Julia Frayer of London  
24 Economics International, Inc. (LEI) will be available to respond to questions concerning  
25 the LEI report, *Analysis of the Feasibility and Practicality of Non-Transmission*  
26 *Alternatives (“NTAs”) to the Greater Hartford / Central Connecticut Reliability Project*  
27 *(“GHCCRP”), August 31, 2015*, a copy of which was submitted as Exhibit 2.D.1 to the  
28 Application, and concerning Section 10.3 of the Application, which is based on that  
29 report. All of our résumés are provided to the Council in a separate volume.

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

32 A. Yes. At page 3-18, the Application incorrectly states that the Newington  
33 Substation’s *eastern* fenced area would be expanded 30 feet to the *east* to accommodate  
34 the new battery enclosure; however, the Application should have stated that the  
35 Newington Substation’s *western* fenced area would be expanded by approximately 20  
36 feet to the *west*. Also, at page 4-26, Piper Brook the un-named perennial tributary to  
37 Piper Brook, which would be crossed along the underground segment of the 115-kV  
38 Proposed Route adjacent to Shepard Drive in Newington, is described as 40’ wide. As  
39 correctly stated at pages 5-10 and 6-6 of the Application and in the table provided as part  
40 of the response to CSC 01 – Q29, the brook is 21’ to 25’ wide, bank-to-bank. In addition,  
41 the Application states conservatively at page 6-7 that the underground cable trench will  
42 be approximately 10’ wide in wetlands. Based on the results of further study of the  
43 anticipated cable installation procedure in wetlands, we expect that the actual trench  
44 width in wetlands will be less than 10 feet, thereby reducing the potential trenching  
45 impact area to less than about 0.11 acre (i.e., less than 5,000 square feet) in wetlands N-2,

46 as well as in wetland N-3. In comparison, Table 6-2 in Section 6 of the Application  
47 identified the trenching impacts in wetlands N-2 and N-3 as 0.12 and 0.16 acre,  
48 respectively. Updated wetland impact acreages will be calculated after the finalization of  
49 wetland construction methods and will be provided in the Project Development and  
50 Management (D&M) Plan(s).

51 **Q. What is the purpose of your testimony?**

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

- 54 1. Overview and Need for the Project;
- 55 2. Evolution of the Project's transmission line from an all-  
56 underground to a predominantly overhead "hybrid" configuration  
57 with the overhead segment located within a National Railroad  
58 Passenger (Amtrak) right-of-way (ROW).
- 59 3. Project Description: New 115-kilovolt (kV) Line
- 60 4. Project Description: Modifications to Substations and Newington  
61 Tap
- 62 5. Cost and Schedule;
- 63 6. Route Selection;
- 64 7. System Alternatives;
- 65 8. Construction;
- 66 9. Electric and Magnetic Fields;
- 67 10. Safety and Security;
- 68 11. Municipal and Agency Consultations and Outreach; and
- 69 12. Statutory Compliance.

70 In addition, Eversource’s environmental consultant, Louise Mango of Phenix  
71 Environmental, Inc. is filing Direct Testimony regarding environmental matters  
72 concerning the Project. Her résumé is also included in the separate volume.

73 **2. OVERVIEW AND NEED FOR THE PROJECT**

74 **Q. Please describe the proposed Project.**

75 A. The Project consists of a new 115-kV transmission line, which would  
76 extend for a distance of approximately 3.7 miles from Eversource’s Newington  
77 Substation in the Town of Newington, through the Town of West Hartford, to the  
78 Southwest Hartford Substation, located in the City of Hartford, connecting these two  
79 substations that are not presently connected. The line would be aligned almost entirely  
80 along existing linear corridors, including for approximately 0.8 mile on Eversource  
81 property or within an Eversource distribution line ROW, for approximately 2.4 miles  
82 along the Amtrak Railroad ROW (Amtrak ROW), and along state and local road ROWs.  
83 In addition to the new transmission line, Eversource proposes to expand and upgrade the  
84 Newington and Southwest Hartford Substations to accommodate the new equipment to  
85 be installed there. Both expansions would be approximately 0.3 acre and would be  
86 entirely within Eversource property. Finally, the Project includes the modification of a  
87 0.01-mile section of an existing overhead 115-kV transmission line (the 1783 Line)  
88 connection to Newington Substation (i.e., the “Newington Tap”).

89 The new 115-kV transmission line would consist of two underground cable  
90 segments – one in Newington and one Hartford (totaling approximately 1.3 miles) – and  
91 an approximately 2.4-mile overhead segment, located along the eastern side of the  
92 Amtrak ROW, which includes two railroad tracks and the CTfastrak busway. In  
93 Newington, the underground segment of the proposed transmission line would be aligned

94 within an Eversource distribution line ROW, local roads, State Route 173 (Willard  
 95 Avenue) and for a short distance over private property. In Hartford, the underground  
 96 segment would traverse along the boundary of a movie theater parking lot and then would  
 97 be aligned along New Park Avenue to the Southwest Hartford Substation. Along the  
 98 Amtrak ROW, the new transmission line would be aligned overhead, east of the  
 99 easternmost rail line.

100 The following table summarizes the proposed Project facilities in each of the three  
 101 municipalities:

102 **Project Facilities, by Municipality**  
 103

PROJECT FACILITIES	MUNICIPALITY			Total
	Approximate Miles			
Proposed 115-kV Line (Line Configuration)	Newington	West Hartford	Hartford	
Underground	1.16	0	0.17	1.33
Overhead	0.17	1.64	0.56	2.37
<b>Total</b>	<b>1.33</b>	<b>1.64</b>	<b>0.73</b>	<b>3.70</b>
Substation and Tap Modifications	Approximate Acres			
Substations	Newington Substation (0.3 acre)	N/A	Southwest Hartford Substation (0.3 acre)	0.6 acre
Newington Tap	Newington Tap (0.01 mile)	N/A	N/A	0.01

104

105 **Q. Please briefly describe the need for the Project.**

106 A. The principal purpose of this project is to connect two “load pockets”  
 107 within the Greater Hartford Sub-area<sup>1</sup> in order to eliminate violations of regional

<sup>1</sup> For the purpose of electric system planning, the Greater Hartford Sub-area includes 17 municipalities: Hartford, West Hartford, Newington, Berlin, Cromwell, Rocky Hill, Wethersfield, Plainville, New Britain, Farmington, Burlington, Avon, East Hartford, Bloomfield, Windsor, East Granby, and Granby. The system planning studies that identified the need for the project discussed in this Application considered needs in the Greater Hartford Sub-area, as well as the sub-areas of Northwest Connecticut, Manchester – Barbour Hill, and Middletown, together with the need to transmit additional power across Connecticut from east-to-west. The entire study area is designated the Greater Hartford – Central Connecticut area.

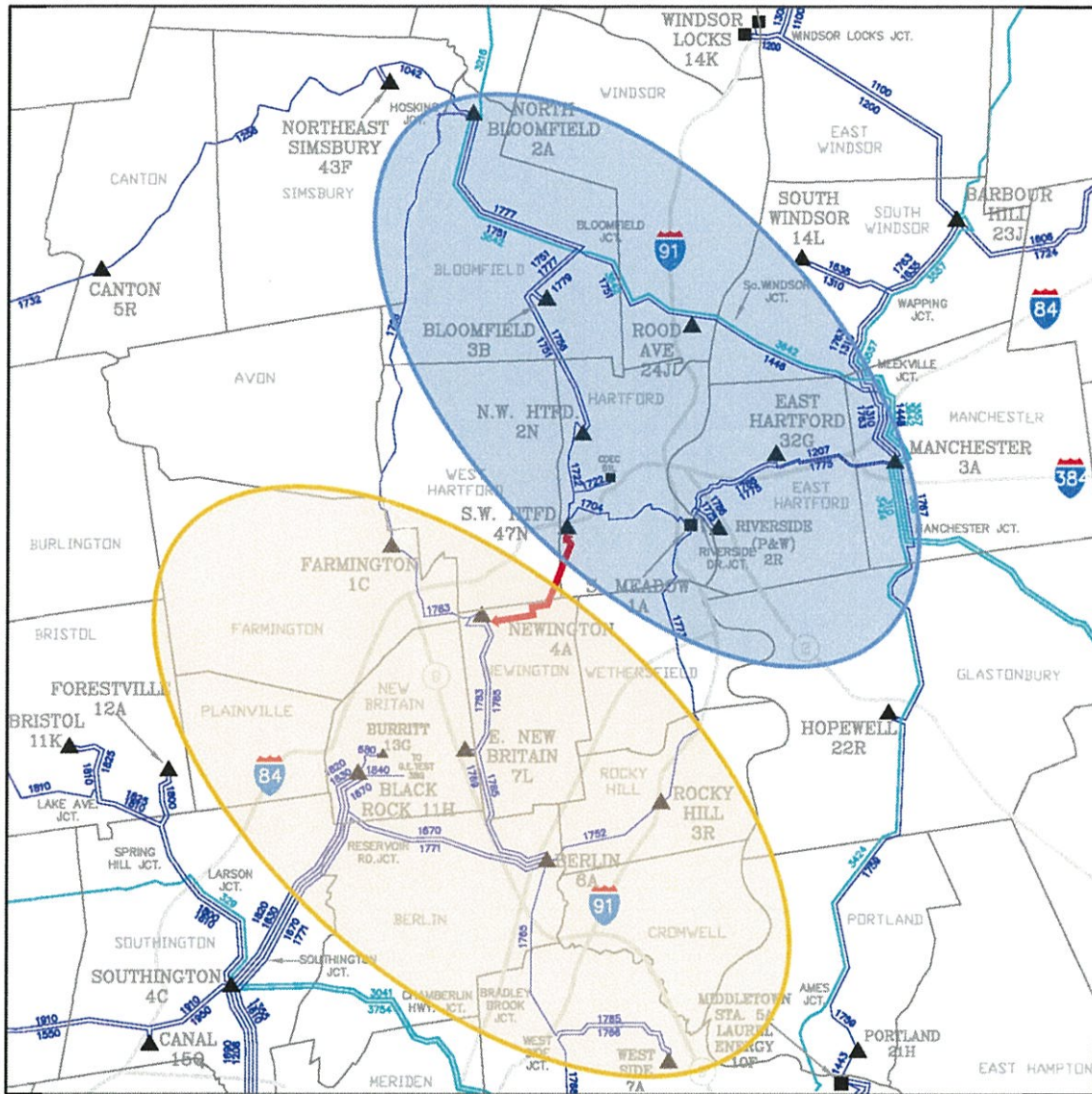
108 planning criteria. Electrical “load pockets” are areas with insufficient generation and/or  
109 transmission to serve customer load when the electric system is placed under stress. The  
110 new transmission line would link the two load pockets so that generation resources and  
111 transmission capacity in either of them would be available to serve the other when  
112 needed. Although not fully integrated electrically, the two load pockets in question<sup>2</sup> are  
113 geographically close to one another, so that they can be connected by a short transmission  
114 line. Figure 1 below illustrates the two load pockets and the connection between them  
115 that the Project would establish.

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<sup>2</sup> The two load pockets are designated as the South Meadow-Berlin-Southington load pocket and the North Bloomfield-Manchester load pocket.



116 **Figure 1: Two Load Pockets Connected by New Hybrid 115-kV Transmission Line**



117  
118 The proposed new transmission line and related substation improvements will enable the  
119 transmission system in each of these load pockets to serve the other. In the event of  
120 contingencies in either area, there will be an additional high voltage transmission element  
121 to share the load that will be automatically redistributed from the failed system element;  
122 and each area will have a new high capacity path by which generation from outside both

123 load pockets may reach the load within each. Both current load pockets will be fully  
124 integrated into the Connecticut electric system.

125 In addition to resolving load-serving deficiencies within the Greater Hartford Sub-  
126 area by eliminating two load pockets, the Project would improve the ability of the  
127 transmission system to move power across Connecticut when the system is under stress,  
128 by adding a new 115-kV transmission line to the Connecticut East-West Import Interface.  
129 As explained in Section 2 of the Application, the Central Connecticut Reliability Project  
130 (CCRP) component of the NEEWS Plan was originally designed to provide additional  
131 transfer capability across this interface, but was cancelled when ISO-NE determined that  
132 such need had substantially diminished, and that the Project could be designed to serve  
133 the “double duty” of addressing local load serving needs and also filling the residual need  
134 for additional transfer capability.

135 **Q. How was the need for the Project determined?**

136 A. The need for this Project was determined by an ISO-NE Working Group  
137 consisting of transmission planners from ISO-NE, Northeast Utilities Service Company  
138 (now Eversource Energy Service Company), and The United Illuminating Company  
139 through the Greater Hartford Central Connecticut (GHCC) suite of studies. These were  
140 the same studies that determined the need for the Frost Bridge to Campville 115-kV line  
141 project that the Council approved last year in its Docket 466, as well as several other  
142 projects listed in response to CSC01-Q06. Eversource has requested that the Council  
143 take administrative notice of that Docket in this one. As the Council knows from the  
144 Docket 466 proceedings, this multi-year series of studies culminated in two reports,  
145 *Greater Hartford and Central Connecticut (GHCC) Area Transmission 2022 Needs*

146 *Assessment (GHCC Needs Report) and Greater Hartford and Central Connecticut*  
147 *(GHCC) Area Transmission 2022 Solutions Study Report (GHCC Solutions Report).*  
148 Copies of the redacted public versions of these reports are included in Volume 2 of the  
149 Application, and copies of the full reports have been filed with the Council pursuant to a  
150 Critical Energy Infrastructure Information (CEII) protective order.

151 These reports identified, respectively, the need for upgrades to resolve reliability  
152 problems throughout the GHCC study area, and the specific solutions designed to address  
153 these needs, including upgrades in the Greater Hartford Sub-area that are the subject of  
154 this Application.

155 **Q. The *GHCC Needs Report* was published in 2012 and analyzed system**  
156 **needs in 2022. Since 2012, ISO-NE's forecasts of future loads have declined. If**  
157 **updated forecasts were used in the analysis, would the Project still be needed?**

158 A. Yes, the Project is needed at current load levels, and in fact it should be  
159 implemented as soon as possible. ISO-NE calculates a “year of need” for system  
160 improvements by estimating when the “critical load level” (CLL) for which  
161 improvements are needed would be reached. The CLL is the demand level at which  
162 criteria violations begin to occur. Above this load level, the system needs to be expanded  
163 to continue to reliably support the demand. The 2012 *GHCC Needs Report* found that the  
164 year of need for the Greater Hartford improvements was 2013, because the Connecticut  
165 peak load forecast for 2013 was 7,776 megawatts (MW), whereas thermal violations  
166 began to occur at a 4,756 MW net load and low voltage violations began to occur at a  
167 4,319 MW net load. Moreover, the majority of the worst-case violations in the Greater  
168 Hartford Sub-area occurred at the forecast 2013 net load level. The actual 2013 summer

169 peak was close to that ISO-NE 90/10 forecast. While subsequent peaks have been lower  
170 as illustrated in Table 1 below, they have consistently exceeded the critical load levels at  
171 which violations occur.

172 **Table 1: CT Historic Peak Loads v. Critical Load Levels**

<b>Actual CT Peak Loads Year</b>	<b>CT Peak (MW)</b>	<b>Thermal CLL (MW)</b>	<b>Voltage CLL (MW)</b>
2013	7,128	4,756	4,319
2014	6,183		
2015	6,342		
2016	5,522		

173 Accordingly, ISO-NE has not seen fit to reassess the need for the Project, and has  
174 continued to list it in its Regional System Plans.

175 **3. EVOLUTION OF THE PROPOSED TRANSMISSION LINE**  
176 **CONFIGURATION**

177 **Q. Please explain why the Project’s transmission line was specified as an**  
178 **all underground line in the *GHCC Solutions Report*, but evolved into a hybrid line**  
179 **with underground and overhead segments.**

180 A. The Project’s transmission line route and design evolved over a multi-year  
181 period and now reflects Eversource’s efforts to minimize Project cost, maximize the  
182 collocation of the new 115-kV line along existing linear corridors, and limit potential  
183 impacts to residential uses and environmental features.

184 When the line was initially designed, the ISO-NE Working Group concluded that,  
185 because of the dense urban and suburban development in the area between Newington  
186 and Southwest Hartford Substations, the installation of a new 115-kV line in an overhead  
187 configuration between these points would be impractical. Eversource was aware of the  
188 Amtrak corridor, which is situated east of both substations, extends generally from  
189 southwest to northeast, and is occupied by the two Amtrak rail lines and the Connecticut

190 Department of Transportation's (ConnDOT's) *CTfastrak* express bus service roadway.<sup>3</sup>  
191 However, the initial conclusion was that the presence of the new busway and two rail  
192 lines posed challenges for collocating an electric transmission line within the same  
193 corridor and, further, the corridor did not offer a direct connection between Newington  
194 and Southwest Hartford Substations.

195 As a result, Eversource anticipated that the new 115-kV line to interconnect the  
196 substations would have to consist of an all-underground cable system, located principally  
197 along local and state roads in the congested Newington-West Hartford-Hartford Project  
198 area. Eversource then conducted extensive investigations of alternative routes, following  
199 various road ROWs, for an all-underground line. The comprehensive analysis of  
200 underground line options is presented in the Project's Municipal Consultation Filing  
201 (MCF), which was issued in December 2015.

202 When Eversource was preparing the MCF for this Project in Autumn 2015, the  
203 hearings on the Greenwich Substation and Line Project were underway. At the Council's  
204 direction, Eversource was investigating the potential for collocating a portion of the  
205 Greenwich transmission line with the Metro-North Railroad ROW, a possibility we had  
206 dismissed during the early routing studies for the Greenwich project. That experience  
207 prompted Eversource to revisit the potential for collocating a portion of this project's  
208 transmission line, in an overhead configuration, along the Amtrak ROW. In doing so,  
209 Eversource recognized that an overhead line design could result in significant savings on  
210 the cost of the line (compared to an all-underground configuration) and also that the use  
211 of the Amtrak ROW could route a majority of the new line near commercial and

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<sup>3</sup> The *CTfastrak* is aligned along the western portion of Amtrak's ROW; ConnDOT leases the land for the busway from Amtrak.

212 industrial areas, rather than near residential uses. Accordingly, Eversource commenced  
213 further consultations with ConnDOT and Amtrak. We were pursuing that investigation at  
214 the time we filed the MCF, in December 2015. Although an all-underground route was  
215 presented as the proposed route in the MCF, we also advised the municipalities that we  
216 were investigating the potential feasibility of a route alternative along the  
217 Amtrak/CTfastrak corridor, and in the MCF included preliminary information about the  
218 status of these investigations and potential route alignments. We also indicated that we  
219 would advise the Council of the results of that investigation in our Application. *See*,  
220 Section 11.6.3.3 of the MCF. Ultimately, Eversource concluded that collocation of the  
221 2.4-mile overhead segment along the Amtrak ROW was feasible and significantly more  
222 cost-effective than the all-underground route.

223           Once it was determined that a portion of the new 115-kV line could be aligned  
224 along the Amtrak ROW, Eversource then conducted further studies to identify viable  
225 routes and line designs to connect the overhead portion of the new line along the Amtrak  
226 ROW to both Newington and Southwest Hartford Substations. Because of suburban  
227 development in Newington and commercial/transportation uses (including Interstate 84)  
228 in Hartford, the results of those analyses led to the selection of an underground line  
229 design for the connection of the Amtrak ROW segment to both of the substations.

230           **Q.     The MCF was filed in December 2015, but the Application in this**  
231 **Docket was not filed until June 2017. What accounted for the length of that**  
232 **interval?**

233           A.     Much of that time was spent working with Amtrak to determine if  
234 collocation was actually feasible. Before it would commit in principle to issuing a

235 license for Eversource to occupy its ROW, Amtrak required the submission of what it  
236 refers to as a “CE-4 Package” – basically a plan showing the proposed location and  
237 design of every transmission structure to demonstrate that the line could be built in  
238 compliance with Amtrak’s rigorous collocation requirements. Once we submitted the  
239 CE-4 package, 11 different departments within Amtrak were required to sign off on it  
240 before Amtrak could inform us that collocation was feasible in principle. In the  
241 meantime, we worked on routing of the line segments between each of the substations  
242 and the Amtrak ROW to design the optimal overall route. The Amtrak Chief Engineer  
243 issued a notice of Final Acceptance of our CE-4 package on January 6, 2016, which  
244 enabled us to proceed to negotiate a license agreement.

245 **Q. What is the current status of an Amtrak license for collocation of the**  
246 **overhead segment within its ROW?**

247 A. Eversource and Amtrak have agreed to the terms of the license and it is in  
248 the process of being executed. The document is currently with Eversource, which  
249 requires several levels of authorization for the license to be executed. When it has been  
250 executed by Eversource, the license will be presented to Amtrak for execution.

251 **Q. What is the status of the ISO-NE approval of the Project?**

252 The *GHCC Solutions Report* specified a project with an all underground  
253 transmission line and the I.3.9 technical approval that ISO-NE issued on April 16, 2015  
254 was based on an analysis of a project that included an all underground transmission line.  
255 Accordingly, Eversource will need to seek a supplemental I.3.9 approval from ISO-NE  
256 before it can construct the Project. We plan to do that as soon as the Council has issued a

257 decision in this Docket so that we can assure ISO-NE that there will be no further  
258 changes in the configuration of the Project.

259 **Q. Do you anticipate any difficulty in obtaining this supplemental**  
260 **approval from ISO-NE?**

261 A. No. Eversource planners have determined that the electrical  
262 characteristics of the revised Project are sufficiently close to that for which the original  
263 I.3.9 was issued such that there should be no issue with the issuance of supplemental I.3.9  
264 approval. Moreover, ISO-NE should be pleased that the estimated overall project cost  
265 has been significantly reduced by the change in the configuration of the transmission line.  
266 The estimate of the cost of the improvements making up the all-underground project in  
267 the 2015 *GHCC Solutions Report* was \$95.9 million. The more current estimate of the  
268 all-underground alternative cost in the Application in this Docket is \$99.8 million. In  
269 comparison, the estimated cost of the proposed Project, with the hybrid transmission line,  
270 is \$61.1 million.

271 **4. PROJECT DESCRIPTION**

272 **4A. NEW 115-KV LINE**

273 **Q. Please indicate the location and configuration of the new 115-kV line.**

274 A. Figure 1-2 from the Application, illustrates the Proposed Route for the  
275 new 115-kV line (designated by Eversource as the 1346 Line), as well as the locations of  
276 Newington and Southwest Hartford Substations, which the new line will connect. The  
277 line will include two segments of single-circuit underground cross-linked polyethylene  
278 (XLPE) cable, each extending from one of the substations. These two underground  
279 segments will be connected by a segment of overhead transmission line located along the  
280 eastern portion of the Amtrak ROW.



281 The underground cables will be installed in polyvinyl chloride (PVC) ducts  
282 encased in concrete duct banks, which will also house three fiber optic cables. Two of  
283 these fiber optic cables will be used for remote protection and control of the cable system  
284 and the third for monitoring the operating temperature of the cables.

285 The overhead line segment will typically consist of galvanized steel monopoles,  
286 approximately 95 to 110 feet in height above ground level, in a vertical configuration,  
287 supporting standard 1,272-kcmil aluminum conductor with steel support (ACSS)  
288 conductors and a lightning shield wire. The preliminary design provides for 49 of these  
289 structures. In addition, there would be two transition structures, each a steel monopole,  
290 approximately 95 to 105 feet in height above ground level, one at each end of the  
291 overhead ROW segment.

292 The various line segments would be located as follows:

- 293 • ***Underground Route Segment: Newington.*** This underground segment would  
294 extend approximately 1.1 miles from Newington Substation east/northeast to the  
295 Amtrak ROW. Along this segment of the Proposed Route, the underground cable  
296 would be located for approximately 0.8 mile on Eversource's property and within  
297 Eversource's existing ROW between Newington Substation and State Route 173  
298 (Willard Avenue). From the intersection of the Eversource ROW and State Route  
299 173, the Proposed Route would be aligned north along State Route 173 for  
300 approximately 0.14 mile and then east for approximately 0.13 mile along Shepard  
301 Drive and across a privately-owned paved parking area to a transition structure to  
302 be located west of and adjacent to the Amtrak ROW. As shown on the maps in  
303 Volume 3 of the Application, all three splice vaults would be located in upland  
304 areas: two on Eversource property and one along Shepard Drive.
- 305 • ***Overhead Route Segment: Newington, West Hartford, and Hartford.*** From the  
306 transition structure located at the end of the underground cable segment in  
307 Newington, the overhead portion of the line would span the CTfastrak<sup>4</sup> and  
308 Amtrak's two existing rail lines and then would extend north for approximately  
309 2.4 miles along the east side of the Amtrak ROW in West Hartford and Hartford.  
310 South of Interstate 84 (I-84), the overhead line would turn west, again spanning

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<sup>4</sup> The CTfastrak, a busway developed and operated by ConnDOT, extends linearly along the western portion of the Amtrak ROW between New Britain and Hartford. Amtrak operates two railroad lines on the central and eastern portions of the ROW.

311 the Amtrak rail lines and *CTfastrak* to another transition structure (proposed for  
312 location on Amtrak property west of the *CTfastrak*, near the northern portion of  
313 the Bow Tie Cinema parking lot). Along this Proposed Route segment, the  
314 Amtrak ROW, which Amtrak owns, varies in width from 86 feet to 155 feet, but  
315 typically is 93 to 115 feet wide.

316 • ***Underground Route Segment: Hartford.*** This underground segment would  
317 extend for approximately 0.2 mile, traversing from a transition structure located  
318 within the Amtrak ROW at the north end of the overhead line segment into  
319 Southwest Hartford Substation. From the transition structure, the underground  
320 cable would extend west for approximately 0.1 mile on the northern portion of the  
321 Bow Tie Cinema property, which is situated directly south of I-84, and then  
322 would turn north along New Park Avenue, crossing beneath I-84 to Southwest  
323 Hartford Substation (located adjacent to and west of New Park Avenue).

324 **Q. Describe the process by which Eversource identified the proposed**  
325 **overhead structure locations and line design, as illustrated in the Application,**  
326 **along the Amtrak ROW.**

327 A. The preliminary location for each of the proposed transmission line  
328 structures was determined based on consultation with Amtrak and by applying  
329 transmission line design software (Power Line System's PLS-CADD™). Each structure  
330 design and location must conform to both Amtrak and Eversource specifications.

331 In determining the line design along the Amtrak ROW, Eversource consulted with  
332 Amtrak, recognizing that standard overhead configurations, as used for structures placed  
333 on wider transmission line ROWs, could not be applied to the constrained work space  
334 within the railroad property. In addition, Eversource's transmission line design had to  
335 avoid impacts to the adjacent rail lines by locating structures as close to the eastern edge  
336 of Amtrak ROW as possible and by confining potential wire blowout, to the extent  
337 possible, to the edge of Amtrak ROW. Further, Amtrak requested that the overhead line  
338 design also account for:

- 339       • A future electrification catenary structure<sup>5</sup> line, which would potentially be  
340       aligned west of the overhead 115-kV line and east of the existing two railroad  
341       tracks.
- 342       • A future regional train station, which could potentially be located east of and  
343       adjacent to the tracks, just south of Flatbush Avenue in West Hartford.
- 344       • The provision, where possible, of a 10-foot-wide access road along the eastern  
345       portion of the ROW for Amtrak's use.<sup>6</sup>
- 346       • The maintenance, where possible, of 18 feet from the center of easternmost  
347       railroad track to the face of each proposed transmission structure.

348       To accommodate these design requirements, the proposed 115-kV structures  
349       along the Amtrak ROW must be taller and more closely spaced than would be the case  
350       along a typical transmission line ROW. For example, most spans between the proposed  
351       structures along the Amtrak ROW would be approximately 250 to 300 feet. In  
352       comparison, along an existing, wider ROW, new 115-kV transmission structures would  
353       typically be lower and spaced at 600- to 800-foot intervals. The locations and design of  
354       the structures, as presented in the Application, reflect the results of Amtrak's review of  
355       the CE-4 engineering package that Eversource provided concerning the overhead line  
356       segment.

357       Structure locations may be modified as the Project design process proceeds and  
358       coordination with Amtrak continues. For example, each proposed structure location  
359       would be further evaluated based on continued constructability studies. Future changes  
360       could occur based on information obtained from more detailed field studies (e.g.,

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<sup>5</sup> A catenary is a system of overhead structures and wires used to supply power to an electrified rail system.

<sup>6</sup> An existing Amtrak access road extends along the portions of the Amtrak ROW, east of the eastern rail line (refer to the Application, Volume 3 maps). Some areas of this access road may be affected by the proposed transmission line structures. In such locations, Eversource proposes to relocate the access road, if possible, within the Amtrak ROW. If not affected by the proposed transmission line structures, the access road would remain in place.

361 subsurface investigations, final engineering and constructability reviews), as well as input  
362 from municipalities, the Council, and other regulatory agencies.

363 After this additional information has been evaluated, final detailed line  
364 engineering would be performed to determine the exact locations of the new structures.  
365 Typically, the final structure locations are expected to be within 20 feet (longitudinally  
366 along the line) of the proposed structure locations, as depicted on the Application,  
367 Volume 3, 100-scale maps.

368 **Q. In addition to the Amtrak license, will Eversource require any**  
369 **easements from private property owners for the overhead segment of the**  
370 **transmission line?**

371 A. Yes, one structure south of Flatbush Avenue in West Hartford (Structure  
372 46) will probably need to be located on private property adjacent to the Amtrak ROW  
373 because there is insufficient room within the ROW in that location. In addition, the  
374 southern (Newington) transition structure is proposed for location on a privately-owned  
375 industrial parcel. Eversource is consulting with both affected property owners.

376 **Q. Does Eversource have the rights to install and operate the**  
377 **underground segment of the line along its existing distribution line ROW between**  
378 **Newington Substation and State Route 173?**

379 A. Yes. The underground cable would extend for approximately 0.8 mile within  
380 Eversource's existing ROW, which is presently occupied by five distribution line circuits  
381 (two double-circuit overhead lines and an underground line). Approximately 80% of this  
382 segment of "ROW" is actually located on Eversource fee-owned property. As to the  
383 remainder of the ROW, Eversource has underground cable installation rights.

384           **Q.     Will Eversource require easements from private property owners for**  
385 **any portions of the underground transmission line?**

386           A.     Yes, in certain areas, portions of the cable system (duct bank or splice  
387 vaults) must traverse private property (such as the private lands that the Proposed Route  
388 would cross between public road ROWs and the Amtrak ROW where the line transitions  
389 from underground to overhead). Further, if underground utilities within public roads  
390 pose constraints, portions of the cable system could have to be situated outside of public  
391 road ROWs. In such locations, Eversource would negotiate a permanent easement with  
392 the private property owner.

393           **Q.     In addition to these permanent easements, will Eversource need**  
394 **temporary construction easements?**

395           A.     Yes. Eversource would acquire temporary easements, as needed, for the  
396 access roads and staging areas/laydown yards required to construct the new 115-kV line.  
397 These temporary construction support areas, which may be located on private properties,  
398 would be identified as part of the Council's Development and Management ("D&M")  
399 Plan process.

400 **4B.    MODIFICATIONS TO SUBSTATIONS AND NEWINGTON TAP**

401

402           **Q.     Describe the existing Newington Substation.**

403           A.     Newington Substation, which has been in operation for about 60 years, is  
404 located at 185 Cherry Hill Drive in the northwestern portion of the Town of Newington.  
405 The substation occupies approximately 1.7 acres of an 11.4-acre Eversource property,  
406 and is a 115- to 23-kV substation with three 115- to 23-kV transformers. The existing  
407 1785 Line and the 1783 Line each connect to separate circuit breakers within the

408 substation. A transformer connects to these two circuit breakers. Each of these existing  
409 115-kV lines leaves the substation overhead. Existing distribution lines extend from the  
410 substation to the north, east, and west.

411 **Q. What modifications to Newington Substation are planned?**

412 A. The existing 1783 Line position would be relocated to accommodate the  
413 connection of the new 115-kV line to the existing 1783 Line position. The final  
414 configuration for each terminal position would include one lightning arrester, one  
415 disconnect switch, and one Capacitance Coupling Voltage Transformer (“CCVT”) per  
416 phase. Other modifications include a new, approximately 70-foot-tall dead-end structure  
417 for the relocation of the 1783 Line, the construction of a new control enclosure (having  
418 dimensions of approximately 32 feet by 14 feet) to house protection and control  
419 equipment, and the extension of the substation ground grid. To accommodate these  
420 modifications, the developed portion of the substation would be expanded by  
421 approximately 0.3 acre and a cast-in-place concrete retaining wall would be built on the  
422 south and west sides of the substation fence line to maintain the grade for that expanded  
423 portion of the substation.

424 **Q. Briefly describe the existing Southwest Hartford Substation.**

425 A. Southwest Hartford Substation is located at 219 New Park Avenue in a  
426 commercial area in the southwestern portion of the City of Hartford. The site is  
427 bordered on the south by I-84, on the east by New Park Avenue, to the north by a  
428 tributary to the South Branch of the Park River and to the west by commercial areas.  
429 Eversource acquired the Southwest Hartford Substation property for utility use in  
430 1968. Two 115-kV underground high-pressure fluid filled (“HPFF”) cables (the 1722

431 Line and the 1704 Line) and nine 23-kV distribution lines presently connect to the  
432 substation. The existing (fenced) substation area occupies approximately 2.1 acres of  
433 a 7.1-acre Eversource property.

434 **Q. What modifications to Southwest Hartford Substation are planned for**  
435 **the Project?**

436 A. The existing 115-kV yard would be reconfigured into a ring bus, with two  
437 new 115-kV circuit breakers, and a portion of the 1722 Line and related substation  
438 equipment would be relocated. The facilities for each line would include a series reactor,  
439 circuit switcher, disconnect switch, arrester, CCVT and pothead per phase. Although the  
440 new 1346 Line would enter the substation underground, as does the existing 1722 Line, a  
441 bypass would be necessary for the operation of the reactors. This would require the  
442 installation of two new 70-foot-tall dead end structures, per line (for a total of four new  
443 dead end structures) within the substation. Other Project modifications would include the  
444 extension of the substation ground grid, as well as the relocation or removal of certain  
445 existing interconnection piping and a valve cabinet, and the relocation of the termination  
446 of the existing 1704 HPFF underground line. To accommodate the new equipment, the  
447 fenced area would be expanded by approximately 65 feet to the east and the existing  
448 access road and gate off New Park Avenue would be modified. Grading and drainage  
449 improvements would be performed, as required.

450 **Q. Please describe the existing Newington Tap and the proposed**  
451 **modification to it.**

452 A. Eversource's 115-kV overhead 1783 Line extends from Farmington  
453 Substation (in the Town of Farmington) to East New Britain Substation (in the City of

454 New Britain), passing adjacent to Newington Substation. A 0.01-mile segment of the  
455 1783 Line connects to Newington Substation. This connection, referred to as the  
456 Newington Tap, would be modified as part of the Project. Specifically, the existing 0.01-  
457 mile Tap transmission line would be relocated and rebuilt with larger conductors. These  
458 modifications would provide space within the substation to accommodate the new 1346  
459 Line termination and would avoid overloads on the Tap line under certain contingencies,  
460 such as when Newington Substation tries to simultaneously supply both East New Britain  
461 and Farmington Substations.

462 **5. COST AND SCHEDULE**

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

464 A. The estimated capital cost of the Project is approximately \$61.1 million  
465 (\$44.4 million for the transmission line, including \$1.2 million for the Newington Tap  
466 modifications, and \$16.7 million for the substation modifications).

467 **Q. Does Eversource expect that the costs of the Project will be**  
468 **“regionalized”?**

469 A. ISO-NE makes the determination of whether all costs of a project are  
470 regionalized in a Transmission Cost Allocation (TCA) process. As currently designed,  
471 Eversource expects that all costs of the Project would be subject to regional cost support.  
472 However, if ISO-NE were to determine that the Project, as built, includes some costs that  
473 are incurred to satisfy “local” requirements, such costs would likely be localized. The  
474 TCA process for this Project will be unusual, since ISO-NE previously selected a much  
475 more expensive all-underground project as the preferred solution in the *GHCC Solutions*



476 *Report.* Instead of “gold plating” an approved project, the siting process will have  
477 reduced its cost.

478 **Q. If the costs are regionalized, then what share would Connecticut’s**  
479 **electricity customers pay?**

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

482 **Q. What is the anticipated timetable for construction?**

483 A. The Application contemplates that construction will commence in mid-  
484 2018, with an in-service date of the fourth quarter of 2019. However, given that the year  
485 of need for this project was 2013, it should be placed in service sooner, if possible. The  
486 Siting Council has provided an early hearing for the Project. If it continues to process the  
487 Application at an accelerated pace and if other required permits can be obtained in time,  
488 we would hope to achieve an earlier in-service date.

489 **6. ROUTE SELECTION**

490 **Q. How did Eversource determine the proposed transmission line route?**

491 A. As explained in Section 3 of this testimony, we initially considered only  
492 all-underground routes, mostly within local or state roads. That route selection process  
493 and the many different all-underground routes we considered are reviewed in the MCF  
494 and summarized in Volume 1, Section 11.6 of the Application. After we determined that  
495 collocation of an overhead segment of the line along the Amtrak ROW was feasible (as  
496 explained in Section 3 of this testimony), we began the route selection process for a  
497 “hybrid” overhead/underground route. Our routing criteria, route selection process, and

498 the many routes and route variations considered before we arrived at the final Proposed  
499 Route are described at length and in detail in Volume 1, Section 11 of the Application.

500 In designing the hybrid route, we sought to maximize the length of the overhead  
501 segment along the railroad corridor, and thus to minimize the lengths and potential  
502 impacts of the two connecting underground segments from the substations to the Amtrak  
503 ROW, which would be constructed along public streets and across private property.

504 Underground Segment Extending from Southwest Hartford Substation

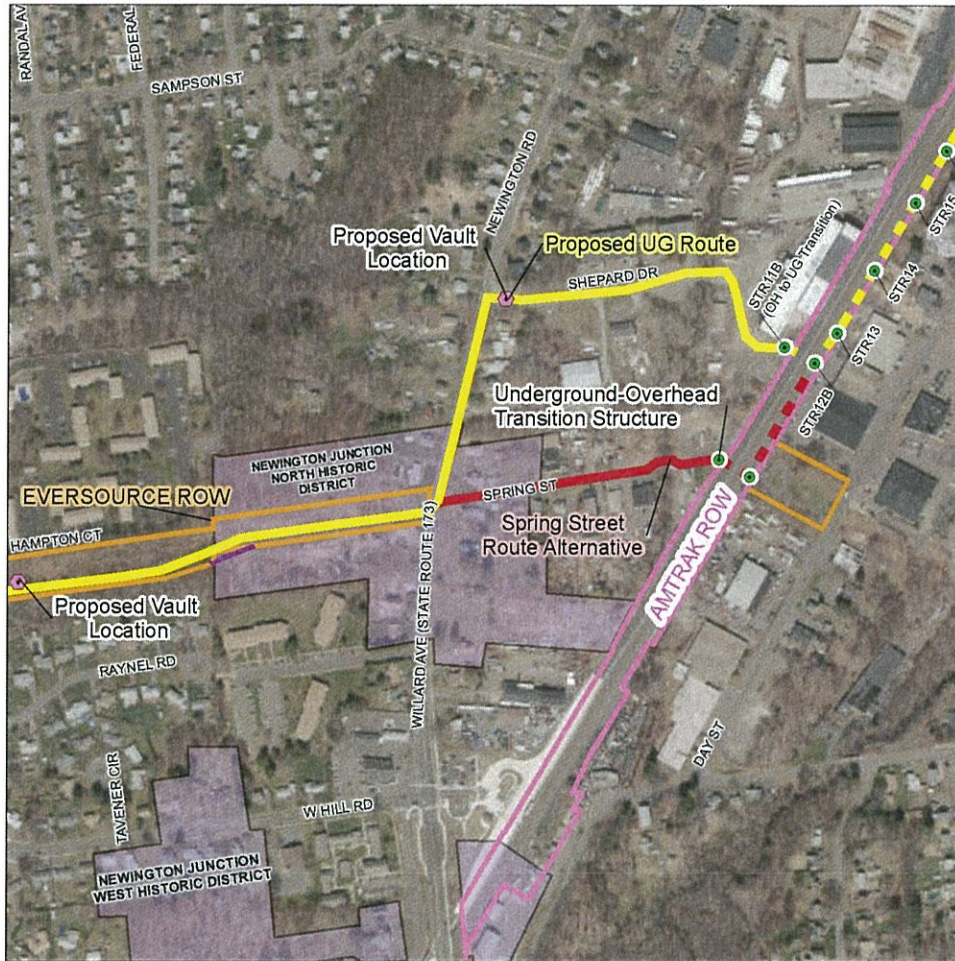
505 As described in the Application, Volume 1, Section 11.5, Eversource's  
506 investigations quickly identified a preferred underground line configuration to connect  
507 the new 115-kV line from Southwest Hartford Substation to the Amtrak ROW, which  
508 would be aligned along private property (a cinema parking lot) and within New Park  
509 Avenue, avoiding conflicts with commercial and industrial uses and I-84.

510 Underground Segment Extending from Newington Substation

511 The optimal route for the segment that would connect Newington Substation to  
512 the overhead line segment along the Amtrak ROW proved more difficult. Along this  
513 segment, land uses are characterized predominantly by residential areas with some  
514 commercial/industrial development near the Amtrak ROW. Ultimately, Eversource  
515 identified and analyzed 10 route/line configuration variations for the Newington  
516 Substation-Amtrak ROW segment. The Proposed Route segment, involving an  
517 underground configuration along a combination of Eversource's ROW, Willard Avenue  
518 (State Route 173), and Shepard Drive, was selected as the preferred approach based on a  
519 comprehensive consideration of social/environmental, constructability, engineering, and  
520 cost factors. Shepard Drive was determined to be preferable as a means of reaching the

521 Amtrak ROW to Spring Street, which begins across Willard Avenue from the eastern end  
522 of the Eversource ROW, a block south of Shepard Drive, and thus would have provided a  
523 more direct route. Figure 2 below shows these two streets and their relation to the  
524 Newington Substation, the Eversource ROW and the Amtrak ROW.

525 **Figure 2: Spring Street and Shepard Drive Approaches to Amtrak ROW**



526

527 A larger scale, annotated illustration of these two alternatives is provided as Figure 11-13  
528 at page 11-41 of Volume 1 of the Application.

529 Another key routing decision for the Newington Substation to Amtrak ROW  
530 segment was the configuration of the new transmission line along its 0.8-mile length  
531 within the Eversource ROW— specifically whether we would propose to construct the

532 new 115-kV line in a hybrid overhead and underground configuration, or an all-  
533 underground configuration. After extended consideration, we decided to propose an all-  
534 underground route on the ROW.

535 The basis for each of these routing decisions is explained in the following  
536 testimony.

537 **Q. What are Eversource's reasons for proposing to use Shepard Drive**  
538 **rather than Spring Street to reach the Amtrak ROW from the Newington**  
539 **Substation?**

540 A. Spring Street is a narrow (approximately 20-foot-wide) privately owned  
541 street that is bordered by four commercial properties and six residences, three of which  
542 are within the Newington Junction North NRHP District. A route along Spring Street  
543 would pose construction, property acquisition, and historic district impact challenges that  
544 make it an inferior choice to Shepard Drive.

545 Construction Challenges

- 546 • Four Eversource distribution circuits and other utilities are buried beneath the  
547 narrow private road, providing obstacles to burial of the duct bank and a splice  
548 vault within the paved street. As a result, the cable system would need to be  
549 located, at least in part, on adjacent private property.
- 550 • Because cable system construction typically requires a 30-foot-wide area within  
551 roads, Spring Street would need to be closed completely to all traffic in order to  
552 install the new 115-kV duct bank and the splice vault that would be required.  
553 This would pose significant inconvenience to residents and the commercial uses  
554 that abut Spring Street. To maintain access for residents and businesses during  
555 cable system construction, and for emergency vehicle access, Eversource  
556 anticipates that a new, temporary access road (approximately 0.1-0.2 mile in  
557 length) would have to be established across private commercial property between  
558 Spring Street and Shepard Drive.

559 Easement Acquisition Requirements and Challenges

- 560 • Although the Town of Newington maintains Spring Street, the street has not been  
561 accepted into the municipal road system, and is privately-owned. Efforts to  
562 identify the current owner(s) through title searches have so far been unsuccessful.

563 Accordingly, to install the cable system within the road, easements would have to  
564 be acquired from currently unidentified owners, or through an eminent domain  
565 proceeding against an unknown owner(s).

566 • Because the duct banks and the necessary vault could not be installed entirely  
567 within the narrow roadway, easements from adjoining landowners would be  
568 required.

569 • An easement for the temporary access road over private properties between  
570 Shepard Drive and Spring Street would have to be acquired.

571 Historic District Impact

572 • Excavation would be required very close to the historic homes within the  
573 Newington Junction North NRHP District.

574 • A transition structure approximately 100 feet tall to convert the line from an  
575 underground to an overhead configuration before the line crosses the Amtrak rail  
576 tracks would need to be located at the end of Spring Street and a structure of  
577 similar height would be required on the opposite (east) side of the tracks. Both of  
578 these structures would be directly visible from the Newington Junction North  
579 NRHP District.

580 Willard Avenue and Shepard Drive are approximately 25' – 35' wide, and  
581 Shepard Drive is north of the NRHP District. Accordingly, the Proposed Route, which  
582 would extend from the Eversource ROW north along Willard Avenue (State Route 173)  
583 and then east on Shepard Drive although approximately 0.17 mile longer than the Spring  
584 Street route, would not pose construction challenges; would not require any road  
585 closures; is unlikely to require easements over private property other than for the  
586 transition structure at the end of Shepard Drive; and would not result in adverse impacts  
587 to the NRHP District. Willard Avenue (State Route 173) and Shepard Drive are wide  
588 enough to accommodate installation of the duct bank; excavation would be farther from  
589 the historic structures in the NRHP District; and the transition structure adjacent to the  
590 Amtrak ROW would be at the end of Shepard Drive in the parking lot for an industrial  
591 building, where it would be less visible from the NRHP District. Construction along this  
592 Proposed Route segment could be scheduled to avoid conflicts with commercial uses

593 along Shepard Drive and to minimize traffic disruptions along Willard Avenue (State  
594 Route 173).

595 **Q. What are Eversource’s reasons for proposing an all-underground**  
596 **route for the new transmission line along the Eversource ROW?**

597 A. After extensive consideration, we determined that an all-underground  
598 configuration would be slightly less costly, and would minimize impacts to the existing  
599 distribution circuits and potential visual effects on abutters and the NRHP District, while  
600 still limiting environmental impacts. These analyses are discussed and illustrated in  
601 detail in Volume 1, Section 11.5.2 of the Application and summarized further on in this  
602 testimony.

603 This analysis had to consider that sections of line at the beginning and end of the  
604 Eversource ROW would be underground, so that only .52 mile of the 0.8 mile distance  
605 between Newington Substation and Willard Avenue (State Route 173) could be  
606 configured either overhead or underground.

607 **Q. Why would sections of the new transmission line at the beginning and**  
608 **end of the Eversource ROW be underground even if the segment between them**  
609 **were to be overhead?**

610 A. There is a separate reason for each underground segment:

611 The Substation “Get-Away”

612 There are five existing distribution line circuits that enter the substation from the  
613 ROW. Eversource determined that the “get-away” section of the new line exiting the  
614 substation should be configured as an approximately 600-foot segment of underground  
615 line extending to a transition structure on Eversource property west of Avery Road in

616 order to avoid conflicts with these circuits. (Refer to Volume 1, Appendix 11A, Mapsheet  
617 1)

618 The Eastern-most ROW Section

619 The eastern portion of the Eversource ROW extends through the Newington  
620 Junction North NRHP District. Potential visual impacts to this district had to be  
621 considered as part of the routing studies. At a May 2016 on-site meeting with  
622 Eversource, a representative of the Connecticut State Historic Preservation Office  
623 (SHPO) indicated that to avoid visual impacts to the NRHP District, the new 115-kV line  
624 should be installed underground through the district. Thus, any overhead alignment  
625 along the Eversource ROW would involve a transition to an underground configuration  
626 approximately 460 feet west of Willard Avenue (State Route 173) (refer to Appendix  
627 11A, Mapsheet 3 for the location of such a transition structure).

628 **Q. What were Eversource's reasons for proposing that the .52 mile**  
629 **segment of the new line between the two underground segments just described be**  
630 **configured as underground rather than overhead?**

631 A. An overhead segment would have required more reconfiguration of the  
632 existing circuits, and thus more vegetation clearing, including in wetlands, would have  
633 added 75' tall transmission structures in close proximity to adjoining residences; and  
634 would have been more expensive than the all-underground configuration.

635 **Q. Why would the overhead line configuration along the distribution line**  
636 **ROW be more, rather than less costly than the proposed underground design?**

637 A. An all-underground segment would be more expensive than a hybrid  
638 (\$18.83 million vs. \$17.76 million) if the ROW were open and unobstructed. However,

639 in order to install the overhead structures along this ROW, the existing distribution  
640 circuits would have to be permanently relocated, for an estimated cost of \$2.65 million.  
641 In comparison, using the Proposed Route and underground line design, only some of the  
642 distribution poles would have to be temporarily relocated for construction, resulting in an  
643 estimated cost of \$0.66 million. Thus, for this line segment, the cost of the underground  
644 line will be less than the use of an overhead design.

645 **Q. Did Eversource consider an all-underground alternative for the entire**  
646 **transmission line?**

647 A. Yes. As previously explained, ISO-NE included an all-underground  
648 transmission line in the Greater Hartford Sub-area *GHCC Solutions Report* and  
649 Eversource initially investigated and identified such an optimized all-underground line  
650 route in detail in the MCF for this Project. That all-underground route alternative is  
651 summarized in the Application, Volume 1, Section 11.6.

652 **Q. What is the estimated life-cycle cost of the transmission line**  
653 **component of the proposed Project as compared to the line cost of an all-**  
654 **underground configuration?**

655 A. As discussed on page 3-25 (as revised by correction sheet filed on August  
656 14, 2017) of the Application, the life-cycle cost of the proposed transmission line would  
657 be approximately \$80.5 million. For the all underground transmission line previously  
658 analyzed, the life-cycle cost of the transmission line would be approximately \$107  
659 million.



660 7. **SYSTEM ALTERNATIVES**

661 Q. Would a “no action” alternative to constructing the Project be  
662 reasonable?

663 A. No. Doing nothing to eliminate violations of national and regional  
664 reliability standards and criteria would not address the risk of system failures under  
665 certain contingency conditions and would be inconsistent with Eversource’s obligation to  
666 provide reliable electric service. Failure to take action to bring the Greater Hartford  
667 electric supply into conformity with the applicable reliability standards and criteria would  
668 also undermine the long-range plan of ISO-NE and Eversource for providing reliable  
669 transmission service throughout Connecticut.

670 Q. Did Eversource consider and evaluate any transmission alternatives to  
671 the proposed Project?

672 A. Yes. As part of the GHCC studies, the ISO-NE Working Group (which  
673 included Eversource representatives) evaluated transmission alternatives in all of the sub-  
674 areas studied, including the Greater Hartford Sub-area. As discussed earlier, the  
675 conceptual solution to resolve the criteria violations in the targeted South Meadow–  
676 Berlin–North Bloomfield–Southington and North Bloomfield–South Meadow–  
677 Manchester load pockets was to connect them with a new transmission line so that the  
678 transmission system in each load pocket would be able to serve the other when needed.

679 The Working Group identified two sets of logical terminal points for such a new  
680 line. One set consisted of the Newington and Southwest Hartford Substations, which are  
681 not currently interconnected and were ultimately selected as the terminal points of the  
682 preferred solution. The other set of terminal points considered was Farmington

683 Substation in Farmington and North Bloomfield Substation in Bloomfield. These two  
684 substations are presently connected by an existing 11.7-mile Eversource 115-kV  
685 overhead transmission line. A second 115-kV line could be built within the same ROW  
686 in an overhead configuration adjacent to this existing 115-kV line.

687 At the time, the Working Group initially compared these two transmission  
688 alternatives, a partially overhead transmission line route between Newington and  
689 Southwest Hartford Substations was believed to be impractical because of the dense  
690 urban and suburban development in this area. As a result, the two alternatives that were  
691 initially analyzed in detail by the Working Group were an all-underground cable route  
692 between Newington and Southwest Hartford Substations and an overhead line between  
693 Farmington and North Bloomfield Substations. The Working Group found the  
694 Newington to Southwest Hartford underground line to be preferable. Subsequently, after  
695 it became apparent that placement of an overhead segment of the Newington–Southwest  
696 Hartford line within the Amtrak transportation corridor was feasible, Eversource  
697 compared that configuration to the Farmington – North Bloomfield alternative. That  
698 comparison made the choice of the Newington – Southwest Hartford alternative even  
699 clearer, given the significant cost savings realized through the use of the hybrid route.

700 **Q. Why is the proposed Project superior to an overhead alternative**  
701 **between Farmington and North Bloomfield Substations?**

702 A. Compared to the overhead alternative between Farmington and North  
703 Bloomfield Substations, the proposed 115-kV hybrid underground/overhead line between  
704 Newington and Southwest Hartford Substations would provide the same system benefits  
705 at a far lower cost, would be shorter, and would result in fewer impacts to vegetation,

706 wildlife, water resources, and scenic resources. Both alternatives would resolve all  
707 thermal and voltage criteria violations in the 10-year planning horizon; and both would  
708 require upgrades at each of the new transmission line's terminal substations. However,  
709 the proposed Project:

710 (1) Provides these reliability benefits at a cost of approximately \$61.1 million, as  
711 compared to the estimated cost of \$95.9 million to construct a new overhead line  
712 between Farmington and North Bloomfield Substations;

713 (2) Results in fewer miles of new transmission line as compared to 11.7 miles of new  
714 transmission line construction along Eversource's Farmington – North Bloomfield  
715 ROW (which is bordered by low density residential areas and open space), the  
716 proposed Project involves only 3.7 miles of new 115-kV construction, including  
717 use of an existing 0.8 mile Eversource ROW and 2.4 miles of overhead  
718 construction within an Amtrak ROW that has been dedicated to transportation use  
719 for decades and is bordered predominantly by industrial and commercial  
720 development; and

721 (3) Minimizes environmental, cultural, and scenic impacts, as a result of the  
722 differences in the ROW used and the length of the new line.

723 **Q. Did Eversource consider non-transmission alternatives?**

724 A. Yes, Eversource retained LEI to prepare a comprehensive analysis of non-  
725 transmission alternatives that could address the need served by the Project. As explained  
726 in detail in LEI's report (see Volume 2 of the Application) and summarized in Section  
727 10.3 of the Application, LEI's analysis considered the entire solution recommended for  
728 the Greater Hartford Sub-area in the *GHCC Solutions Report*, which included the Project  
729 proposed here as well as other elements that are not part of this Application, and  
730 compared the cost of that solution set, to the cost of an NTA that could potentially  
731 substitute for it. LEI concluded that the optimal potentially feasible NTA solution –  
732 consisting of a combination of new generation and demand reduction - would be far more  
733 costly than the Greater Hartford solution set, including the Project, and therefore was  
734 economically impractical.

735           **Q.     What types of non-transmission alternatives did LEI consider in its**  
736 **comparison to the Greater Hartford Sub-area solution set, including the Project?**

737           A.     After considering various technically “feasible” technologies that would  
738 provide the identified reliability need for the four sub-areas included in the GHCC study  
739 area and could be, in theory, implemented based on planning criteria and technology-  
740 specific operating profiles, LEI developed a hypothetical hybrid NTA consisting of a  
741 combination of demand response and new generation. This hypothetical hybrid NTA  
742 included the following elements:

- 743           • Construction of a 182 MW combined-cycle natural gas fueled turbine generator  
744           (CCGT) at Northwest Hartford Substation and a 24 MW peaking plant of  
745           aeroderivative technology at Southington Substation; and
- 746           • Incremental demand response of 23 MW at Northwest Hartford Substation and 3  
747           MW at Southington Substation.

748           **Q.     What was the estimated annual cost to Connecticut ratepayers of the**  
749 **NTA and the proposed Greater Hartford solution set?**

750           A.     The comparison was not close. The cost of the NTA described above was  
751 estimated to range from \$26 million to \$39 million a year, depending on the revenues that  
752 the generation components of the NTA would be able to earn, while the Greater Hartford  
753 solution set that included the all-underground Newington to Southwest Hartford line was  
754 estimated by LEI to cost approximately \$4.6 million per year. When this analysis was  
755 adjusted to include the proposed Project in the Greater Hartford solution set instead of the  
756 all-underground project, the annual cost to Connecticut ratepayers dropped to \$2.9

757 million, rendering the cost of the hypothetical NTA to be 13 times greater than the  
758 proposed solution.

759 **8. CONSTRUCTION**

760 **Q. What construction steps would be followed for the installation of the**  
761 **115-kV line?**

762 A. Different procedures would be used to construct the overhead and  
763 underground 115-kV line segments.

764 **Overhead Line Construction**

765 For the overhead line segment, Eversource's license agreement with Amtrak<sup>7</sup> may  
766 specify certain non-standard construction methods and schedules, including the  
767 performance of Project activities during select night-time hours to avoid or minimize  
768 conflicts with rail operations. In general, however, the overhead transmission line would  
769 be constructed in several stages, some overlapping in time, as follows:

- 770 • Survey and stake the proposed structure locations, ROW boundaries and  
771 monument line (where necessary), and the limited areas of clearing (as needed).
- 772 • Mark the boundaries of Trout Brook (the only watercourse crossing along the  
773 overhead line segment), and any other areas to be avoided or where mitigation  
774 measures are to be implemented.
- 775 • Establish a construction yard/field office, typically including space for office  
776 trailer(s), equipment storage and maintenance, sanitary facilities, and parking.
- 777 • Prepare material staging sites (e.g., storage, staging, and laydown areas) to  
778 support the construction effort. The preferred locations for such areas would  
779 typically be, but are not limited to, the general vicinity of the Amtrak ROW.
- 780 • Perform vegetation clearing or mowing, where necessary. Vegetation removal is  
781 expected to be minimal as the entire Amtrak ROW is already cleared of tall-  
782 growing vegetation.

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<sup>7</sup> Eversource would continue to coordinate with Amtrak to finalize the design of and construction plans for the 115-kV transmission line segment; accordingly, Eversource anticipates that pre-construction planning studies, such as soil and groundwater testing and analyses, would be performed at structure sites within the Amtrak ROW as input to final design.

- 783 • Install erosion and sedimentation controls, as needed, in accordance with Amtrak  
784 specifications and (as appropriate to urban areas) Eversource’s *Best Management*  
785 *Practices Manual for Massachusetts and Connecticut (Construction &*  
786 *Maintenance Environmental Requirements)*, September 2016.
- 787 • Identify and if necessary, improve or construct, access to work sites along the  
788 ROW. Amtrak maintains an existing access road east of the railroad tracks,  
789 adjacent to portions of the Project’s overhead segment. As part of its license  
790 agreement with Amtrak, Eversource anticipates that this access road, or other  
791 Amtrak access points, would be used for Project construction activities to the  
792 extent practical. With Amtrak approval, the existing railroad access roads may be  
793 upgraded (using gravel or timber mats) for Project construction. In addition,  
794 various public roads and private driveways and parking lots about the Amtrak  
795 ROW; Eversource would investigate the use of such areas to provide access to  
796 Project work sites, if needed.
- 797 • Prepare level work (crane) pads as necessary at each proposed 115-kV structure  
798 site, as well as at conductor pulling sites, and (if necessary) at guard  
799 structure/boom truck sites.<sup>8</sup> Work pad installation may involve grading and  
800 requires the installation of a stable base (consisting of gravel, timber mats, or  
801 equivalent) for drilling and other structure installation equipment.
- 802 • Construct structure foundations and erect/assemble new structures. These  
803 activities require flat-bed trucks for hauling new structure components, new  
804 hardware, and augers, other trucks for hauling reinforcing rods, drill rigs, cranes,  
805 concrete trucks for structures that require concrete for foundations, dump trucks  
806 for structures that require crushed rock backfill, and bucket trucks. Dump trucks  
807 also would be needed for foundation work for the removal of excavated material  
808 from the ROW. If groundwater is encountered during foundation excavation,  
809 pumping (vacuum) trucks or other suitable equipment would be used to pump  
810 water from the excavated areas. The water then would be discharged in  
811 accordance with applicable regulatory requirements.
- 812 • Install counterpoise, where needed. Depending on site-specific soil conductivity,  
813 supplemental grounding would be installed.
- 814 • Install shield wires, OPGW, and conductors. The equipment required for these  
815 activities would include conductor reels, conductor pulling and tensioner rigs, and  
816 bucket trucks. Helicopters also may be used to install the initial pulling lines for  
817 the conductors or shield wires.
- 818 • Restore construction sites. Construction materials and debris would be removed  
819 from temporary access roads, work pads, and staging areas; such sites would then  
820 be re-graded or otherwise restored and stabilized. In the urban Project area,  
821 gravel or paving would typically be used for site restoration/stabilization.  
822 Construction debris would be removed from the Project area for proper disposal.

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<sup>8</sup> Temporary guard structures or boom trucks with “bat wings” would be located at road and other crossings as a safety measure during conductor and OPGW installation.

- 823 • Maintain temporary erosion and sediment controls until vegetation is re-  
824 established or disturbed areas are otherwise stabilized with gravel or paved. After  
825 site stabilization is achieved, all temporary erosion and sedimentation controls  
826 would be removed from construction sites and disposed of properly.

827 **Underground Line Construction**

828 To install the 115-kV underground cable segments, the following typical  
829 construction activities would be performed (certain activities would apply only to specific  
830 portions of the underground segments):

- 831 • Perform pre-construction planning (e.g., locate underground utilities, perform soil  
832 and groundwater testing) as needed to finalize the underground cable design and  
833 location.
- 834 • Establish traffic control procedures to minimize traffic disruption and provide a  
835 safe working environment (for cable installation in or adjacent to roads, or that  
836 otherwise involves construction activities that would impact traffic on roads).
- 837 • Remove vegetation, where necessary. Vegetation removal (tree and brush  
838 clearing, mowing, and side tree trimming) would be required particularly along  
839 the Eversource ROW, but may be performed as necessary to provide clearance for  
840 equipment along paved areas.
- 841 • Establish a construction access road, as needed, along the Eversource ROW.
- 842 • Relocate (temporarily) the distribution lines within the Eversource ROW.
- 843 • Install splice vaults.
  - 844 – Excavate for splice vaults. For the vault located along Shepard Drive,  
845 pavement saw cutting and removal would be performed as needed.
  - 846 – Install pre-cast splice vaults.
  - 847 – Backfill over top of the splice vaults with excavated spoils and/or other  
848 approved material.
  - 849 – Repave or restore disturbed areas.
- 850 • Construct duct bank system.
  - 851 – Excavate trench, including saw cutting and pavement removal for location in  
852 roads or other paved areas.
  - 853 – Install conduits in trench.
  - 854 – Encase the conduits in concrete.
  - 855 – Backfill trench with excavated spoils and/or other approved material. Other  
856 approved material may include a concrete-like substance known as a fluidized  
857 thermal backfill (FTB).

- 858           – Repave or restore disturbed areas.
- 859           • Install cable system.
- 860           – Pull the cables into the conduits.
- 861           – Splice the cables within the splice vaults or terminate cables at substations.
- 862           • Return the temporarily-relocated Eversource distribution lines to permanent  
863 configuration along the Eversource ROW.
- 864           • Remove temporary access roads.
- 865           • Complete any remaining site restoration work (e.g., pave affected road ROWs and  
866 parking lots; revegetate non-paved or graveled areas, such as those along the  
867 Eversource ROW).

868           **Q.     What types of construction activities will occur at Southwest Hartford**  
869 **and Newington Substations and at the Newington Tap in connection with the**  
870 **proposed modifications to those facilities?**

871           A.     The modifications to the two existing substations would involve standard  
872 construction procedures (e.g., site preparation, implementation of erosion and  
873 sedimentation controls, installation of foundations and equipment, and site stabilization  
874 with crushed stone or equivalent). Construction procedures for the substations and the  
875 Newington Tap are discussed in detail in Volume 1, Section 4.5 of the Application.  
876 The operation and maintenance of the substation modifications would not substantially  
877 affect or alter existing practices at these substations.

878           **Q.     Has Eversource identified potential material staging sites and field**  
879 **offices?**

880           A.     Only preliminarily. As described in Section 4.1. of the Application,  
881 potential material storage or staging sites may be situated on Eversource-owned property,  
882 as well as along or near the Amtrak ROW and road ROWs. Because the location of these  
883 sites will not be finalized until after a construction contractor is selected, final locations



884 either would be identified in the D&M Plan or submitted separately to the Council for  
885 review and approval before use.

886 **9. ELECTRIC AND MAGNETIC FIELDS**

887 **Q. What are Electric and Magnetic Fields?**

888 A. Electric fields ("EF") are produced when a voltage is applied to a  
889 conductor. The level of an electric field at a given location near to a power line depends  
890 on the magnitude of the voltage applied, the arrangement and spacing of the line  
891 conductors and the distance from the conductors to the location. In the case of  
892 underground transmission lines, the sheath provides shielding of the electric field and  
893 there are no external electric fields associated with underground transmission lines.

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

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

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

906           A.     Yes. Section 7 (Volume 1) of the Application provides an analysis of the  
907 effect of the Project on EF and MF levels, along with the supporting information  
908 provided in Exhibit 2.C of Volume 2.

909           **Q.     Has Eversource considered the Council’s EMF Best Management**  
910 **Practices in designing the Project?**

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

914           **Q.     What do the EMF BMP require?**

915           A.     Among other things, the BMP require transmission line applicants to  
916 adopt “no cost” line designs for lowering MF from new or reconstructed lines, and to  
917 identify “low cost” opportunities for making further reductions. The BMP establish a  
918 “benchmark” for “low cost” field reduction measures of 4% of the project cost, including  
919 substation costs. “Low cost” measures for reducing MF are required to achieve at least a  
920 15% reduction in the fields that would be associated with the “base line” construction,  
921 consistent with standard good utility practice and incorporating no-cost field reduction  
922 measures.

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

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

930           A.     Yes. Eversource retained Dr. Gabor Mezei of Exponent, Inc. to perform  
931 such an analysis. Volume 2 of the Application includes his report with a systematic  
932 literature review critical evaluation of epidemiology and *in vivo* studies published from  
933 August 1, 2012 to August 31, 2016.

934           **Q.    What was Dr. Mezei's conclusion?**

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

939           **Q.    What would be the major sources of EMF along the Proposed Route**  
940 **once the Project is completed?**

941           A.     For the underground segments of the route along the Eversource ROW in  
942 Newington, and in roads, the existing distribution lines and the proposed 115-kV  
943 underground line would be the major sources of MF. There would be no above ground  
944 *electric* fields associated with the installation of the underground portion of the new 115-  
945 kV line because the sheath of the cable grounds out the electric field outside of the cable  
946 assembly.

947           For the overhead portion of the route along the Amtrak ROW, the proposed 115-  
948 kV overhead line would be the major source of EMF. If Amtrak eventually proceeds

949 with its plans for future electrification of this rail corridor, the lines serving the railroad  
950 would be another source of EMF along this corridor.

951 Transformers and other equipment within the Newington and Southwest Hartford  
952 Substations are also potential EMF sources, but would cause little or no exposure to the  
953 general public. The strength of fields from equipment inside a typical substation  
954 decreases rapidly with distance, and reaches very low levels at relatively short distances  
955 beyond substation perimeter fences. The exception is where transmission and  
956 distribution lines enter the substation property. Both Newington and Southwest Hartford  
957 Substations are situated on larger parcels of Eversource property, and thus are not directly  
958 near public use areas.

959 **Q. Did Eversource take measurements of existing electric and magnetic**  
960 **field levels along the Proposed Route, as required by the BMP?**

961 A. Yes. Spot measurements of electric and magnetic fields were taken by  
962 Eversource representatives on April 5, 2017 at selected locations along the Proposed  
963 Route, including around the perimeters of Newington Substation and Southwest  
964 Substation, and at Avery Road in Newington and Flatbush Avenue in West Hartford.  
965 Graphs of these measurements are shown in Section 7.3 of Volume 1 of the Application.  
966 The measurements were taken at a height of 1 meter (3.28 feet) above ground, in  
967 accordance with the industry standard protocol for taking measurements of EMF near  
968 power lines.

969 The Council's *Application Guide* requires measurements of existing EMF at the  
970 boundaries of adjacent schools, child daycare facilities, playgrounds, hospitals, youth  
971 camps, and residential areas. There are no schools, child daycare facilities, playgrounds,

972 hospitals, youth camps, or residential areas adjacent to the overhead segments of the  
973 Proposed Route.

974 **Q. What type of information do these measurements provide?**

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

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

983 A. Yes, this information can be found in Exhibit 2.C.3 in Volume 2 of the  
984 Application, and is summarized in Section 7.4 in Volume 1.

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

986 A. Eversource estimated (1) annual peak load (APL) conservatively from  
987 ISO-NE's projected 90/10 system peak loads, (2) peak-day average loads (PDAL) over  
988 24 hours at 85% of the system's hourly peak load (based on the 90/10 peak-load days)  
989 and (3) annual average loads (AAL) based on the annual hourly average.

990 The Application presents calculations of magnetic field levels at 25-foot intervals  
991 for the base design at AAL, APL and PDAL, together with associated electric field  
992 levels. (See Volume 2, Exhibit 2.C.3) We consider the AAL case to be most useful  
993 reference for predicting field levels for any 'typical' day.

994 As required by the EMF BMP, loads projected for the year the first summer when  
995 the new line is scheduled to be in service were used for the “before construction”  
996 calculations, and the highest loads projected to occur within five years after the line is  
997 scheduled to enter service were used for the “after construction” calculations.

998 **Q. How do the estimated pre-Project electric and magnetic field levels**  
999 **compare to the estimated post-Project electric and magnetic fields?**

1000 A. There will be no above ground electric fields associated with the  
1001 installation of the transmission line beneath public roads. The magnetic field calculations  
1002 based on projected annual average loading conditions (which best represents the time  
1003 weighted average of exposure) demonstrate that MF associated with the underground  
1004 segments of the new transmission line will drop quickly to background levels as the  
1005 distance from the centerline of the conductor and cables increases.

1006 **Table 1: Summary of Calculated Magnetic Fields near UG Transmission Line**

Calculated Magnetic Field (mG)		
Left Edge of ROW	Max in ROW	Right Edge of ROW
0.3	63.0	3.3

1007 Along the Amtrak ROW, the new transmission line would be vertically-  
1008 configured with 12-foot phase spacing. Because the transmission line must be designed  
1009 to accommodate future electrification of the railroad, the bottom conductor would be 55  
1010 feet above grade, which is higher than Eversource would typically design. As a result,  
1011 MF 1 meter above ground are lower than typical in and adjacent to an overhead ROW.

1012

**Table 2: Summary of Calculated Fields for OH Transmission Line**

Calculated Fields near OH Line			
Field	Left Edge of ROW	Max in ROW	Right Edge of ROW
Magnetic Field (mG)	3.7	13.6	12.8
Electric Field 9kV/m)	0.03	0.44	0.38

1013 At Newington and Southwest Hartford Substations, EF will be unchanged as a  
1014 result of the proposed Project modifications, and MF will be unchanged except for those  
1015 associated with the new underground transmission line entries into the switchyards. The  
1016 reconfiguration of the existing Newington Tap will not cause a measurable change of the  
1017 electric and magnetic fields beyond the substation property.

1018 **Q. What is a Field Management Design Plan?**

1019 A. Under the EMF BMP guidelines, the Council requires an applicant  
1020 proposing to build an overhead electric transmission line to develop and present a Field  
1021 Management Design Plan that identifies design features to mitigate MF that would  
1022 otherwise occur along an electric transmission ROW, particularly where the ROW is near  
1023 certain land uses, such as playgrounds, residential areas, schools, and licensed child day-  
1024 care facilities.

1025 **Q. Did Eversource provide a Field Management Design Plan in the**  
1026 **Application, as required by the Council’s BMP?**

1027 A. Yes, Eversource’s Field Management Design Plan is included in Section  
1028 7.5 of Volume 1 of the Application. In accordance with the BMP guidelines, the  
1029 proposed new 115-kV line has been designed so that it will have very little effect on  
1030 magnetic field levels within and along the Proposed Route. The Project’s base design for  
1031 the overhead portion along the Amtrak ROW incorporates the use of taller structures in

1032 light of Amtrak’s plans for future electrification. By increasing the distance between the  
1033 conductors and the ground, the use of taller structures reduces projected magnetic field  
1034 levels at ground level.

1035 **Q. Did Eversource evaluate whether any additional “low cost” magnetic**  
1036 **field mitigation measures were warranted at any locations along the Proposed**  
1037 **Route?**

1038 A. Yes, but we determined that such measures were not warranted for the  
1039 Project. The overhead segment of the proposed 115-kV line extends through  
1040 commercial and industrial areas. There are no adjacent residential areas, public or private  
1041 schools, licensed child daycare facilities, licensed youth camps or public playgrounds.  
1042 Moreover, the MF associated with the overhead lines drop off sharply to background  
1043 levels. Consequently, no further mitigation measures are recommended for the overhead  
1044 segment of the transmission line.

1045 With respect to underground lines, the EMF BMP recommend further EMF  
1046 mitigation beyond that provided by the base design only in “special circumstances.”  
1047 Eversource considers that no such special circumstances are present in this case, because  
1048 the underground segments will not provide sources of persistent exposure of fields above  
1049 background to people or inhabited structures. In addition, typical low-cost magnetic field  
1050 mitigation measures for underground transmission lines are not appropriate for these  
1051 circumstances. The use of cancellation loops, for example, may have the effect of  
1052 reducing MF above the splice vaults, but fields would be higher at nearby residences.  
1053 The implementation of metallic plates to cancel or shield the fields would not be possible



1054 at splice vaults because of the need for a man-hole access point negating the effectiveness  
1055 of the plates.

1056 **Q. Has Eversource complied with all of the requirements in the relevant**  
1057 **provisions of the statutes concerning EMF and the Council's BMP?**

1058 A. Yes, Section 7 of the Application and the supporting documents in Exhibit  
1059 2.C in Volume 2 fully comply with all of the requirements in the relevant provisions of  
1060 the statutes concerning EMF and the Council's BMP.

1061 **Q. Please summarize Eversource's efforts to comply with the statutory**  
1062 **and BMP requirements concerning EMF.**

1063 A. Eversource has complied with the statutory and the BMP requirements  
1064 regarding EMF by:

- 1065 • providing an update of scientific research and authoritative positions  
1066 concerning potential adverse health effects of MF;
- 1067 • providing measurements and calculations that were developed in  
1068 accordance with the BMP; and
- 1069 • preparing a Field Management Design Plan with a base design that  
1070 incorporates standard utility practice with no-cost MF mitigation design  
1071 features as applicable.

1072 **Q. Has Eversource complied with published EF and MF guidelines?**

1073 A. Yes, the IEEE International Committee for Electromagnetic Safety  
1074 ("ICES") and the International Commission on Non-Ionizing Radiation Protection  
1075 ("ICNIRP") have issued guidelines for long-term public exposures to EF and MF. For  
1076 EF, the ICES reference level is 10 kV/m, and the ICNIRP reference level is 4.2 kV/m.  
1077 For MF, the ICES reference level is 9,040 mG, and the ICNIRP reference level is 2,000  
1078 mG. Projected EF and MF levels for the Project are a small fraction of these guideline  
1079 levels.

1080 **10. SAFETY AND SECURITY**

1081 **Q. Would the new 115-kV line, substation modifications, or Newington**  
1082 **Tap modifications pose any safety risk to the public?**

1083 A. No. The construction of the Project facilities would not pose a safety  
1084 threat or create any undue hazard to the general public, including persons or property.  
1085 All work would be designed and constructed in accordance with all applicable national,  
1086 electric utility industry, state and, to the extent practical, local codes.

1087 **Q. What would happen if an outage or fault occurred on the**  
1088 **transmission or substation equipment?**

1089 A. High-speed protective relaying equipment would automatically detect  
1090 abnormal system conditions (e.g., a faulted transmission line that causes an outage) and  
1091 would send a protective trip signal to circuit breakers to isolate the faulted section of the  
1092 transmission system. Protection would also be provided by a Supervisory Control and  
1093 Data Acquisition system (“SCADA”). The SCADA system allows for remote control  
1094 and equipment monitoring by the Connecticut Valley Electric Exchange (“CONVEX”)  
1095 System Operator.

1096 **Q. What fire protection systems are maintained at Newington and**  
1097 **Southwest Hartford Substations?**

1098 A. Smoke detection equipment systems are already in place at both  
1099 substations. In the event that smoke is detected, this equipment would automatically  
1100 activate an alarm at CONVEX and the system operators would then take appropriate  
1101 action. The relay/control enclosures at each substation also are equipped with fire  
1102 extinguishers.

1103           **Q.     Would the physical security of the Newington and Southwest Hartford**  
1104 **Substations, as modified by this Project, be consistent with the Council's *White***  
1105 ***Paper on the Security of Siting Energy Facilities*, initially adopted in the Council's**  
1106 **Docket 346, as amended (White Paper)?**

1107           A.     Yes. As explained in detail in the Application, the Project modifications  
1108 would be consistent with the Council's *White Paper* Guidelines, including the focus on  
1109 security issues associated with planning, preparedness, response, and recovery.

1110 **11.   MUNICIPAL AND AGENCY CONSULTATIONS AND OUTREACH**

1111           **Q.     Has Eversource complied with the municipal consultation**  
1112 **requirement of section 16-50I(e) of the General Statutes?**

1113           A.     Yes. Briefings concerning the Project were provided to municipal  
1114 officials in 2015 and 2016, as well as in March 2017. As previously noted, Eversource  
1115 initiated the formal municipal consultation process with these municipalities in  
1116 December, 2015, more than 60 days before the Application filing, and held a  
1117 supplemental open house in Newington in April 27, 2017. Feedback received at these  
1118 open houses is described in Section 9.3 of the Application.

1119           **Q.     Has there been any dialogue with the municipal representatives after**  
1120 **the municipal consultation filing?**

1121           A.     Yes. Eversource received feedback from representatives of the Towns of  
1122 Newington and West Hartford during this period, As reported in Section 9.3 of the  
1123 Application, both towns have indicated support for the current proposed route as  
1124 preferable to the original all-underground route. Section 9.3 of the Application also  
1125 reports that the Town of Newington encouraged us to use Spring Street rather than

1126 Shepard Drive to reach the Amtrak ROW. However, more recently Newington has  
1127 agreed to support the Shepard Drive route.

1128 **Q. Please summarize Eversource's contacts with Connecticut**  
1129 **stakeholders, including other government entities, interested organizations,**  
1130 **landowners, and other individuals interested in or concerned about the Project,**  
1131 **since you began your public outreach efforts.**

1132 A. Commencing in 2015, Eversource has implemented a comprehensive  
1133 outreach effort to inform elected federal, state, and local officials, municipal department  
1134 heads, municipal Commissions and Agencies, residents, business organizations and other  
1135 stakeholders about the Project and to solicit feedback. This outreach has included group  
1136 and individual meetings and presentations, written communications, phone calls, and the  
1137 public open houses.

1138 **Q. What feedback have you received from these stakeholders?**

1139 A In addition to the feedback reported in Section 9.3 of the Application,  
1140 more recently, we also received feedback from representatives of the Elmwood Business  
1141 Association (West Hartford), which includes town representatives. While the  
1142 Association appears to be pleased with the change in route away from the business  
1143 district, a few members expressed concern with respect to the height and diameter of the  
1144 overhead structures along the Amtrak ROW.

1145 We also continue to work with landowners who may be affected by the Project  
1146 concerning mitigation of effects that the Project could have, in particular through  
1147 vegetative screening.

1148 **Q. What federal and state agencies has Eversource consulted with in**  
1149 **connection with the Project?**

1150 A. In connection with the permits and approvals that would be required for  
1151 the construction and operation of the Project, Eversource consulted, and is continuing to  
1152 consult with, the following federal and state agencies:

- 1153 • U.S. Fish and Wildlife Service
- 1154 • U.S. Army Corps of Engineers
- 1155 • Connecticut Department of Energy and Environmental Protection
- 1156 • Connecticut State Historic Preservation Office
- 1157 • Native American Tribal Historic Preservation Offices

1158 We have received comments from some of these agencies, which are reported in the  
1159 separate Environmental testimony of Louise Mango.

1160 **12. STATUTORY COMPLIANCE**

1161 **Q. What measures were undertaken by Eversource to inform the public**  
1162 **and property owners along the route of the Project and adjacent to the substations,**  
1163 **and to obtain their input?**

1164 A. Eversource sponsored two open houses concerning the Project: one on  
1165 January 20, 2016 in West Hartford's Elmwood Community Center and one on April 27,  
1166 2017 in the Town of Newington at John Wallace Middle School. Property owners and  
1167 abutters along the Proposed Route, all route variations, and next to the substations were  
1168 notified of the proposed Project and invited to the Open Houses. In addition to the Open  
1169 Houses, field Project Outreach representatives conducted door-to-door outreach to  
1170 property owners located in the vicinity of the new preferred route to inform them of the  
1171 proposed Project and invite them to the Open Houses. At the time of the first Open

1172 House, which was held shortly after the issuance of the MCF, the 115-kV transmission  
1173 line was anticipated to consist of a cable system that would be installed principally in  
1174 public streets; however, the MCF also described a potential overhead line segment along  
1175 the Amtrak ROW as a route option under consideration. The second Open House was  
1176 held after the proposed transmission line had been changed to a hybrid underground and  
1177 overhead line.

1178 As required by section 16-50l(b) of the Connecticut General Statutes, bill inserts  
1179 with Project information were mailed to customers. Notices were provided to community  
1180 organizations and water companies as required by the Council's Application Guide, and  
1181 to abutters of the Newington and Southwest Hartford Substations, as required by section  
1182 16-50l(b). Legal notices of the Application were published in the Hartford Courant and  
1183 West Hartford News, as required by section 16-50l(b). Copies of the Municipal  
1184 Consultation Filing were placed in the local libraries and on the Project website:  
1185 [www.eversource.com](http://www.eversource.com). Finally, a project hotline (1-800-793-2202) and a transmission  
1186 project email address (TransmissionInfo@eversource.com) were established through  
1187 which residents and other stakeholders can communicate with Project management.

1188 **Q. How was information presented at the Open Houses?**

1189 A. The information was presented using a series of informational kiosks.  
1190 The Project team subject matter experts were present to address questions from attendees  
1191 about the proposed Project.

1192           **Q.    Were signs posted informing the public of the Council’s public**  
1193 **hearing to be held on August 22, 2017, in advance of the hearing?**

1194           A.    Yes. On August 3 and 4, 2017 , six 4’ x 6’ signs notifying the public of  
1195 the hearing were posted by members of the Project team at locations specified in  
1196 Eversource’s report to the Council dated August 11, 2017, which is part of the record in  
1197 this proceeding.

1198 **13.    CONCLUSION**

1199           **Q.    Please summarize your testimony.**

1200           A.    Eversource proposes to construct the Project in compliance with all  
1201 statutory requirements, the Council’s regulations and applicable industry codes and  
1202 standards. The Project is needed for the reliability of the State’s electric transmission  
1203 system, and the design provides the needed reliability at the lowest reasonable cost and  
1204 with minimal adverse environmental effects. We respectfully request that the Council  
1205 issue a Certificate of Environmental Compatibility and Public Need for the Project.