CROSS ROAD TO FISHER ROAD RELIABILITY PROJCET
D.P.U. 19-46
EXECUTIVE SUMMARY

NSTAR Electric Company d/b/a Eversource Energy ("Eversource" or the "Company") proposes to construct a new approximately 5.1-mile, 115-kilovolt ("kV") transmission line on steel structures along an existing Eversource right-of-way ("ROW") between the Cross Road Substation and the Fisher Road Substation in Dartmouth, Massachusetts. In addition to the line work, Eversource will make minor modifications at the substations to accommodate the new transmission line. Collectively, the new transmission line and substation modifications are referred to as the Cross Road to Fisher Road Reliability Project (the "Project").

The Project is a reliability project that is designed to reinforce the transmission system in a portion of southeastern Massachusetts area including parts of Dartmouth and western Westport serviced by the Fisher Road Substation and to ensure that the transmission system in this area meets the Company's planning standards for reliability and capacity. Specifically, the area serviced by the Fisher Road Substation is fed by a single 115-kV transmission line and the loss of that one line would result in the loss of the primary supply in the area. As a result, approximately 6,900 customers served out of the Fisher Road Substation would remain out of service for this outage event and three large solar farms connected to Fisher Road Substation would also suffer the immediate interruption of service. Further, existing and proposed distributed generation projects cannot operate when the single 115-kV transmission line is out of service, thus increasing the substation load. The Project will address the need for a second 115-kV transmission supply to the Fisher Road Substation and will serve the public interest by improving the reliability and capacity

of the Company's southeastern Massachusetts' transmission system and area distributed generation projects.

The Company analyzed various alternatives to resolve the identified needs and determined that the proposed Project is the best solution to meet the secondary transmission and reliability needs while minimizing cost and associated environmental impacts. The alternatives considered by the Company included two underground transmission line alternatives, energy efficiency and demand responses, distributed generation, distribution alternatives, utility-scale generation and battery storage. When compared with the Project cost, costs for the battery storage and the underground transmission alternatives exceed the cost for the Project, while costs for the remaining alternatives are comparable to the Project cost. With the Project proposed for an existing Company ROW, potential environmental impacts for the Project are minor and temporary in nature. Overall, compared to the alternatives, the Project is superior, providing greater reliability benefits at a lower or comparable cost and environmental impact.

Therefore, the Company seeks approval from the Department of Public Utilities (the "Department") to construct and operate the Project in accordance with G.L. c. 164, § 72. As described in greater detail herein, because the Project is necessary and will serve the public convenience and be consistent with the public interest, the Project meets the Department's standards for approval pursuant to G.L. c. 164, § 72.

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC UTILITIES

Petition of NSTAR Electric Company d/b/a Eversource Energy Pursuant to G.L. c. 164, § 72 for Approval to Construct and Operate a New 115-kV Overhead Transmission Line on an Existing Right-of-Way Between Fisher Road Substation and Cross Road Substation in the Town of Dartmouth	)	D.P.U. 19-46

PETITION OF NSTAR ELECTRIC COMPANY d/b/a EVERSOURCE ENERGY PURSUANT TO G.L. c. 164, § 72 FOR APPROVAL TO CONSTRUCT AND OPERATE A NEW 115-kV OVERHEAD TRANSMISSION LINE ON AN EXISTING RIGHT-OF-WAY IN THE TOWN OF DARTMOUTH

I. INTRODUCTION

Now comes NSTAR Electric Company d/b/a Eversource Energy ("Eversource" or the "Company") seeking a determination from the Department of Public Utilities (the "Department") that, pursuant to G.L. c. 164, § 72, the Company's proposal to construct approximately 5.1 miles of new transmission line primarily on steel monopoles along an existing Eversource right-of-way ("ROW") between the Cross Road Substation and the Fisher Road Substation, both located in the Town of Dartmouth, Massachusetts (the "Project"), is necessary to meet a reliability and capacity need, serve the public convenience and is consistent with the public interest. In support thereof, the Company states as follows:

1. Eversource, with a principal place of business at 800 Boylston Street, 17th Floor, Boston, Massachusetts 02199, is an electric company, as defined by G.L. c. 164, § 1, providing electric service to approximately 1.2 million electric customers in Boston and 80 surrounding cities and towns in Massachusetts. As an electric company, Eversource is authorized to file this petition with the Department under G.L. c. 164, § 72 (the "Petition").

2. The purpose of the Project is to provide a second 115-kilovolt ("kV") supply to Fisher Road Substation, which will reinforce and improve the reliability and capacity of Eversource's 115-kV electric transmission system that supplies power to portions of the Towns of Dartmouth and Westport. A map showing the Eversource transmission system serving the southeastern Massachusetts portion of the Eversource territory is provided as Exhibit A.

3. The Project satisfies the Department's standards under G.L. c. 164, § 72 because, in accordance with the Company's applicable planning standards, the proposed facilities are needed and will serve the public interest by increasing the reliability and capacity of the electric transmission system in the area, resulting in improved service to its customers.[1]

II. THE PROJECT

A. Regulatory History

4. The ROW between Cross Road Substation and Fisher Road Substation was established in 1960 at 150-feet in width, when Line 109 was originally installed, with a provision for a second 115-kV transmission line in this corridor. Pursuant to an order in D.P.U. 16706 issued January 8, 1971 (provided as Exhibit C), Eversource's predecessor, New Bedford Gas & Edison Light, received Department approval for the construction and operation of: (1) a new Cross Road 115/13.2-kV Substation; (2) a new High Hill 115-kV Switching Station; (3) a second 115-kV line from High Hill to Cross Road; and (4) a second 115-kV line from Cross Road Substation to the existing 115/13.2-kV Fisher Road Substation. The Cross Road Substation and the High Hill to Cross Road portion of the 115-kV line were constructed later in 1971. At that time, the Department's approval specifically noted that the 5.1-mile 115-kV line from Cross Road Substation to Fisher Road Substation would be

[1] See Eversource's Transmission System Reliability Standards, SYS-PLAN 001 ("SYS-PLAN 001"; provided herewith as Exhibit B1) and Bulk Distribution Substation Assessment Procedure, SYS-PLAN 010 ("SYS-PLAN 010" provided herewith as Exhibit B2).

constructed in the future (i.e., "within five years" or approximately calendar year 1976) in accordance with the Company's load studies for that time period. However, the line from Cross Road Substation to Fisher Road Substation was not built within the anticipated time frame. Load growth in portions of the Company's service territory in the late 1960s and early 1970s was as high as 15% per year because of new residential and commercial construction. In the Dartmouth area, the new North Dartmouth Mall and the expansion of the Southeastern Massachusetts University (now University of Massachusetts' Dartmouth ("UMASS Dartmouth")) campus were significant growth drivers during this period. Eversource's predecessor considerably expanded the transmission and distribution infrastructure with several new substations being added, including Cross Road Substation. With load growth dropping significantly in the latter part of the 1970s, the construction of the line was deferred.

B. Existing Transmission and Substation System

5. Lines 111 and 109 are 115-kV lines, located within an existing Eversource ROW in Dartmouth and New Bedford, Massachusetts. Line 111 is a four (4)-terminal 115-kV transmission line that runs between Industrial Park Substation in New Bedford and the High Hill 115-kV Switching Station in Dartmouth, and a lateral transmission line originating at High Hill Switching Station running south to the EMI Dartmouth combined-cycle gas-fired generating facility and to the Cross Road Substation. The Line 111 radial portion ends at the Cross Road Substation. Line 109 is a two-terminal radial transmission line that originates at the High Hill Switching Station and extends south to Cross Road Substation, continuing south to terminate at Fisher Road Substation. The shared ROW from High Hill Switching Station to Cross Road Substation is approximately 4.2 miles and the ROW from Cross Road Substation to Fisher Road Substation is approximately 5.1 miles. Both segments of Line 109 are supported on wooden H-frame tangent structures with dead-end and angle structures supported on steel poles with concrete foundations. See Exhibit D for a cross section of the ROW.

6. Cross Road Substation consists of two 115/13.2-kV transformers, each with a maximum capacity of 62.5 MegaVolt Amperes ("MVA") and five 13.2-kV feeders serving portions of the Towns of Dartmouth and Westport, as well as a portion of the City of New Bedford. Fisher Road Substation is comprised of two 115/13.2-kV transformers, each with a maximum capacity of 22.4 MVA, and five 13.2-kV feeders serving Dartmouth and a portion of Westport, west to just beyond state Route 88 in Westport and south down to Nonquitt and Horseneck Beach in Dartmouth. The remaining portion of Westport is served by New England Power Company d/b/a National Grid ("NEP"). See Exhibit E for a map of the Westport service areas.

7. Line 109 supplies load to the South Dartmouth and Westport areas, including the UMASS Dartmouth campus. This area is at the physical edge of the Eversource service territory, which is bordered by the ocean to the south and by portions of Westport to the west that are served by NEP.[2]

C. Project Description

8. The proposed Project will provide a second 115-kV transmission supply to Fisher Road Substation. The new extension of Line 111 will be installed adjacent to the existing Line 109 and extend approximately 5.1 miles from Cross Road Substation to Fisher Road Substation located entirely within the Town of Dartmouth. To support the proposed new 115-kV transmission line, approximately 50 structures, consisting of steel monopoles with two steel three-pole structures, will be installed on the east side of the existing ROW. One of the three-pole structures will be installed leading into Fisher Road Substation and the second will be installed leading into Cross Road Substation. The ROW is of sufficient width to accommodate the new line. Dead-end and angle structures will consist of steel

[2] Westport is a community that straddles the service territories of Eversource and NEP and, thus, is served by both electric companies.

monopoles erected on poured concrete foundations. Tangent structures will be primarily direct-embedded steel poles, except for locations where soil conditions warrant foundations. Upon Project completion, Line 111 will serve a transformer at Cross Road and a transformer at Fisher Road. Similarly, Line 109 will also serve a transformer at Cross Road and a transformer at Fisher Road. See Exhibit F for a United States Geological Survey ("USGS") locus map and Exhibit G for an aerial photograph of the proposed route.

9. The general location, layout, dimensions and configuration of the proposed line structures are shown on the plans that are attached hereto as Exhibit H. Depictions of typical cross-sections of the ROW showing existing and proposed lines and structures are provided as Exhibit D.

10. The total cost estimate for the proposed line is approximately $15 million. This is a planning grade estimate with an expected accuracy of ±25% so that actual cost is estimated to be within 25% of the cost estimate.

III. STANDARD OF REVIEW

11. G.L. c. 164, § 72 requires that electric companies seeking approval to construct a transmission line must file with the Department a petition for:

> authority to construct and use or to continue to use as constructed or with altered construction a line for the transmission of electricity for distribution in some definite area or for supplying electricity to itself or to another electric company or to a municipal lighting plant for distribution and sale . . . and shall represent that such line will or does serve the public convenience and is consistent with the public interest . . . The Department, after notice and a public hearing in one or more of the towns affected, may determine that said line is necessary for the purpose alleged, and will serve the public convenience and is consistent with the public interest.

12. The Department considers all aspects of the public interest in making a determination under G.L. c. 164, § 72 ("Section 72"). Boston Edison Company v. Town of Sudbury, 356 Mass. 406, 419 (1969) ("Boston Edison"); NSTAR Electric Company d/b/a Eversource Energy, EFSB 16-02/D.P.U. 16-77, at 77 (2018) ("Eversource Needham"); NSTAR Electric Company d/b/a

Eversource Energy and New England Power Company d/b/a National Grid, EFSB 15-04/D.P.U. 15-140/15-141, at 151-52 (2018) (Eversource Woburn-Wakefield); NSTAR Electric Company, D.P.U. 13-177/13-178, at 41 (2015) ("NSTAR Seafood Way"). Section 72, for example, permits the Department to prescribe reasonable conditions for the protection of the public safety. Boston Edison, 356 Mass. at 419-20. All factors affecting any phase of the public interest and public convenience are weighed by the Department in a determination under Section 72. Town of Sudbury v. Department of Pub. Utils., 343 Mass. 428, 430 (1962).

13. In evaluating petitions filed under Section 72, the Department examines: (1) the need for, or public benefits of, the present or proposed use (see Eversource Needham at 77-78; Eversource Woburn-Wakefield at 151-52; NSTAR Seafood Way at 41); (2) the environmental impacts or any other impacts of the present or proposed use (see Eversource Needham at 77-78; Eversource Woburn-Wakefield at 152; NSTAR Seafood Way at 41; NSTAR Electric Avenue at 40); and (3) the present or proposed use and any alternatives identified (see Eversource Needham at 77-78; Eversource Woburn-Wakefield at 151-52; NSTAR Seafood Way at 41).

IV. NEED FOR THE PROPOSED PROJECT

A. Description of Transmission Planning and Engineering Standards

14. As a transmission provider, the Company must maintain its transmission system consistent with the reliability standards and criteria developed by the North American Electric Reliability Corporation ("NERC"), the Northeast Power Coordinating Council ("NPCC") and the Independent System Operator–New England ("ISO-NE"). These criteria are established under the purview of NERC, which sets the standards for electric power transmission for all of North America. The criteria set by NERC, NPCC and ISO-NE require transmission operators to design, test and operate their systems to withstand representative contingencies as specified in the criteria.

If the Eversource transmission system does not have sufficient capability to serve forecasted load under the conditions outlined in the NERC, NPCC and ISO-NE criteria, the Company must plan and implement system additions and upgrades to address the identified inadequacies.

15. NERC and NPCC standards and criteria generally do not extend to the radial parts of the transmission system. Eversource Lines 109 and 111 between High Hill Substation and Fisher Road are radial circuits and, therefore, are not classified as Pool Transmission Facility ("PTF") by ISO-NE, Bulk Power System ("BPS") by NPCC, or Bulk Electric System ("BES") by NERC. The Company has established its own planning criteria for evaluating these portions of its system where the aforementioned transmission planning standards do not directly apply.

16. In planning its transmission system, the Company does not, in general, make a distinction between BPS and non-BPS or PTF and non-PTF when planning and designing the reliability of its transmission system, which ensures that a consistent design approach is applied across the Company's transmission system and that the system is tested and designed in accordance with the NERC, NPCC, and ISO-NE standards and criteria identified above. This practice is especially pertinent to loss of a single transmission element (an "N-1" contingency). All these transmission standards, including the Company's, require that the transmission system shall be designed with sufficient transmission capacity to serve area loads in the event of N-1 contingencies.[3]

17. The Company plans its distribution system to ensure that:

i. each distribution bus has at least two means of supply (primary and secondary) (see Exhibit B2, at page 7);

ii. upon loss of a supply source customer electric service is automatically restored (see Exhibit B2, at page 6); and

[3] See SYS PLAN 001 attached as Exhibit B1.

iii. bulk distribution buses should have reliable primary and secondary supply capabilities and no more than one bulk distribution supply bus should lose supply as a result of a single transmission system contingency (see Exhibit B2, at pages 11 and 16).

The loss of Line 109 results in the loss of the primary supply in the area and, as a result, loss of load and customers within a significant portion of Eversource's Dartmouth and Westport service areas. This single contingency event results in the loss of three distribution buses and does not allow for the automatic restoration of customer load for the two substation transformers that are interrupted. Load Flow Diagrams for each contingency event are provided herein as Exhibit I (CONFIDENTIAL).[4]

B. Load Forecast Methodology

18. The forecasting process begins by forecasting the peak demand at the Eversource system level. The Eversource system level peak demand is forecasted using an econometric model that evaluates historical peak demand as a function of peak day weather conditions and the economy. The econometric model utilizes two different weather variables in forecasting summer peak demand, a three-day weighted temperature humidity index and cooling degree days. The forecast assumes normal weather conditions, which are based off the most recent 10-year period. Eversource produces a 50/50 and a 90/10 peak demand forecast. The 50/50 forecast is based off normal 10-year weather and has a 50 percent change of being exceeded. The 90/10 forecast is the extreme weather scenario that has a 10 percent chance of being exceeded. The economic history and forecast is provided by Moody's Analytics, an international economic consulting company.

19. Once the Eversource system level forecast is finalized, the substation level forecasts

[4] Exhibit I has been redacted for the public record in order to avoid disclosure of Critical Energy Infrastructure Information ("CEII"). An unredacted copy has been provided to the Department under seal and subject to a Motion for Protective Treatment and will be provided to eligible parties who execute a CEII Non-Disclosure Agreement.

are developed. Load demand for each substation is forecasted using an econometric model that evaluates substation historical demand as a function of the Eversource system peak demand history and forecast. The substation econometric models measure how each substation performed relative to the Eversource system and then projects that relationship into the future.

20. After a trend forecast is produced for each substation, the forecast is then adjusted for energy efficiency, solar and large customer projects. Company-sponsored energy efficiency and behind the meter solar are both proportionally applied to each substation using peak demand at each substation. Specific, identified large development projects or expected changes in system operations that could not otherwise be predicted by the econometric forecasts are added to their respective substation loads.

C. Identified Transmission and Distribution Reliability Needs

21. As a transmission provider, Eversource must maintain and operate its electric transmission system consistent with its applicable standards and criteria. To do so, the Company assesses the performance of its system using the same mathematical system models as used for the bulk substation and distribution assessments, with the results similarly reported to the Department as part of the "Annual Reliability Report" submitted to the Department annually, see, e.g., D.P.U. 18-ARR-02.

22. Analysis using these detailed system models indicated the Company's existing 115-kV transmission supply system in the Dartmouth and Westport area is or will be deficient and will not be in compliance with SYS-PLAN 010. As a distribution provider, Eversource must maintain and operate its bulk distribution substations and distribution system consistent with its applicable standards. SYS-PLAN 010 establishes the Company's guidelines for the planning and design of its bulk substation and distribution facilities, and sets forth the various reliability criteria by which

the capacity and reliability performance of the Company's supply systems are gauged, and the means by which these assessments are conducted. SYS-PLAN 010 specifies planning and performance criteria that each bulk distribution substation must meet or exceed. These criteria include the following with regard to the loss of a bulk distribution supply transformer or the loss of transmission lines that supply more than one bulk transformer:

- After operation of automatic restoration systems or the use of distribution automation capabilities, all customer load must be served. See Exhibit B2 at 6-7, 16-17.
- Distribution bus voltages should be able to be maintained at their normal scheduled value using transformer load tap changers and/or distribution capacitor banks (substation distribution capacitors banks should be in service under these circumstances to supply increased reactive losses resulting from the loss of a transformer). See Exhibit B2 at 16-17.
- Distribution feeders providing the secondary supply to bulk distribution supply buses, should be below the long term emergency (LTE) rating and shall not exceed the short-term emergency rating. See Exhibit B2 at 16-17.

In the performance of system planning studies to establish whether system upgrades are required to maintain a reliable system, Eversource employs detailed mathematical models of its transmission, substation and distribution supply systems using both Power System Simulator for Engineering ("PSS/E"), a product of Siemens-PTI, and CymDist, a product of Cooper Power Systems. Analysis using these detailed system models indicates that the Company's existing supply system in the Dartmouth and Westport area is or will be deficient with respect to the performance criteria specified in SYS-PLAN 010.

23. With the existing electrical configuration of the 115-kV transmission system, Eversource has determined that an outage of Line 109 results in significant customer outages with substantial reliability impacts under existing and forecasted summer peak load conditions. After accounting for post-contingency transfers of distribution loads to other stations, up to five (5) 13.2-kV distribution circuits, including two (2) 13.2-kV circuits out of Cross Road Substation and three

(3) 13.2-kV circuits at the Pine Street Substation in the City of New Bedford that back up load from Fisher Road Substation, will all immediately reach or exceed their respective LTE ratings during peak periods. As a result, a contingency outage of Line 109 is an event that violates Eversource's planning standards.

24. The load served from Fisher Road Substation is backed up via two 13.2-kV distribution feeders from Cross Road Substation and two 13.2-kV feeders from Pine Street Substation in New Bedford. To transfer the load to the 13.2-kV feeders requires up to eighteen (18) distinct steps, described in Paragraph 22 below, of cascaded manual and radio-controlled distribution switching. Distribution circuits that backup Fisher Road 13.2-kV circuits directly must be manually pre-relieved of load with cascaded transfers to other circuits before interrupted Fisher Road area load can be transferred. In particular, to reduce loading on 13.2-kV tie lines out of Cross Road Substation, a portion of the load normally served off the Cross Road Substation circuits must be transferred to Pine Street Substation in downtown New Bedford. Additional cascaded distribution transfers are required between two (2) 13.2-kV circuits out of Pine Street Substation, to relieve sufficient load from those circuits to accept load from Fisher Road Substation. Assuming availability of crews for manual switching operations and the successful performance of radio-controlled switching, the number of switching steps, plus the manual voltage regulator setting changes at Fisher Road Substation, could take an hour or more to perform. Because of the excessive amount of distribution transfers required to restore load, the excessive number of individual switching steps required and the estimated amount of time to perform this switching, an outage of Line 109 would be a current and ongoing violation of the Company's design standards.

25. Remedial Switching Steps for Loss of Line 109. The switching steps currently required for loss of Line 109 are summarized in Table 1 below:

Table 1

SWITCHING STEPS REQUIRED FOR SUMMER PEAK BACKUP OF FISHER ROAD FOR LINE 109 OUTAGE		
Steps	**1. Isolate Fisher Road #1 and #2 Transformers that are out of service: (*5 switching steps)***	
1	Open:	Circuit Switcher 10972
2	Open:	Main circuit breaker 109B72
3	Open:	Circuit Switcher 10982
4	Open:	Main circuit breaker 109B82
5	Open:	Recloser 528-1
	Leave Open:	Bus Tie Breaker T1-72
	2. Pre-Relieve the Cross Road #531 and #533 13.2kV Feeders with the following transfers between each other and to Pine Street Substation #611: *(2 switching steps)*	
	Transfer #502 Circuit from LCU #673 Hawthorne Substation (Pine Street #70 Circuit) to the Rockdale Substation #693 (Pine Street #72 Circuit)	
6	Close:	Tie ASU T1-501-502 (on State Road East of Slocum Road)
7	Open:	Feeder Recloser 50251 at LCU #673 Hawthorne Substation.
	Transfer a portion of the Cross Road #531 Circuit to the tied #501/502 circuits being fed out of Rockdale Substation via the Pine Street #71 Line: (*2 switching steps)*	
8	Close:	Tie ASU T1-502-531 (on State Road West of Slocum Rd.)
9	Open:	Manual Air Break Switch #531-8 (State Road at Tucker Road)
	Transfer a portion of the Cross Road #531 Circuit to the Cross Road #533 Circuit with the following switching: (*2 switching steps)*	
10	Close:	Tie ASU T1-531-533 (on State Road West at Faunce Corner Road)
11	Open:	Recloser 531-63 on State Road at the Right-of-Way
	3. Pre-Relieve the Fisher Road #528 Circuit with transfers to Pine Street Substation #611: (*2 Switching Steps)*	
	Transfer a portion of the #528 circuit to the #506 Circuit from LCU #673 Hawthorne Substation (Pine Street #70 Circuit):	
12	Close:	Tie ASU T1-506-528 (on Russell's Mills Road)
13	Open:	Recloser 528-7 (on Russell's Mills Road)
	4. Transfer the Fisher Road #524, #525, and another portion of the #528 circuit to the Cross Road #531 by backfeeding the Fisher Road East 13.2kV bus: (*4 Switching Steps)*	
14	Close:	Tie ASU T1-525-531 at UMASS-Dartmouth Campus
15	Close:	Tie ASU T1-528-531 (Chase Road)
16	Open:	ASU 528-20 (Chase Road at Russell's Mills Road)
17	Close:	Tie ASU T1-524-528 (Russell's Mills Road at Fisher Road)
	5. Transfer the Fisher Road #522 , #523, and the remainder of #528 to the Cross Road #532 by backfeeding the Fisher Road West 13.2kV bus: (*1 Switching Step)*	
18	Close:	Tie ASU T1-522-532 (Reed Road at Old County Road)

26. Contingency Outage of High Hill – Cross Road – Fisher Road 109 Line. As

described above, Eversource's Line 109 is a radial transmission facility. This line has three substation transformers between Fisher Road and High Hill Switching Station. These are the Line 109 37/50/62.5 MVA transformer bank at Cross Road Substation, and the #1 and #2 12/16/20 [22.4] MVA transformer banks at Fisher Road Substation. There are 115-kV auto sectionalizing switches on Line 109 between High Hill Switching Station and Cross Road Substation, and a separate switch on the Cross Road to Fisher Road section of Line 109, to permit the line to be sectionalized so that the High Hill to Cross Road section of the line can be restored in the event of a fault or outage on the Cross Road to Fisher Road section of the line. At Cross Road Substation, there is an Automatic Bus Restoration ("ABR") scheme that automatically transfers load to the Line 111 transformer bank for loss of Line 109 or the Line 109 transformer bank.

27. With the current termination of Line 111 at the Cross Road Substation, the relevant 115-kV contingency event (loss of Line 109) would result in the immediate interruption of service for approximately 10,800 customers and 42.8 MW of 2018 forecasted load in the southern Dartmouth area, including large customers such as UMASS Dartmouth.[5] The load interrupted at Cross Road Substation would be automatically restored by the substation's ABR arrangement, restoring approximately 3,900 customers, assuming successful operation. Nevertheless, approximately 6,900 customers served out of Fisher Road and all of the load served out of Fisher Road Substation would remain out of service for this outage event until backup distribution switching could be performed.[6] Such a contingency event would also result in the immediate interruption of service to three large solar farms connected to Fisher Road

[5] The peak load of the UMASS Dartmouth campus was 6.4 MW in 2015. The campus has a 2 MW combined heat and power cogeneration facility, a 660-kW wind turbine, and roof-mounted solar panels on various buildings within the campus. Eversource has no information on the dispatch of these DG resources that are behind the primary meter.

[6] The peak load at Fisher Road that would be immediately interrupted by the event is 24.9 MW (2018), increasing to 26.2 MW (2028) per the current substation load forecast.t

Substation, currently owned by the Town of Dartmouth (1.25 MW), Sycharpha (3.56 MW) and Clean Energy Collaborate (2.55 MW), totaling 7.4 MW.

28. For Fisher Road Substation, the 90/10 load forecast was projected to be 24.9 MW in Summer 2018, increasing to 26.2 MW by Summer 2028, with a cumulative annual growth rate of ("CAGR") of 0.50% per year.[7] The 90/10 load forecast for Cross Road Substation was projected to be to 43.6 MW in summer 2018, increasing to 46.0 MW by Summer 2028, with an CAGR of 0.52% per year.[8]

29. At Summer 2018 extreme weather forecasted load levels, using the Company's 2018-2028 load forecast, post-contingency and post distribution switching transfers, the following distribution system constraints would remain:

- The Cross Road #532 Circuit would be loaded to or beyond 23.0 MVA, 106% of the LTE rating for 795 thousand circular mil ("kcmil") Aluminum HDX spacer cable conductor, with a 1.2 MW load shed risk.
- The Pine Street #72 Circuit would be loaded to 9.5 MVA, 108% of LTE rating with an 0.7 MVA load shed risk, limited by 500 kcmil underground cable in a duct bank.
- The Pine Street #70 Circuit would be loaded to 14.9 MVA, 169% of the 8.8 MVA LTE rating with a 6.0 MW load shed risk, limited by 500 kcmil underground cable.
- The Hawthorne #506 Circuit, fed by the Pine Street #70 circuit, would be loaded to 11.6 MVA, 167% of the 6.9 MVA LTE rating for #2 American Wire Gauge ("AWG") copper conductor, with 4.6 MVA LTE load shed risk. The 328-Ampere (7.5 MVA) voltage regulator that feeds the #506 Circuit would be loaded to 11.6 MVA, 155% of the 7.5 MVA rating.

30. Eversource has exhausted the ability to optimize distribution switching transfers in this area in response to a Line 109 outage event in order to prevent or minimize all of the potential

[7] The 90/10 load forecast is an extreme weather forecast that has a 90% probability of falling short and a 10% chance of being exceeded due to weather conditions.

[8] The source of the future loads is the 90/10 load forecast produced by the Company's Load Forecasting group. The CAGR is the cumulative annual load growth calculated for 10 years from the load forecast.

overloads identified above. Overloads of Pine Street Circuits #70, #72, and #506 would occur because of the cascaded transfers that are required to relieve the Cross Road #531 Circuit. If these cascaded transfers are not performed, the Cross Road #531 Circuit would exceed its LTE rating, with severely low primary voltages in the Westport area. There is no combination of distribution switching that would prevent all overloads for the Line 109 outage event. If one step fails, the result is that more load is not backed up and is at risk.

31. Under a scenario where the forced outage of Line 109 also tripped a transformer bank at Cross Road Substation and the bank cannot be restored by the ABR scheme, the Cross Road 111 transformer would be loaded to 90% of its 75 MVA LTE rating. The Line 111 bank would be loaded to 97% of its LTE rating by Summer 2028. The transformer bank, which is presently loaded to less than 100% of LTE, would be so heavily loaded post contingency and post switching that should the load forecast or other factors change, load would need to be interrupted in addition to load already shed.

32. Load Shedding. Following all of the preceding cascaded switching attempts described in paragraph 22 to move customers to other supplies, not all overloads can be resolved with distribution switching, therefore, load shedding would be inevitable. Based on the 10-year extreme weather load forecast, increasing amounts of overloads beyond LTE ratings would occur on the distribution circuits discussed above in paragraph 29, with increasing amounts of load that must be shed to stay within LTE ratings. Per the 2018-2028 substation load forecast, at least 7.9 MW of load in the combined power supply area served by Fisher Road Substation and the tie circuits out of Cross Road and Pine Street Substations would be at risk in 2018. Load shed risk increases to 11.8 MW by 2028. The total load in the Dartmouth-Westport area interrupted by a Line 109 outage event during peak load that would have to be shed in order to retain the capability

of the existing distribution facilities discussed above in paragraph 29, is 31.7% in 2018 increasing to 45.1% by 2028. Therefore, a significant amount of the total load interrupted by the 115-kV line outage cannot be backed up because of distribution system limitations in the area.

33. History of Poor Distribution Reliability for Loss of Supply Events. The 13.2-kV supply lines and associated distribution circuits normally served out of Fisher Road Substation have qualified as "penalty circuits"[9] under Department standards in prior years, in part because of loss of supply (115-kV line or station outages). Specifically, the Fisher Road #524 distribution circuit was a penalty circuit in 2009. Distribution circuits out of Fisher Road Substation have higher outage exposures than other portions of the Company's system because this area is the edge of Eversource's service territory, with long 13.2-kV feeds, heavy exposure to weather in coastal areas and limited backup and switching flexibility. Despite measures taken to improve reliability on the 13.2-kV distribution circuits, loss of supply events still occur at Fisher Road Substation because of outages on the single 115-kV transmission line that supplies the substation. The construction of a second 115-kV source into Fisher Road Substation will improve circuit reliability performance in terms of "loss of supply."

34. Eversource has performed significant prior and ongoing investigations and work to improve distribution reliability in the areas of Dartmouth and Westport served out of Fisher Road Substation. Specifically, Eversource has implemented the following programs for reliability improvement:

- Storm hardening on the existing 115-kV lines, including structure and framing replacements and installation of storm guying.

[9] The Department has established penalties for poor service quality. Substantial penalties can be imposed if a circuit is in the worst 5% of a company's circuits based on the System Average Interruption Frequency Index or the System Average Interruption Duration Index for three consecutive years.

- Installation of additional radio-controlled Automatic Sectionalizing Units, which are remotely controlled distribution switches that can be opened and closed by the Eversource dispatcher without the need for sending line crews to perform switching.

- Installation of 115-kV auto-sectionalizing switches on existing Lines 109 and 111 between High Hill Switching Station and Cross Road Substation.

- Reconfiguration of the #524 Circuit by splitting it into two separate circuits with reduced customer counts and length. The new circuit that was created is Circuit #528. As part of this reconfiguration, Hendrix spacer cable and tree wire were installed to reduce outages because of incidental tree contact.

The work and upgrades identified above have improved distribution reliability on the 13.2-kV distribution system out of Fisher Road Substation. The tree trimming and structure upgrades on the existing 115-kV transmission lines are expected to reduce the risk of an outage on those facilities.

35. The system upgrade work identified above improved the *reliability* of the overall transmission and distribution supply in the Fisher Road Substation power supply area, but did not add *capacity* to the system to cover for an outage of Line 109, which is the most critical event that can affect service to the area. The reliability history of Fisher Road Substation and its associated 13.2-kV distribution feeders for "loss of supply" events involving only the existing radial Line 109 and the Fisher Road and Cross Road Substations from 2005 to 2019 are detailed in Exhibit J. There were eight "loss of supply" events affecting Fisher Road Substation over this 14-year time frame. Three of these outages did not result in penalty circuit issues because they occurred during Emergency Response Plan ("ERP") (storm response) events when outages are not Department reportable. For the remainder of the outages, individual circuits did not go into penalty status due to the nature of the outage and rapid response of restoration. Line 109 experienced six of these outages between 2005 and 2015, three as the result of contacts from fallen trees from outside the ROW, one from a lightning strike, and one trip and reclose event because of a transformer problem

at Fisher Road Substation. The sixth event was the result of a transformer protective relay tripping one of the transformers at Fisher Road Substation. The total accumulated customer outage hours for the six outage events ranged from zero for a Line 109 outage event where all interrupted customers were able to be restored within five minutes, making the outage non-reportable, up to a high of 17,228 customer outage hours for a Line 109 outage, which resulted in outages to 11,256 customers and required up to 1.5 hours to completely restore service to all customers. See Exhibit J. There was a seventh forced outage of Line 109 as a result of a tree falling on the static wire during an ERP event in March of 2018. High winds on February 25, 2019 caused an eighth outage during another ERP. Customer outages were excluded from reporting to the Department for that outage because ERP events are not required to be reported to the Department.

36. The proliferation of existing and proposed Distributed Generation ("DG") resources is also a driver for the need for the Project. Impact studies for solar applicants that are now online identified that loss of the existing Line 109 is a contingency event under which DG resources cannot operate because of excessive voltage flicker, severe impacts on voltage regulation apparatus, or light load voltage rise on the 13.2-kV distribution system during operation when the 115-kV transmission line is out of service and Fisher Road is backed up via 13.2-kV ties.[10] As a result, the station load would be higher during restoration as the DG resources would be brought back on line only after the Line 109 has been restored.

[10] Excessive voltage flicker, impacts on voltage regulation equipment, and voltage rise are typical limiting factors identified for higher penetration levels of distributed resources. Eversource's voltage flicker limit for variable distributed generation is 2%. Voltage regulation equipment, such as substation load tap changers (LTC) and pole-mounted voltage regulators, need to have reverse flow (cogeneration) capability to be able to effectively regulate voltage correctly during reverse power flow caused by distributed generation. Large variations in distributed generation output could cause excessive numbers of tap changes on voltage regulators, and Eversource limits the step change caused by variable distributed generation to one step. The reverse flow caused by distributed generation results in reverse voltage drop (voltage rise), and a high saturation of distributed generation with respect to load can result in customer voltages in excess of applicable ANSI C84 limits.

37. The extension of Line 111 from Cross Road Substation to Fisher Road Substation will provide sufficient capacity into Fisher Road Substation to eliminate customer outages for a contingency event associated with Line 109. In addition, the new portion of Line 111 will provide a second source of supply to accommodate future load growth. All of the eight outage events listed in Exhibit J would have been prevented by the proposed Project, in addition to the other reliability-hardening work, which has already been completed in the area, as described above.

38. With the new line, the amount of relief switching for Fisher Road Substation in response to a 115-kV line outage event will be reduced to zero, as the ABR scheme will automatically close the station breaker and restore load. No cascaded switching to remote stations will be required once the proposed Project is in place. The distribution capacity constraints on the four 13.2-kV ties supplied from Cross Road and Pine Street Substations will not occur, because the need to perform all of the identified relief switching to restore all load out of Fisher Road remotely at the 13.2-kV distribution level will be avoided. As proposed, the new line extension of Line 111 will result in all customers' electric service automatically restored upon loss of supply to bulk distribution substation supply buses.

V. ALTERNATIVES CONSIDERED

39. In addition to the Company's proposed Project, Eversource identified and evaluated potential alternatives for addressing the reliability and capacity needs, incorporating environmental impacts, constructability, complexity, cost, maintenance requirements and schedule to meet the required need. In reviewing potential alternatives to the Project, the Company considered: (1) a no-build approach; (2) non-transmission alternatives; (3) generation and energy storage; (4) a distribution alternative; and (5) other transmission alternatives.

A. Project Alternatives Considered

1. The Proposed Project

40. As described above, the proposed Project will address the identified need by providing a second source of 115-kV transmission supply to Fisher Road Substation. The new line (an extension of existing Line 111) would be installed within an existing, maintained ROW adjacent to the existing Line 109 and extend approximately 5.1 miles from Cross Road Substation to Fisher Road Substation. The construction of the Project will address the identified need at a reasonable cost and with minimal environmental impacts. All of the proposed structures on the Line 111 extension will be weathered steel structures. This will match the weathered steel finish of the existing steel dead-end and angle structures on Line 109 and will be similar in color to the wood tangent structures on that line. The overall visual effects of the new structures are expected to be marginal because a majority of the new structures will be aligned with those of the existing line. Public roads and abutting properties where the Company has access rights will be used to access the ROW. Within the ROW there are existing gravel roads that provide access to the structures. These roads are segmented within the ROW by wetland resource areas. Wherever possible, upland access will be utilized and construction mats will be installed as needed.

41. The cost estimate for the Project is approximately $15 million, and construction is predicted to take approximately six to nine months, with few construction impacts to the community due to utilizing the existing ROW, which runs through sparsely populated and wooded areas for a majority of the route.

2. The No-Build Alternative

42. The Company determined that a no-build alternative would not address the identified reliability and capacity need. Continued reliance on the existing system would continue to expose the

system to risk of load loss brought about by an interruption of the single existing 115-kV transmission line, Line 109, combined with time-consuming cascaded distribution transfer switching necessary to restore customers at off-peak load levels, while load shedding would continue to occur during peak system load levels. The existing system configuration also presents a potential for maintaining existing "penalty circuits," a circumstance that the Company is trying to resolve by implementing meaningful system upgrades. The no-build alternative further restricts higher penetration rates for standalone solar and other forms of distributed resources interconnecting in the Dartmouth and Westport areas.

43. Further, the no-build alternative is inconsistent with Company planning guidelines. As a regulated utility, Eversource has an obligation to provide reliable service to customers and to design and operate its system in accordance with its internal planning guidelines. Under the no-build alternative, the Company would not meet its obligation to provide reliable electric power service to nearly 6,900 customers. For these reasons, the no-build alternative was rejected by the Company and this option was eliminated from any further consideration.

3. Non-Transmission Alternatives: Expanded Energy Efficiency, Demand Response and Generation

44. As an initial matter, the Company determined that because of the radial nature of Fisher Road Substation, any Non-Transmission Alternative ("NTA") would need to inject or deliver power into Fisher Road Substation to effectively meet the identified need. Other neighboring substations, such as Cross Road Substation, are isolated from Fisher Road after outage of Line 109 and would not be effective locations for NTA resources to address the identified need. The Company then considered the size of hypothetical NTA resources that would need to be developed at or near Fisher Road Substation if an NTA were to be developed in lieu of the proposed Project. Because 11.8 MW of load would remain unserved at Fisher Road Substation in 2028, even after distribution switching transfers, the Company determined that at least 11.8 MW of NTA injection would be required. Up to 26.2 MW

of NTA injection would be required if an NTA were to provide continuous service, after a transmission line outage, to customers in the Fisher Road supply Area without relying on distribution switching transfers.

a. Energy Efficiency and Demand Response

45. The Company considered whether energy efficiency "(EE") or demand response ("DR") programs would be effective in meeting the identified need. Eversource has a strong tradition of offering customers comprehensive EE programs as described in the Massachusetts Joint Statewide Three-Year Electric and Gas Energy Efficiency Plans, which encompass EE programs for the state's eight Program Administrators.[11] These EE programs have led to substantial demand savings. The projected statewide savings are included in the forecast Eversource uses for system planning, and thus are already factored in to the projections showing the need for the Project. As previously noted, even assuming no issues executing the distribution switching plans, there is still an existing load shed risk of 7.9 MW in 2018, increasing in accordance with the 10-year load forecast through Summer 2028 to 11.8 MW. Thus, in order for EE efforts to produce the needed demand savings, it would require installing *additional* EE measures in the area of the affected load that produce at least 11.8 MW in demand savings by 2028. The amount of load being reduced by EE is currently forecasted at about 1.2 MW, or 5% of the load in 2028. Based on the Company's experience implementing EE programs, it would be difficult to achieve the magnitude of additional savings of at least 40% needed over and above the EE measures already completed or planned.

[11] The eight Program Administrators are Eversource, National Grid, Columbia Gas of Massachusetts, Cape Light Compact, Berkshire Gas, Liberty Utilities, Unitil, and Blackstone Gas Company.

46. Utility DR programs specifically target peak demand reduction for additional savings, in addition to installing EE measures. However, it is unlikely that a DR program would produce peak load reductions at the scale that would be needed to produce a demand reduction at Fisher Road of at least 11.8 MW (approximately 45% of the forecasted demand at the substation) by 2028. For example, according to the latest ISO-NE Capacity, Energy, Loads and Transmission ("CELT") data from the 2018 CELT report, active DR is expected to reduce the system peak by about 2% in 2028; therefore, it is unreasonable to expect that 45% of demand can be reduced at the substation. Further, the area does not have any large customers that could participate in DR to make a meaningful reduction, other than UMASS Dartmouth. UMASS Dartmouth is already participating in DR with a small battery storage project.

b. Distributed Generation

47. Eversource is receiving a large number of DG interconnection requests, the majority of these being photovoltaic ("PV") solar farms, both behind-the-meter PV and stand-alone, primary-metered PV systems participating in net metering and injecting all of their output back onto Eversource's distribution systems. There are also recent applications with combined solar and battery storage under the Massachusetts Department of Energy Resources Solar Massachusetts Renewable Target ("SMART") program. In particular, Eversource currently has numerous small behind-the-meter solar arrays, three large standalone solar array interconnections, one 600-kW wind turbine and one large gas-fired synchronous Combined Heat and Power ("CHP") generating unit currently in-service on various 13.2-kV distribution feeders in the Fisher Road Substation power supply area. The stand-alone solar arrays, currently totaling 7.4 MW, are intermittent standalone solar units interconnected under the net metering tariff. The CHP unit is a 2 MW gas-fired cogeneration unit installed and operated as a load reducer by UMASS Dartmouth

and financed under the Eversource EE program. Eversource continues to receive additional interconnection requests for standalone solar applications under the net metering tariff and under the SMART program and is conducting impact studies for qualifying applicants to identify upgrade and interconnection requirements; Eversource conducts these required impact studies either on a "first-come-first-served" basis or as clustered group studies per the DG Tariff if they are submitted by the same developer and on the same feeder. As of February 2019, there were 15 large, standalone distributed generation applications in the Fisher Road supply area, totaling 42 MW, either currently in impact study or queued for impact study, with an additional five applicants, totaling 17.5 MW, on the Cross Road 13.2-kV circuits that tie to Fisher Road Substation. Smaller applications that are behind the meter and did not require an impact study, or were withdrawn due to lack of activity, do not appear in the list. Because of the large number of applications that Eversource continuously receives, the list of applications in any particular substation area, and for Fisher Road Substation in particular, can change frequently. Previously conducted impact studies for stand-alone DG applicants have demonstrated that the Line 109 outage is a limiting condition that would prohibit their operation due to excessive voltage flicker, light load rise, or impacts on voltage regulation equipment. To accommodate the amount of DG currently in queue, the proposed Project will be required. The total queued amount of DG actually exceeds the top name plate ratings for both Fisher Road Substation transformers. If these DG applicants were all to interconnect, not only would the second 115-kV line would be required, but also an upgrade of Fisher Road Substation to larger transformers would be required. The large amount of Pre-Application requests that Eversource is continuing to receive, and required to respond to under Section 3.2 of the Standards for Interconnection of Distributed Generation Tariff (M.D.P.U. No. 162D), demonstrates continued interest by developers in the Dartmouth and Westport areas.

48. The proliferation of existing and proposed DG resources is one of the drivers for the need for the Project. Impact studies for solar applicants that are now online identified transmission contingency events under which they cannot operate because of excessive voltage flicker, severe impacts on voltage regulation apparatus, or light load voltage rise on the 13.2-kV distribution system during operation when the 115-kV transmission line is out of service and Fisher Road is backed up via 13.2-kV ties, as described above. Thus, DG resources would be ineffective in either deferring or obviating the need for the Company's proposed Project for a number of reasons, including:

(a) The vast majority of the DG resources in this area trip offline and cannot operate if the utility source is lost, as would be the case for the single contingency outage of Line 109. Incremental DG resources added in this area would be subject to the same restriction and would be generally unable to operate after this outage. Even for the existing and proposed facilities that can continue to operate, any benefit would be negligible and limited to the few customers who have these resources.

(b) Eversource's system planning standards for DG interconnection requests direct that, if restorative distribution switching is being conducted on a distribution circuit to which DG resources are interconnected and part of the restorative switching involves reconfiguring the distribution system such that the DG resources are tied to another circuit that is not their normal source of supply, the DG resource would not be permitted to operate. This precludes operation of most DG resources in combination with any distribution solutions described in more detail in Subsection 4 below.

(c) PV arrays, which constitute the majority of the DG interconnection requests within the Company's service territory, produce peak output during the middle of the day, when the sun is directly overhead, and then gradually drop off to zero output in the late afternoon. The peak load condition for the Fisher Road power supply area, being set by the residential and small commercial and industrial sector, typically occurs as late as 7:00 p.m. to 8:00 p.m., after solar output has dropped to zero. The "dispatchability" of PV systems can be improved upon with the combined interconnection of battery storage, but with the caveats previously discussed, even PV systems paired with battery storage would generally be unable to operate after a transmission outage.

49. Since the need being addressed by the Project is the result of an outage and service interruption for the entire power supply area served by Fisher Road Substation caused by a transmission line contingency event, distributed generation would not mitigate customer impacts to any meaningful degree. The most prevalent distributed generation technologies will not operate if they are not

connected to an energized grid, because they cannot operate in an islanded manner and must trip offline, per the Institute of Electrical and Electronics Engineers ("IEEE") Standard 1547-2018 – IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems. Furthermore, while some generation technologies will allow for operation in "islanded" mode in order to feed a customer's on-site load, such technologies are not allowed to feed into a utility grid that has lost its supply, per IEEE Standard 1547-2018, or unless studies have been conducted and the resulting "microgrid" is designed specifically for that type of operation. Therefore, these sources would not provide any reliability benefit for the system. Micro-grids, which serve a group of customers, may be designed to operate when disconnected from the utility grid, but only those customers in the micro-grid would benefit. There is presently only one planned microgrid in the Fisher Road Substation power supply area. This is the proposed 195-kW UMASS Dartmouth battery storage application currently under review by Eversource. The proposed microgrid would support the UMASS Dartmouth campus for loss of supply, but the installation is too small to be an effective alternative to the Company's proposed Project. The UMASS Dartmouth campus is the location of the only other customer generator that is currently online that could potentially be relied upon for support for the identified contingency event. The UMASS Dartmouth 2 MW cogeneration unit can remain in service because it is on a 13.2-kV backup path that is necessary to restore supply to Fisher Road from Cross Road Substation via the required cascaded backup distribution switching. Additional microgrid projects coupled with large distributed generation, even if developed, may themselves require significant distribution upgrades, along with additional costs associated with the microgrid installations.

50. For the reasons set forth above, DG is not a solution to the identified reliability issues in the Fisher Road Substation power supply area because the contingency outage of the single 115-kV line serving the area serves as the fundamental constraint to further DG applicants in the area. Completion of

the Company's proposed Project in establishing a second 115-kV source to Fisher Road Substation will actually enhance the Company's ability to facilitate additional DG applicants to interconnect to the13.2-kV distribution systems out of Fisher Road Substation.

4. Utility-Scale Generation and Battery Storage Alternatives

51. The Company also considered whether utility-scale generation or battery storage alternatives could be utilized to serve the load at Fisher Road after the contingency loss of Line 109. However, the Company determined that no utility-scale resource could be interconnected at Fisher Road under ISO-NE reliability criteria for generator interconnections. More specifically, any utility-scale resource attempting to interconnect at 115-kV at Fisher Road Substation would need to successfully complete an ISO-NE System Impact Study, which would test the performance of the resource at its full capacity under a range of load levels, including light and minimum loads. Operation of any resource at Fisher Road under these conditions would be found to have an unreasonable adverse impact on the Company's distribution system after the transmission contingency, and interconnection would not be allowed without the construction of an additional transmission path out of Fisher Road – namely, the extension of Line 111.

52. Even if the technical limitations that prevent the interconnection of an NTA at Fisher Road could be overcome, the necessary size of a battery storage system would make it significantly more expensive than the proposed Project. As previously noted, after all distribution switching has been completed, there is a forecasted load shed risk of 11.8 MW by 2028. Therefore, a battery storage system would need to be larger than 11.8 MW, because a smaller size would not be able to cover all the load at risk. However, depending on the success of the distribution transfer switching steps, which could take upwards of an hour, a battery storage system may need to cover the entire load at Fisher Road, which is forecasted to be 26.2 MW by 2028. Depending on the configuration, the Company estimated that the

amount of battery storage to serve the load at risk at Fisher Road Substation could be between 11.8 MW and 26.2 MW.

53. Based on the historical load at Fisher Road, the Company estimated that between 115.6 MWh and 256.6 MWh of stored energy would be required under peak load conditions. This estimate is based on an assumed 12-hour duration of a transmission contingency, which ensures comparability with how transmission line ratings are developed.[12] Having an energy storage system with sufficient energy to support load for 12 hours promotes consistency with the capability and evaluation of a wires-based alternative. The Company estimated that a battery storage system sized to meet only the minimum requirement (11.8 MW) would cost at least $43 million. There would also be additional costs associated with the acquisition of land, siting and permitting, site preparation, and other necessary activities that are not factored into these estimates. In the Company's experience, these costs often add an additional 35 percent to 50 percent to the cost of a battery storage system. Finally, a battery storage system would require ongoing maintenance, capital replacement and warrantee costs that would exceed those of the proposed Project. Accordingly, the Company concluded that a battery storage system would likely be at least three times more costly than the proposed Project. A larger storage system designed to serve all of the load at the station (26.2 MW) would be even more expensive.

4. Distribution Alternatives

54. The Company also considered potential distribution alternatives to meet the identified need, including the potential upgrade of five 13.2-kV distribution feeders in the Dartmouth area. This potential alternative was determined to not completely resolve all the identified criteria violations. Specifically, the distribution alternatives considered would reduce the amount of switching steps

[12] According to ISO-NE Planning Procedure 7, a transmission facility can only be operated above its normal rating (but below its emergency rating) for up to 12 hours to avoid loss of life or loss of tensile strength in excess of design criteria.

necessary to respond to a 109 Line outage, but not prevent the loss of customers in the first instance. Instead, this alternative would still require a significant portion of the same 18 steps of distribution switching to transfer interrupted loads to the Cross Road and Pine Street Substations, which is a continuing violation of the Company's criteria, while the proposed Project adequately resolves all criteria violations. Also, based upon previously conducted interconnection studies, this distribution alternative would not permit a higher penetration of DG resources, as discussed above, which the second 115-kV line will permit. For these reasons, the distribution alternative was eliminated from further consideration.

5. Transmission Alternatives

55. The Company considered two 115-kV transmission alternatives. The first was a new 115-kV underground cable from Pine Street Substation in New Bedford to the Fisher Road Substation. Eversource does not own sufficient property at the Pine Street Substation for a new transmission line terminal; therefore, this alternative would require the acquisition of new property or property rights in addition to the 9.3 miles of in-street construction. The estimated cost of underground construction in public ways from Pine Street Substation to Fisher Road Substation (as compared to overhead construction in an existing transmission ROW) would be approximately $180,000,000, in addition to the cost of the acquisition of property or property rights. This is an order of magnitude estimate with an accuracy of -50/+200%. Moreover, in-street construction for such a length would cause significant temporary impacts to traffic in the area for a greater period of time, resulting in a greater impact on the community, as compared to an overhead solution in an existing ROW. Lastly, such construction would be estimated to take 24 months longer than for the proposed Project, thereby jeopardizing service in the area for an extended period of time. Thus, because the in-street transmission alternative would be significantly more expensive, have greater impacts on the community and take

longer to implement, the Company determined that this alternative was inferior to the proposed Project and eliminated it from further consideration.

56. The second transmission alternative considered was a new 115-kV underground transmission line from Fisher Road Substation to National Grid's Tiverton Substation in Tiverton, Rhode Island. This line would be a total of 10.8 miles in length and would primarily consist of running a new 115-kV line within existing roads for approximately nine miles. The remaining approximately 1.8 miles to connect to the Tiverton Substation would run overhead through an existing National Grid gas transmission easement. This would require both Eversource and National Grid to secure new easement rights. The estimated cost of this transmission alternative would be approximately $220,000,000. This is an order of magnitude estimate with an accuracy of -50/+200%. This cost does not reflect costs associated with securing any new easement rights, which are anticipated to be substantial. Although this transmission alternative would largely be placed within existing roadways, the conduit would cross approximately five rivers and streams including; Destruction Brook, the West Branch of the Westport River, Kerby Brook, Stony Brook and tributaries to Stafford Pond. This alternative is also approximately five miles longer than the proposed Project. Based upon considerations of environmental impacts and cost, the Company determined that this alternative was inferior to the proposed Project and eliminated it from further consideration.

6. Conclusion on Alternatives

57. The Company's alternatives analysis demonstrates the Project will best address the need and improve reliability to the Towns of Dartmouth and Westport that are served by Cross Road Substation and Fisher Road Substation. Relative to the other transmission and non-transmission alternatives studied, the Project is the best solution to balance reliability, cost and environmental impacts.

VI. IMPACTS OF THE PROPOSED PROJECT

58. Eversource has identified and evaluated the potential environmental effects from the construction and operation of the Project and has proposed measures to avoid, minimize or mitigate these effects, as described below.

59. Construction Phases. Construction of the proposed transmission line will occur in phases, as described in the next sections. Some phases may occur in parallel, depending on location.

a. Staging Areas. Prior to the start of construction, Eversource's contractor will secure arrangements for one or more temporary staging areas in the general vicinity of the Project. Locations typically utilized for this purpose include an existing contractor's yard or unused space at a commercial or industrial facility. The staging area(s) will function as a storage laydown area for equipment and materials needed for the Project and may also be used for construction office trailers, temporary sanitation facilities and worker parking. The storage yard will have dumpsters and containers specifically for collecting and recycling shipping and crating material and scrap metals from packaging or equipment. The staging areas will also act as meeting points for crew assembly. Upon Project completion, all related construction materials, trailers and equipment will be removed and the property will be restored, per land owner agreements.

b. Work Area Preparation. Preparation of the work area is required to provide safe access for construction equipment and personnel. Work at each structure location may require some vegetation removal in the form of mowing and shrubbery/tree trimming as well as minor grading of the ground surface to improve existing access roads and to create a level and safe work area. Minor side trimming may be required to provide adequate clearance for the new conductors. A gravel work pad of approximately 100 feet by 100 feet, will be established at upland structure locations to enable the foundation work, structure embedment, and structure assembly. Work pads for structure locations in wetlands will be temporary construction matting and removed after completion. The work pad size may vary slightly depending on terrain, equipment needs, and the overall site conditions, with an estimated maximum work area of 100 feet by 120 feet at the three-pole structure locations. Construction mats will be utilized to facilitate safe access to, and to create temporary work areas around, proposed structures in wetland resources and lawn areas. Construction mats may also be used in uplands to create level work areas where topography is uneven and in resource areas where additional soil protection is warranted. Erosion and sedimentation ("E&S") controls will also be installed, as necessary and as required by permits obtained for the Project.

c. Access. The 5.1-mile stretch of ROW for the Project crosses a number of public roads in Dartmouth including Cross Road, Route 6, Old Westport Road and Lucy

Little Road. The existing gravel access roads within the ROW will provide the primary access for construction work. Some new spur roads will be constructed within the ROW to connect existing access roads to proposed structure locations and to provide contiguous access along the ROW where possible. Existing access roads may also be improved by adding gravel and/or minor grading to smooth out depressions. There will be some vegetation removal in the form of mowing and shrubbery/tree trimming as well as minor grading of the ground surface to improve existing access roads. In wetland areas, temporary construction mats will be used for wetland crossings.

d. Foundation Installation. As previously explained, the proposed line will consist of steel monopole dead-end and angle structures on concrete foundations, direct-embedded steel monopole tangent structures, and three-pole configured steel structures connecting the new line to both the Cross Road and Fisher Road Substations. Direct-embedded structure holes will be made using a drill auger or an excavator, depending on site specific conditions. The majority of direct embedded structures will be constructed with a casing and backfilled with compacted material. In limited circumstances, a poured concrete foundation or vibrated casing may be used if soil conditions require. In parallel with the structure work, the counterpoise or grounding wire (part of the line's lightning protection) will be buried within the ROW using standard trenching equipment (e.g., Ditch Witch). Blasting is not anticipated for this Project.

e. Structure Assembly. From the staging area(s), work crews will transport individual structure segments, along with insulators and associated hardware, to each structure location in the ROW. The structure sections will then be assembled at each work area and lifted in place by a crane. Direct-embedded poles will be placed in the casing, leveled and backfilled, while the remaining poles will be set on concrete foundations. The davit arms will be individually hoisted and framed to the structures. Insulators, clamps, travelers (stringing blocks, consisting of urethane-lined sheaves or pulley wheels), and other hardware will then be installed.

f. Conductor Stringing. Following structure assembly, the "tension stringing" method will be employed to install the conductors and shield wire. Using this method, the conductor will be unreeled under tension and will not be allowed to contact the ground. The conductor will be delivered on reels to the designated pulling areas within the ROW. These are typically at the angles, on either side of the section of conductor being installed. One end of a pulling line will be threaded through the travelers, either by ground crews or utilizing a helicopter and attached to winches and the wire to be pulled. The pulling line will be then used to pull the wire from the reels through the travelers. Tension will be maintained on the wire during this process to maintain a minimum height above the ground. Once the wire is strung, it will be "sagged" to the appropriate tension and permanently attached to the structures. During tension stringing operations, equipment will be positioned at strategic locations, or pull pads, along the transmission line alignment. To avoid and minimize disturbance to soils and vegetation, existing access routes will be

utilized to the greatest extent possible. When it is necessary to establish pull pads within a wetland, construction mats may be used to support the equipment and minimize disturbance in wetlands.

g. Substation Work and ROW Work Adjacent to Substation. Modifications are not required within the fence line at the High Hill Substation, except for relay setting changes, which will occur inside the control enclosure. Modifications at the Cross Road Substation location will consist of reconfiguring the 115-kV T1-109-111 Switch (which is outside the fence line) to operate as a tie switch between Line 109 and Line 111 and which will be necessary to extend Line 111. An overhead distribution line that runs in the center of the ROW and adjacent to the Fisher Road Substation will be partially relocated underground for approximately 200 feet in the vicinity of Fisher Road Substation to allow for the termination of Line 111 at Fisher Road Substation. This line relocation will include the removal of a three-pole distribution structure, the installation of a short section of distribution cable underground in a duct around the exterior of the station and the installation of a new transition pole for the overhead to underground transition. Three single-phase 7.62-kV voltage regulators at Fisher Road Substation will be removed as part of this Project.

h. Site Restoration. Restoration efforts, including final grading, will be completed following construction. All construction debris will be removed for the Project site and disposed of in accordance with applicable laws and regulations. All disturbed areas around structures and other locations will be seeded with appropriate conservation seed mixtures and mulched to stabilize soil disturbance. Pre-existing drainage patterns, ditches, roads, stone walls and fences will be restored to their former or better conditions.

Permitting required for the various construction phases is outlined in Section VIII, Table 7 below; all permits will be obtained by Eversource prior to construction. The construction effort is anticipated to last approximately six to nine months, beginning during the first quarter of 2020. The Company plans to place the Project in service by fourth quarter 2020.

60. Land Use. Construction and operation of the Project will have no permanent effect on the existing pattern of land use in the Project area. Land use adjacent to the ROW includes some agricultural areas (cranberry bogs), lower density residential and municipal conservation land on the southern end of the Project area. Residential density increases as the ROW extends north from Fisher Road Substation and runs along the eastern edge of the UMASS Dartmouth campus. The ROW then

crosses over Route 6 and the associated commercial district and ties into the existing Cross Road Substation. The Project will be located entirely within the existing maintained ROW, which is already occupied by other existing transmission and distribution lines, and will utilize existing access to the ROW. Accordingly, no impact to existing adjacent land uses is anticipated. The Project is not anticipated to significantly alter terrain. Minor grading may be required for access road improvements and construction work areas.

61. Wetland Resource Areas. The ROW in the Project area contains freshwater wetland resources and crosses two perennial streams, but does not cross any open water bodies. Wetlands throughout the ROW are typically part of larger wetland systems and/or tributaries to intermittent streams that ultimately drain to the Paskamanset River. The southern end of the ROW crosses over an unnamed perennial stream near Lucy Little Road and Destruction Brook, the second perennial stream, near the Fisher Road Substation. Each stream has an associated 100-year flood plain. While structure locations for this Project were designed to minimize impacts to wetland resources, given the extent of wetlands in this area, 12 of the proposed 50 new structures will be located within wetland resource areas. Further, 20 structures will require the use of temporary construction mats for access and/or to establish work areas. In parallel with the structure work, the counterpoise or grounding wire will be installed. Counterpoise will not be installed through wetlands, rather a ground grid will be used that typically consists of the grounding wire radiating out in four directions for approximately 50 feet. Approximate temporary impacts are outlined in Table 3 below and depicted in the Cross Road to Fisher Road Reliability Project Plan Set (Exhibit H):

Table 3

Structure Number	Permanent BVW Impacts (structures)	Temporary BVW Construction Mat Work Areas	Temporary BVW Construction Mat Access	Total Temp. BVW Construction Mat Impact
40			2,747	2,747
41	28	10,000	2,920	12,920
42	28	9,835		9,835
48		2,526		2,526
51		1,408		1,408
52	28	10,000	1,354	11,354
53		6,353		6,353
59		1,023		1,023
60		2,694	245	2,939
62		1,224		1,224
66	79	9,568		9,568
66 (pull pad)		4,626		4,626
68		3,218	2,793	6,011
69		1,064		1,064
70	28	9,515	4,101	13,616
71	28	10,000	1,817	11,817
74		5,658		5,658
75		1,275		1,275
76	28	6,573		6,573
77		846		846
79	28	9,109		9,109
80	28	10,000	9,689	19,689
81	28	10,000	3,658	13,658
84		2,591		2,591
85	28	10,000		10,000
86	28	10,000	8,693	18,693
87		2,724		2,724
TOTAL	**387**	**151,830**	**38,017**	**189,847**

62. Wellhead Protection, Water Supply Resource Areas, Surface and Groundwater. There are no Outstanding Resource Waters, Areas of Critical Environmental Concern or Surface Water Protection Areas within the vicinity of the Project. A small portion of the Project near Chase Road lies

within a Zone II wellhead protection area, including a total of three proposed structures. Zone II Wellhead Protection Areas are typically regulated under the Municipal Zoning By-law. In this case, utility projects are allowed under § 375-28.5(B)(15) of the Dartmouth Aquifer Protection Regulations.

63. Additionally, the Project has limited potential to affect groundwater and drinking water supplies. All vehicle fueling and all major equipment maintenance will be performed off-site with the exception of large, less mobile or fixed equipment (cranes, drill rigs, excavators) that will be refueled, as necessary, on the ROW. Spill containment equipment and absorption materials will be readily available at all work sites and maintained for immediate use in the event of any inadvertent spills or leaks. The contractor will be required to have a spill kit available at all locations where work is taking place. Heavy diesel equipment and fuel transfer vehicles will also carry a supply of absorbent pads and containers to address any potential spill.

64. Visual. The ROW was previously cleared to its full width and has been maintained in accordance with Eversource's Vegetation Management Plan. Limited side trimming may be required for the Project. The ROW already has existing structures and the installation of the Project will result in minor changes to the views of abutting residences. The proposed structures will be taller and of a different design than the existing tangent structures, although the weathered steel finish, which is similar to the existing weathered steel dead-end and angle structures, will help minimize visual effects. No additional substation equipment, including transmission line switches, or expansion is proposed as part of the Project and so there will be no change in the visual effects of the substations. A modification will be made to the configuration of existing transmission line switches adjacent to Cross Road Substation, which will have no visual impact.

65. Noise. Noise impacts from the Project will be temporary in nature and will occur only during construction. Construction noise will be generated by preparation of work areas, including

access roads, delivery of materials, foundation construction, structure assembly and line stringing. Generally, work will be limited to weekday daylight hours.[13] Work crews will not be at any one job site continuously for the duration of the Project. As a result, construction noise at any one location will be brief and intermittent over the construction period. Specific work hours, including potential weekend work, will be determined in coordination with local authorities, as required. In certain instances, the Company may seek approval from the municipality to work at night or on weekends, particularly if a construction task cannot be interrupted until completed, such as pouring concrete foundations and pulling conductor.

66. Air Quality. The main sources of potential construction-related air-quality impacts are emissions from construction equipment and motor vehicles and fugitive dust emissions from disturbed soil surface areas. Construction contractors will be contractually required to adhere to all applicable regulations, including those related to the control of dust and emissions. All diesel-powered non-road construction equipment with engine horsepower ratings of 50 and above to be used for 30 or more days over the course of Project construction will have United States Environmental Protection Agency ("USEPA") verified (or equivalent) emission control devices, such as oxidation catalysts or other comparable technologies (to the extent that they are commercially available) installed on the exhaust system side of the diesel combustion engine. Dust will be controlled at the construction site by use of appropriate best management practices (e.g., maintaining reasonable construction vehicle speeds during dry conditions, application of water, etc.) as per the Eversource Energy Best Management Practices Manual for Massachusetts and Connecticut ("BMPs") (Exhibit K). At areas where construction vehicles are exiting onto public roads, regular road sweeping will be used to remove

[13] The Dartmouth General Bylaws regulate noise and provide an exemption for: "Necessary excavation in or repairs of bridges, streets or highways or any public utility installation by or on behalf of the Town, or any public utility or any agency of the State of Massachusetts." Section 73.2.

tracked out soils thus minimizing conditions that create dust. If necessary, gravel track-out areas will be installed.

67. Public Safety. The Company proposes to build the proposed transmission facility consistent with its system requirements and current industry standards including, but not limited to, the American National Standards Institute, Occupational Safety and Health Act, and the National Electrical Safety Code and 220 CMR 125, "Installation and Maintenance of Electric Transmission Lines." Eversource will coordinate with local public safety officials during construction, where applicable. Any necessary closures at roadway crossings will be temporary and a traffic detail will be used to ensure the safety of the public.

68. Traffic. The Project will have minimal effects to local traffic and the Project will not require the use of any municipal services besides police details, as required. The volume of traffic generated during construction is not expected to be large enough to significantly affect traffic flow on public ways within the Project area. There may be temporary traffic impacts associated with material deliveries and large equipment mobilization to the ROW and with wire stringing across public and private roadways. During construction, the Company will adhere to the State Highway Access Permit requirements issued by the Massachusetts Department of Transportation for the Route 6 crossing.

69. Electric and Magnetic Fields. The Company retained Gradient Corp. to model changes to electric and magnetic field ("EMF") levels associated with the proposed project. Calculations were performed using the FIELDS computer program developed by Southern California Edison. This software has been shown to accurate predict EMF levels near transmission lines. Electric and magnetic fields were calculated at a height of 1 meter (3.28 feet) above ground, in accordance with standard protocol.

70. Magnetic fields were calculated with and without the Project in service, under average annual load conditions and an annual peak load. See Exhibit L for a copy of Gradient's report. These results are summarized in Table 4 below:

Table 4

Calculated Magnetic Field Levels (mG) in the vicinity of the proposed transmission facilities

System Load Condition	Cross Section/Route Segment	Western Edge of ROW		Maximum within ROW		Eastern Edge of ROW	
		With Project	Without Project	With Project	Without Project	With Project	Without Project
Average Annual Load	Cross Road S/S to State Road	1.8	1.3	12.2	9.7	1.2	2.0
	State Road to UMass Campus	2.9	1.5	8.9	3.7	0.7	1.6
	UMass Campus to Fisher S/S	3.3	2.1	9.1	4.6	1.1	2.2
Annual Peak Load	Cross Road S/S to State Road	3.6	2.6	23.6	19.5	2.3	3.9
	State Road to UMass Campus	5.8	3.0	17.7	7.3	1.3	3.2
	UMass Campus to Fisher S/S	7.0	4.2	18.8	9.2	2.6	4.4

Electric fields were also calculated with and without the Project in service. Voltages on all circuits were assumed to be 1.05 times nominal voltages. These calculations are summarized in Table 5 below:

Table 5

Calculated Electric Field Levels (kV/M) in the vicinity of the proposed transmission facilities

Western Edge of ROW		Maximum within ROW		Eastern Edge of ROW	
With Project	Without Project	With Project	Without Project	With Project	Without Project
0.45	0.45	0.9	0.9	0.46	0.01

71. The reference levels for whole body exposure by the general public to 60-Hz fields is summarized in the following Table 6:

Table 6

Reference Levels for whole body exposure by the general public to 60-Hz fields

Organization, recommended limit	Magnetic fields	Electric fields
ICNIRP, reference level[14]	2,000 mG	4.2 kV/m
ICES, maximum permissible exposure (MPE)[15]	9,040 mG	5 kV/m 10 kV/m[16]

72. The calculated EMF levels associated with the Project are many times lower than international guidelines. It is reasonable to conclude that the Project will not have a significant effect on EMF.

73. Cultural Resources. The Company's environmental consultant, Cultural Heritage Group ("CHG") , conducted a cultural resources review in July 2015. In 2016, a project notification form was filed with the Massachusetts Historical Commission ("MHC") and a subsequent

[14] International Commission on Non-Ionizing Radiation Protection; ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1 Hz – 100 kHz); Health Physics 99(6):818-836; 2010.

[15] IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields (0-3 kHz; IEEE International Committee on Electromagnetic Safety on Non-ionizing Radiation, Institute of Electrical and Electronics Engineers, October 2002, New York, NY.

[16] "Within power line rights-of-way, the MPE for the general public is 10 kV/m under normal load conditions."

Intensive Archeological Survey was completed with results submitted to MHC in September of 2016. MHC issued a finding of "no historic properties affected" in October of 2016 (see Exhibit M).

74. Flood Zone. A portion of the Project near Destruction Brook and Lucy Little Road intersects with Federal Emergency Management Agency designated Zone A, a 100-year flood zone. While two structures will be located within the 100-year flood plain near Destruction Brook and two additional structures will be located within the 100-year flood plain in the vicinity of Lucy Little Road, the installation of these structures is anticipated to have an insignificant effect on the flood storage volume of the floodplain. Excavated materials will be transported outside of the flood zone and soils will be stabilized upon Project completion.

75. Protected Species and Habitat. In compliance with the Massachusetts Endangered Species Act, G.L c. 131A and its implementing regulations, an Information Request was sent to the Natural Heritage and Endangered Species Program ("NHESP") Division of Fisheries and Wildlife for regulatory review of the Project and Project area (NHESP tracking No. 12-31680). Based on a letter received on June 26, 2018 (Exhibit N), it was determined that the site is not mapped as Priority or Estimated Habitat and that the NHESP database does not contain any state-listed species records in the immediate vicinity of the site.

76. The Project area was also reviewed for the presence of federally-listed rare species. Based on an online review of the United Stated Fish and Wildlife Service database, the Information for Planning and Conservation Report listed the Northern long-eared bat (*Myotis septentrionalis)* as a threatened species potentially affected by activities in the Project location. Through a review of the state mapping, it has been confirmed that there are no known Maternity Roost Trees or Hibernaculum

located within 0.25 miles of the Project limits. Therefore, no impacts to the Northern long-eared bat are expected as a result of this Project.

77. Stormwater Management and Erosion/Sedimentation Control. The Project will be constructed in compliance with the USEPA National Pollutant Discharge Elimination System ("NPDES") General Permit and a Stormwater Pollution Prevention Plan ("SWPPP") will be developed and implemented involving a series of construction BMPs to reduce the risk of erosion and sedimentation disturbances due to construction activities. Additionally, the Project will be constructed in compliance with the Massachusetts Wetlands Protection Act and the Massachusetts Department of Environmental Protection ("MassDEP") Stormwater Regulations. The only applicable standard for the Project is Standard #8 - Construction Period Pollution Prevention and Erosion and Sedimentation Controls. To comply with this requirement and the developed SWPPP, Eversource will install erosion and sediment ("E&S") controls and employ dewatering as needed for new pole installations. E&S controls may include straw wattles, silt fence, straw bales or other similar products. Furthermore, daily inspections of all work areas and erosion controls will be conducted by construction crews and weekly inspections will be performed by an experienced environmental scientist. Compliance with DEP's Stormwater Management Standards will be demonstrated in the local Notice of Intent filings, as necessary.

78. Waste, Debris, and Soil Management. Project earthwork will be limited to excavations for the structure foundations, counterpoise and some grading work to construct and improve access roads and prepare work areas. The MassDEP reportable release database was reviewed by the Company on December 10, 2018, for possible sites within the ROW, to determine the potential for encountering contaminated soils from historical releases or former land development practices during

the execution of the work. No reportable sites were identified within the ROW at the time of review. Excavated soils will be managed on-site.

79. Restoration. Restoration will begin in sequence with completion of work at each structure. Upland areas will be seeded, as needed, with an appropriate mixture to ensure stabilization of soils and prevent sediment transport. The exposed areas will then be covered with a layer of straw mulch and E&S controls will remain in place until the restoration area is properly stabilized. Upon removal of construction mats, areas will be allowed to re-vegetate, as the existing seed stock in the soils will remain intact. A wetland scientist will review each work area to ensure impacts do not extend beyond the pre-construction conditions. Additional restoration efforts will be implemented if necessary at the discretion of a wetland scientist and may include: smoothing or raking of any ruts, addition of wetland soils, seeding with a wetland seed mix or addition of straw mulch.

80. Based upon the above, the environmental impacts associated with the proposed Project are minor and/or temporary in nature and will be avoided or minimized to the maximum extent possible.

VII. COMMUNITY OUTREACH

81. Consistent with the Company's customary practice of consulting with municipal authorities at the outset of new electric transmission projects, representatives from both the Company and the Town of Dartmouth met first in early 2016 and more recently on June 27, 2018 to inform local officials of the proposed Project. In attendance for the Town of Dartmouth at these meetings were representatives from the majority of the municipal departments. At the meetings, Eversource reviewed the scope of the proposed work, construction scheduling and sequencing, and the environmental permitting process, among other Project-related topics. The Company will continue to maintain

communications with municipal officials throughout the permitting, construction and post-construction phases of the Project to address any concerns or issues that may arise and will conduct further presentations and outreach, if requested. The Company also will implement communication plans to keep neighbors informed throughout the duration of the construction. Additionally, the Company met with the Town of Dartmouth Conservation Commission on February 23, 2016 to discuss the Project and its potential impacts to resource areas, as well as potential mitigation requirements.

82. Project Open Houses were held on April 13, 2016 and more recently on August 8, 2018 at Dartmouth Town Hall, where Company representatives were available to address questions from individual members of the public. Abutters to the Project were notified of the Open Houses via direct mailing. Also, prior to construction, the Town and abutters will be notified of the start of the construction and will be given the Company contact name and number for the Project representative who can answer questions and concerns related to the Project during construction. This notification is generally given to abutters via a door hanger or by direct mailing. The Company will maintain a website with Project information including construction updates, Company contact information and links to the DPU website, petition and legal notices.

VIII. PERMITS REQUIRED

83. On December 17, 2018, the Company submitted an Expanded Environmental Notification Form ("EENF"), pursuant to the Massachusetts Environmental Policy Act ("MEPA") and its regulations (301 C.M.R. 11.00). On February 1, 2019, the Secretary issued a Certificate on the EENF requiring the filing of a Single Environmental Impact Report.[17] The EENF and the Secretary's

[17] In accordance with the Secretary's Certificate, the Company will include draft Section 61 Findings in the Single Environmental Impact Report.

Certificate thereon is provided as Exhibits O and Exhibit P. Table 7 below is a list of the permits, approvals and authorizations the Company anticipates will be necessary to construct, operate and maintain the Project:

Table 7

Anticipated Permits, Reviews and Approvals

Permit	Agency	Measures to Comply with Applicable Performance Standards
Federal		
Section 404 General Permit (Pre-Construction Notification)	Army Corps of Engineers	Compliance with terms and conditions of the General Permit for Massachusetts (i.e., BMPs and compliance with related state wetlands regulations)
Coverage under NPDES General Permit for Discharges from Construction Activities	Environmental Protection Agency	SWPPP to be developed and implemented, involving a series of construction BMPs to reduce potential for erosion and sedimentation.
Review under FAA regulations (Part 77 Obstruction Standards) and Form 7460-1 (Hazards to Navigation)	Federal Aviation Administration ("FAA")	Structures will be designed and equipped with necessary equipment to comply with any navigational requirements identified by FAA.
Review under Section 106 of the National Historic Preservation Act (36 CFR 800)	Army Corps of Engineers	The Project will be designed to minimize archaeological resources impacts.
State		
General 401 Water Quality Certification	MassDEP	For wetland crossings. Similar BMPs to be employed as required by NPDES, Army Corps and the Dartmouth Conservation Commission.
Non-Vehicular Access Permit for Aerial Crossing of State Roads	Massachusetts Department of Transportation	Measures will be implemented to ensure safety and minimize traffic impacts during construction.
Approval under G.L. c. 164, § 72	Department of Public Utilities	Because the Project represents an efficient, necessary, low cost, and low environmental impact method to ensure the reliable supply of electricity to consumers in Eversource's service territory, it is in accordance with the mandates of G.L. c. 164.

Expanded Environmental Notification Form and Single Environmental Impact Report in compliance with M.G.L c. 30A	Massachusetts Environmental Policy Act	Review of the potential environmental impacts of Projects for which Agency action is required, and to assist each Agency in using all feasible means to avoid damage to the environment to the maximum extent practicable.
State and Federal Historic Preservation Acts (Ch. 254 and Section 106)	Massachusetts Historical Commission	The Company received a finding of "no historic properties affected" on October 6, 2016.
Local		
Order of Conditions	Dartmouth Conservation Commission	Temporary construction mats are proposed to minimize wetland impacts at structure locations and access within wetland resource areas. Additional measures to be employed during construction, as required by the Conservation Commissions to prevent erosion and sedimentation that could result in discharges to wetlands.
Grants of Location	Dartmouth Board of Selectman	The Project crosses over several public roads within the Town of Dartmouth. The new line will be in addition to the existing transmission and distribution lines and will be filed in accordance with G.L. c. 166, § 22.

WHEREFORE, Eversource respectfully requests that, pursuant to G.L. c. 164 § 72, and after due notice and a public hearing, the Department determine that the construction of the Project is necessary for the purposes stated and will serve the public convenience and be consistent with the public interest, and authorize Eversource to construct, maintain, and operate said facilities.

Respectfully Submitted,

NSTAR ELECTRIC COMPANY d/b/a EVERSOURCE ENERGY

By its attorneys,

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Dated: March 22, 2019

EXHIBIT LIST

Exhibit A: Existing Transmission System

Exhibit B1: SYS-PLAN 001

Exhibit B2: SYS-PLAN 010

Exhibit C: D.P.U. 16706 – Transmission System Approval, January 8, 1971

Exhibit D: Cross-Section Plans

Exhibit E: Westport Service Map

Exhibit F: USGS Locus Map of Route

Exhibit G: Aerial Photograph of New 115-kV Line from Cross Road to Fisher Road.

Exhibit H: Dartmouth to Westport Reliability Project Plan Set

Exhibit I: Load Flow Diagrams CONFIDENTIAL

Exhibit J: Historic Outage Events

Exhibit K: Best Management Practices

Exhibit L: Gradient EMF Report

Exhibit M: MHC Correspondence

Exhibit N: NHESP Correspondence

Exhibit O Expanded Environmental Notification Form

Exhibit P Secretary's Certificate on Expanded Environmental Notification Form