

SECTION 1

DESCRIPTION OF THE PROPOSED PROJECT

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The Connecticut Light and Power Company (CL&P), a wholly-owned subsidiary of Northeast Utilities (NU), along with The Narragansett Electric Company and New England Power Company, both of which are wholly-owned subsidiaries of National Grid USA (National Grid), propose to construct and operate new 345-kilovolt (kV) electric transmission lines and to make related modifications and improvements to existing 345-kV and 115-kV transmission lines and facilities in northeastern Connecticut, northwestern Rhode Island, and south-central Massachusetts. These proposed electric transmission system improvements, referred to as the Interstate Reliability Project, are part of a family of four projects, collectively known as the New England East-West Solution (NEEWS) projects. Together, the NEEWS projects would address electric system problems in Southern New England.

As part of NEEWS, the Interstate Reliability Project would improve the bulk power electric transmission system in Southern New England and achieve compliance with applicable national and regional reliability standards and criteria. It would increase the capability of the system to move power into Connecticut from the rest of New England, to move power from resources in eastern New England to load in western New England, and to move power from resources in western New England to load in eastern New England. When the electric system is under stress, such transfers are needed to maintain continuity of service.

The Interstate Reliability Project also would eliminate violations of reliability standards existing in Rhode Island at current load levels, specifically overloads and non-compliant voltages. By reinforcing the electrical connections between key substations and switching stations in Connecticut, Rhode Island, and Massachusetts, the proposed improvements not only would address reliability violations that would otherwise occur within the 10-year period for which the system must be planned, but also would provide

long-term flexibility to maintain and operate the transmission system serving all three states and to dispatch existing and potential future generation resources efficiently in all three states and within the New England region.

This section first provides an overview of the proposed Interstate Reliability Project, and then describes the Connecticut portion of the transmission system improvements, as proposed by CL&P. For the purposes of this Application for a Certificate of Environmental Compatibility and Public Need (Application) to the Connecticut Siting Council (Council), “the Project” refers to the Connecticut portion of the Interstate Reliability Project. The “Proposed Route” refers to CL&P’s preferred location for the new 345-kV transmission lines in Connecticut.

1.1 SUMMARY OF THE INTERSTATE RELIABILITY PROJECT

1.1.1 Overview of Interstate Reliability Project Facilities

The Interstate Reliability Project is a proposed set of improvements to the electric transmission systems of Connecticut, Rhode Island, and Massachusetts. Table 1-1 summarizes the Interstate Reliability Project facilities, while Figure 1-1 illustrates the general locations of these facilities.

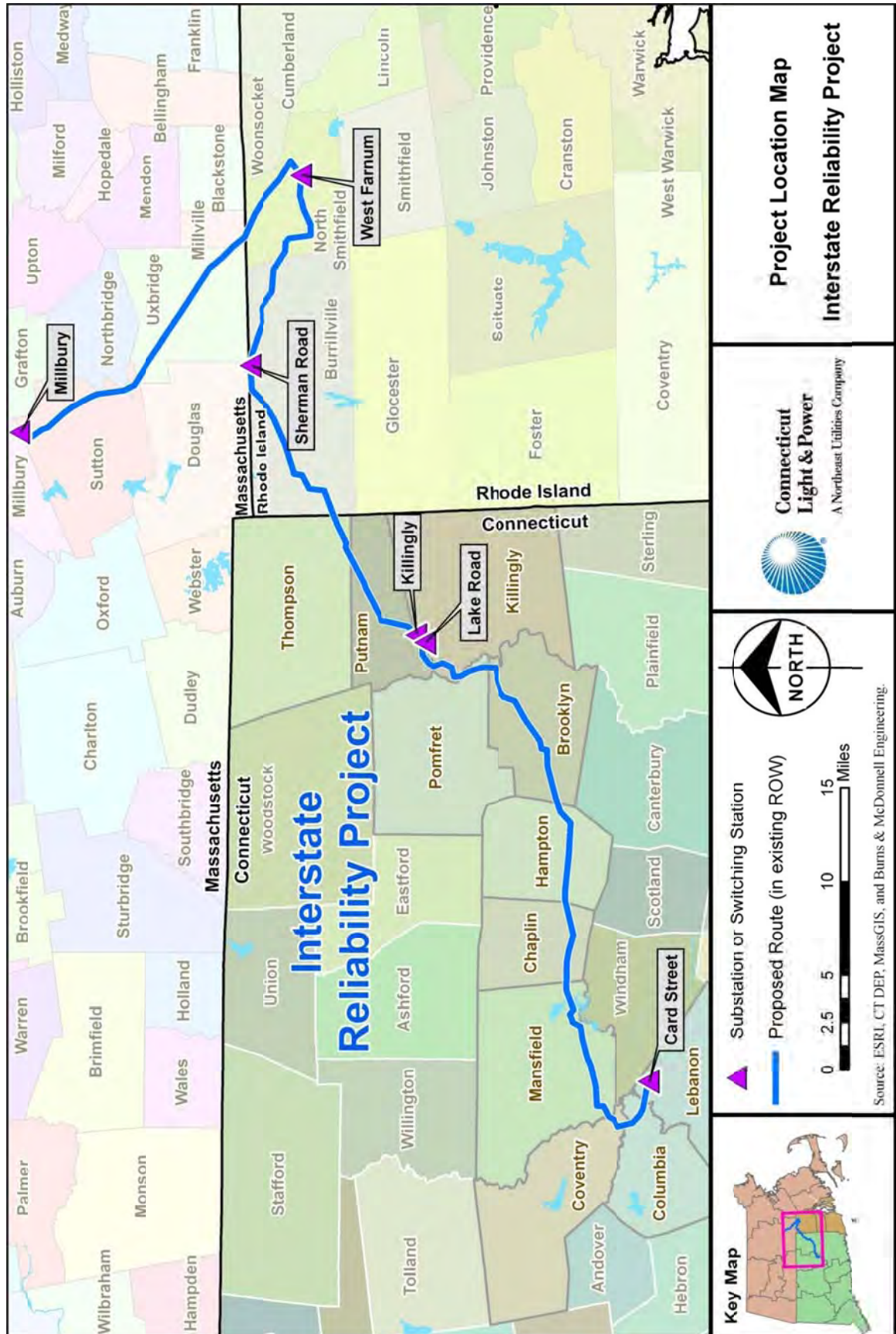
As Figure 1-1 and Table 1-1 show, the Interstate Reliability Project would involve the construction and operation of approximately 75 miles of new 345-kV transmission lines, located predominantly within existing transmission line rights-of-way (ROWs), that would connect CL&P’s Card Street Substation (in the Town of Lebanon, Connecticut), CL&P’s Lake Road Switching Station (in the Town of Killingly, Connecticut), National Grid’s West Farnum Substation (in the Town of North Smithfield, Rhode Island), and National Grid’s Millbury Switching Station (in the Town of Millbury, Massachusetts).¹ The Interstate Reliability Project would entail equipment additions and upgrades to these two substations and two switching stations.

¹ The new 345-kV transmission lines would extend through, but would electrically bypass, CL&P’s Killingly Substation (Town of Killingly, Connecticut), and would pass by Narragansett Electric’s Sherman Road Switching Station in the Town of Burrillville, Rhode Island.

Table 1-1: Interstate Reliability Project: Summary of 345-kV Components

Utility Company / State	Transmission Lines			Substation/Switching Station Improvements
	Voltage (Location)	Approximate Distance (Miles)	Municipalities Traversed	
Connecticut				
CL&P	345 kV (new) Card Street Substation to Lake Road Switching Station to CT/RI Border	36.8	Lebanon, Columbia, Coventry, Mansfield, Chaplin, Hampton, Brooklyn, Pomfret, Killingly, Putnam, Thompson	Card Street Substation Lake Road Switching Station Killingly Substation
Rhode Island				
National Grid (The Narragansett Electric Company)	345 kV (CT/RI Border to West Farnum Substation; West Farnum Substation to RI/MA Border)	22.5	Burrillville, North Smithfield	Sherman Road Switching Station West Farnum Substation
National Grid (The Narragansett Electric Company)	345-kV (rebuild/reconductor) 328 circuit Sherman Road to West Farnum	9.0	Burrillville, North Smithfield	
Massachusetts				
National Grid (New England Power Company)	345 kV (RI/MA Border to Millbury Switching Station)	15.4	Millville, Uxbridge, Sutton, Northbridge, Millbury	Millbury Switching Station
TOTAL	345 kV (new) 345 kV (reconducted)	74.7 9.0		Modifications to three substations and three switching stations

Figure 1-1: Interstate Reliability Project: Proposed 345-kV Transmission Line Location Map



As part of the Interstate Reliability Project, National Grid also would rebuild the Sherman Road Switching Station, located in the Town of Burrillville, Rhode Island. In addition, National Grid would reconstruct (reconductor and rebuild) its existing 345-kV line within the presently managed portion of the ROW between Sherman Road Switching Station and West Farnum Substation.

1.1.2 Summary of State Siting Jurisdictions

CL&P would construct, own, and operate the Project facilities to be located in Connecticut. Facilities in Connecticut are subject to the review and approval of the Council. The proposed facilities in Rhode Island, which would be owned and operated by The Narragansett Electric Company, are subject to review and approval by Rhode Island's Energy Facility Siting Board. Similarly, the proposed facilities in Massachusetts would be owned and operated by New England Power Company and would be subject to review and approval by the Massachusetts Energy Facilities Siting Board.

1.2 CONNECTICUT PORTION OF THE INTERSTATE RELIABILITY PROJECT

The Connecticut facilities proposed as part of the Interstate Reliability Project represent the culmination of a multi-year planning and alternatives analysis process. During this process, CL&P, in partnership with the Independent System Operator – New England (ISO-NE) and National Grid, initially investigated and evaluated five major systems options.

After these studies led to the selection of a preferred system solution for the new 345-kV transmission lines and related facilities in the three-state area, CL&P then identified and analyzed potential route alternatives and transmission line configurations before selecting a Proposed Route and overhead transmission line configurations for the Connecticut portion of the Project. The primary objectives of the route selection process were to identify a location for the new 345-kV transmission lines that would:

- Comply with state and federal statutory requirements, regulations and siting policies
- Minimize adverse effects to natural and human resources

- Achieve a reliable, operable and cost-effective solution

Based on these objectives, the principal factors considered in selecting the Proposed Route and overhead transmission line configurations were:

- Availability of existing ROWs within which the proposed facilities could be developed without the need for extensive additional easements
- Avoidance or minimization of effects on environmental resources
- Constructability/engineering considerations
- Minimization of conflicts with developed areas
- Consideration of visual effects
- Accessibility
- Cost

The Proposed Route and overhead transmission line configurations, consisting of the following facilities, best meet these objectives while representing CL&P's preferred solution for providing reliable, cost-effective, and environmentally sound improvements to the regional electric transmission system (refer to Volume 1A for details regarding the alternatives evaluation process²):

² Underground and overhead line-route variations to portions of the Proposed Route and design were identified and evaluated, consistent with Connecticut General Statutes § 16-50p(i), which requires consideration of alternatives, including underground options where proposed 345-kV transmission line facilities may be determined by the Council to be located adjacent to specific land uses (e.g., areas of known Statutory Facilities and residential areas) designated by the Council. Such alternative alignments, configurations, and route variations are detailed in Volume 1A, Sections 14 and 15.

- New 345-kV electric transmission lines and associated facilities extending between CL&P's existing Card Street Substation in the Town of Lebanon, existing Lake Road Switching Station in the Town of Killingly, and the Connecticut/Rhode Island border (in the Town of Thompson). The overhead line design along this Proposed Route incorporates CL&P's preferred Best Management Practices (BMPs) designs for reducing magnetic fields.³
- Related additions at CL&P's existing Card Street Substation, Lake Road Switching Station, and Killingly Substation.

Figure 1-2 illustrates the locations of these proposed Connecticut facilities, which are described in the following subsections.

1.2.1 Proposed 345-kV Lines from Card Street Substation to Lake Road Switching Station and from Lake Road Switching Station to the Connecticut / Rhode Island Border

The proposed 345-kV transmission lines between Card Street Substation and Lake Road Switching Station (the 3271 Line), and between Lake Road Switching Station and the Connecticut / Rhode Island border (the 341 Line) would traverse approximately 36.8 miles, crossing portions of 11 towns in northeastern Connecticut. The new 345-kV transmission lines would be constructed overhead and aligned adjacent to existing 345-kV overhead transmission lines along existing CL&P ROWs. The existing 345-kV lines along the Proposed Route were constructed in the early 1970s. Segments of the existing ROWs also include other overhead transmission lines (e.g., 69 kV and 115 kV), as well as distribution lines (23 kV).

Approximately 35.4 miles (96%) of the new transmission lines would be installed within CL&P's existing ROWs, requiring no additional easement acquisition. In addition, of the 36.8 miles along the Proposed Route, approximately 5 miles (13.4%) would be aligned across CL&P-owned properties.

³ CL&P's preferred BMP transmission line designs are detailed in Section 3 (Appendix 3A) and Section 7 of this volume, as well as in Volume 10, and are consistent with the Council's *Electric and Magnetic Fields Best Management Practices for the Construction of Electric Transmission Lines in Connecticut* - approved on December 14, 2007.

Figure 1-2: Location of Proposed 345-kV Transmission Lines and Substation / Switching Stations to be Modified in Connecticut

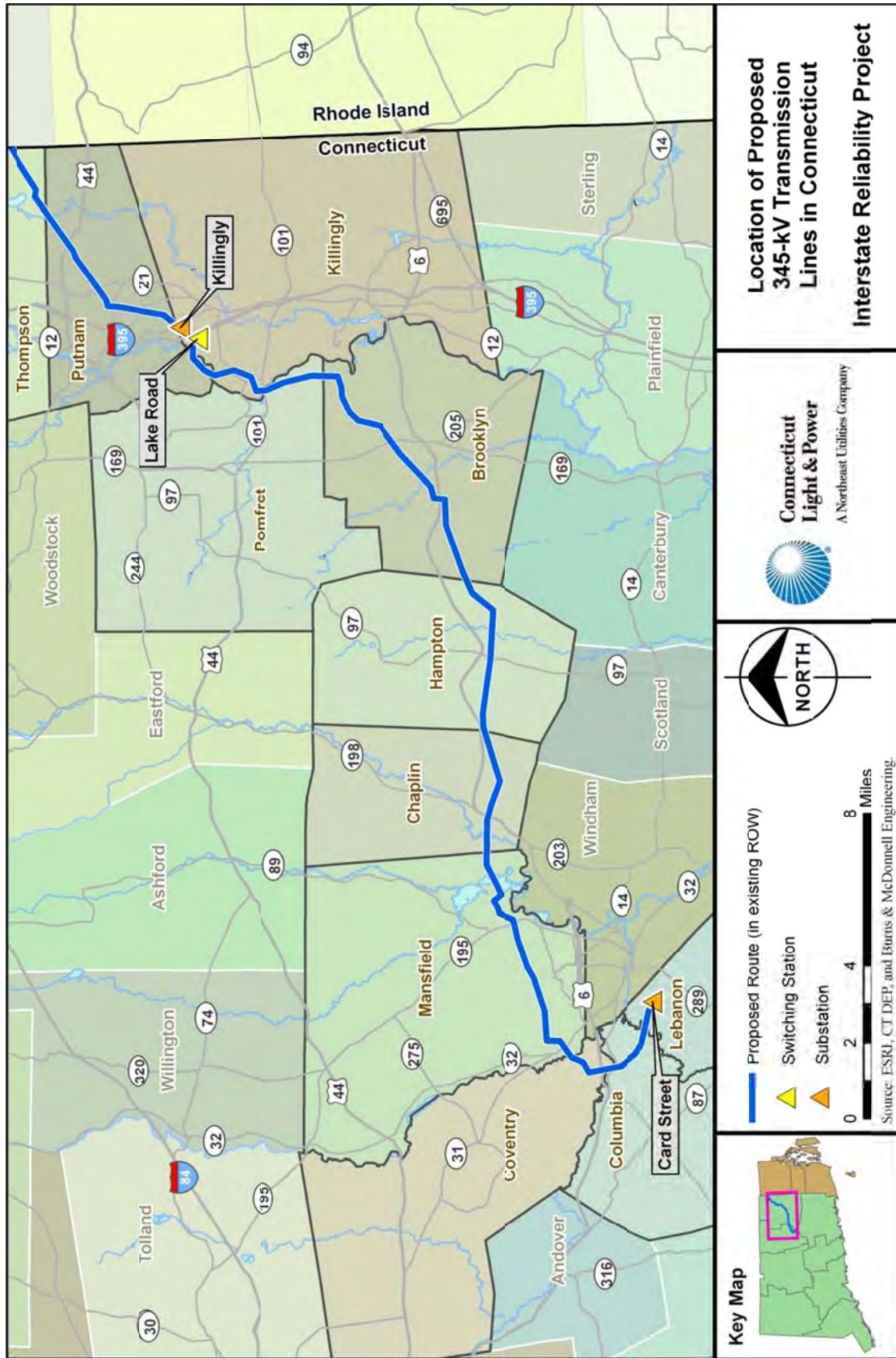


Table 1-2 summarizes the length of the transmission line ROWs in each of the 11 towns along the Proposed Route, as well as the typical width of the existing CL&P ROW along which the proposed 345-kV transmission lines would be aligned. The table also provides a key to the location of the Proposed Route as depicted on the aerial photograph mapsheets in Volumes 9 and 11, and identifies the Cross-Section (XS) drawings in Section 3, Appendix 3A in this Volume and in Volume 10 that illustrate the proposed alignment and configuration of the overhead lines within each of the ROW segments.⁴

Table 1-2: Proposed 345-kV Transmission Line ROW Segments: Miles, Width, Cross-Sections, and Configuration (By Town and Volumes 9 and 11 Aerial Alignment Mapsheet Reference)

Town	ROW		Aerial Alignment Mapsheet Number		Cross-Section (refer to Section 3 of Volume 1, Volume 9, and Volume 10)
	Miles	Width Range (Feet, Typical)	400-Scale (Volume 9)	100-Scale (Volume 11)	
Lebanon	0.6	350	1 of 40	1 – 3 of 133	XS-1
Columbia	1.7	300-350	2 -3 of 40	3 – 9 of 133	XS-1
Coventry	1.2	300	3 – 5 of 40	9 – 14 of 133	XS-1, XS-2 BMP
Mansfield	6.4	150*-300	5 – 10 of 40	13 – 37 of 133	XS-2 BMP, XS-2, XS-3, XS-4
Chaplin	3.3	150*-300	10 – 13 of 40	37 – 49 of 133	XS-4, XS-5, XS-6
Hampton	4.3	300	13 – 17 of 40	48 – 64 of 133	XS-6
Brooklyn	7.2	300-360	17 – 25 of 40	64 – 90 of 133	XS-6, XS-6 BMP, XS-7
Pomfret	1.7	360	25 – 27 of 40	90 – 96 of 133	XS-7
Killingly [^]	3.0	250-400	27 – 32 of 40	96 – 103 and 105 – 109 of 133	XS-7, XS-8, XS-9, XS-10
Putnam [^]	5.6	340-400	30 – 36 of 40	109 – 126 of 133	XS-8, XS-10, XS-11, XS-12
Thompson	1.8	300	37 – 40 of 40	126 – 133 of 133	XS-12, XS-12 BMP
Total	36.8				

* = CL&P's existing easement is 150 feet wide for approximately 0.9 mile in the Town of Mansfield and 0.5 mile in the Town of Chaplin.

[^]= Following CL&P's existing ROWs, the Proposed Route extends northeast across Killingly into Putnam, back into Killingly, and then into Putnam.

⁴ Cross-Section drawings illustrating the proposed overhead line configuration and typical structure type along each segment of the Proposed Route, as well as along each of the route variations, also are included in Volume 9.

1.2.1.1 Line Structure Appearance

Along a majority of the Proposed Route, the new overhead 345-kV transmission lines would be supported on two-pole H-frame structures similar in appearance to the existing H-frame structures that support the 345-kV lines presently occupying the ROWs. Along certain segments of the Proposed Route, CL&P's proposed design incorporates steel-monopole structures.

The new 345-kV line structures would be aligned generally to the north or west (depending on the location of the ROW segment) of and adjacent to the existing 345-kV transmission line structures. The new H-frame structures would be steel or laminated wood, with typical structure heights between 80 and 90 feet above ground. CL&P's preference for structure material would be steel in this instance, due to superior maintenance and constructability benefits. Angle and deadend structures in an H-Frame line would have three poles, either self-supported or guyed, depending on site-specific conditions.⁵

The cross-sections included in Section 3, Appendix 3A, of this Volume and in Volumes 9 and 10 illustrate the tangent structure types, heights, and typical configurations along each of the ROW segments.

1.2.1.2 ROW Width and Potential Easement Acquisition

As summarized in Table 1-2, with the exception of 1.4 miles in the towns of Mansfield and Chaplin (representing approximately 4% of the 36.8-mile Proposed Route), the existing CL&P ROWs along which the proposed 345-kV lines would be aligned are approximately 300 feet wide (or more), and have sufficient unused width to accommodate a new 345-kV transmission line without having to acquire additional easements or to rebuild and reconfigure the existing line. However, for 0.9 mile in the Town of Mansfield and 0.5 mile in the Town of Chaplin (referred to collectively as the "Mansfield Hollow area"), the existing CL&P ROW is 150 feet wide and traverses property owned by the federal government under the auspices of the U.S. Army Corps of Engineers (USACE).

⁵ Section 3, Appendix 3B, includes illustrations of the typical structures associated with a 345-kV H-frame line.

The Mansfield Hollow area property was acquired by the federal government approximately 60 years ago in conjunction with federal projects designed to control flooding on the Thames River, such as the creation of Mansfield Hollow Dam and Lake. The USACE currently leases the property to the Connecticut Department of Energy and Environmental Protection (CT DEEP), which manages it as Mansfield Hollow State Park and the Mansfield Hollow Wildlife Management Area (WMA).

CL&P's existing 345-kV transmission line is centered within the 150-foot-wide ROW across the 1.4 miles of federally-owned properties, leaving insufficient width to install and properly separate the new 345-kV line adjacent to the existing line within the current easement. CL&P is presently engaged in consultations with the USACE regarding the alignment of the proposed 345-kV transmission line across the federally-owned lands.

After investigating various alternative routes and transmission line designs for the 1.4-mile ROW in the Mansfield Hollow area, CL&P determined that the acquisition of additional easement width from the USACE to allow the new 345-kV line to be installed adjacent to the existing 345-kV line, using structures of similar height and appearance, would be best. Accordingly, in this Application, the Proposed Route reflects CL&P's proposed acquisition from the USACE of approximately 11⁶ additional acres of easement to expand the ROW to the north and allow the development of the new 345-kV line, adjacent to the existing 345-kV line, through the 1.4-miles of federal property.

However, as discussed in detail in Section 10, CL&P also has identified two other feasible design configurations for aligning the new 345-kV line across the USACE-owned properties: one involving less additional ROW expansion (approximately 5 acres) but taller line structures, and one involving no ROW expansion but requiring both the reconstruction of the existing 345-kV line and the use of taller line structures for both the new and the reconstructed 345-kV lines. As presented in the no-ROW-expansion

⁶ This additional easement acreage calculation is estimated based on preliminary survey data and takes into consideration the configuration of the existing CL&P easement. Final easement acreages would be determined based on final legal surveys and agreements with the USACE.

option, in the event that obtaining a grant of additional easement from the USACE is not possible or practical, CL&P could develop the new 345-kV transmission line within the existing 150-foot-wide ROW. However, in order to provide space for the new 345-kV line, this design configuration option would require relocating and reconstructing the existing 345-kV transmission line in a vertical configuration within the two ROW segments. Compared to the proposed easement acquisition (11 acres) or the minimal-easement-acquisition option (approximately 5 acres), the no-ROW-expansion option would be more expensive, would require taller transmission line structures (for both the new and rebuilt 345-kV lines), and would require more complicated construction (including outages of the existing 345-kV line) within the existing ROW.

CL&P is prepared to develop the new 345-kV line across the federally-owned properties using either the proposed (11-acre easement expansion) configuration or one of the other design configuration options.⁷ As a result, although in this Application, the Proposed Route incorporates the proposed 11-acre easement expansion across the federally-owned properties, CL&P has included in Section 10 of this volume a complete analysis of the other design configuration options for aligning the new 345-kV line through the 1.4-mile Mansfield Hollow area.⁸ During the Council's siting process, CL&P expects to continue to consult with the USACE, the CT DEEP, and other interested groups regarding the most appropriate configuration for new 345-kV line across the Mansfield Hollow area.

1.2.2 Substations and Switching Stations

In order to interconnect the new 345-kV transmission lines between Card Street Substation and the Connecticut / Rhode Island border to the existing transmission system, CL&P proposes to modify three existing stations: Card Street Substation, Lake Road Switching Station, and Killingly Substation. The

⁷ CL&P also could potentially develop the new 345-kV line across the USACE properties using a combination of these design configurations (e.g., one configuration in Mansfield and another in Chaplin).

⁸ Volume 1A, Section 15.5 describes two less-preferred route variations that CL&P considered for aligning the new 345-kV line to the south of and avoiding the federally-owned properties. Maps of these route variations also are included in Volume 9.

facility modifications proposed for each of these stations are described in the following subsections and illustrated on the drawings in Volume 7.

1.2.2.1 Card Street Substation

The Card Street Substation is located in the northeastern portion of the Town of Lebanon. The developed portion of the existing substation occupies approximately 10 acres of CL&P's 150-acre owned property.

Card Street Substation was initially developed in 1960 as a 115- to 69-kV substation. Shortly thereafter, the station was modified to include distribution facilities. The substation was expanded to include 345-kV facilities in 1969, interconnecting to the 368 and 383 transmission lines to Manchester Substation and Millstone Switching Station, respectively. The 330 Line⁹ (345 kV) was interconnected to the substation in the early 1970s.

To interconnect the new 345-kV line to Card Street Substation, CL&P proposes the following modifications to the substation, all within the existing fenced area: a new 345-kV transmission line terminal structure, three new 345-kV circuit breakers, lightning masts, four disconnect switches, bus work and cable trench, three surge arresters, three capacitively coupled voltage transformers (CCVTs), and one wave trap.¹⁰ New protection and control equipment would be installed within the existing relay / control enclosure. (Note: Initial Project plans included the expansion of Card Street Substation to accommodate the terminal structures for a proposed "loop" of the 345-kV 310 Line into and out of the substation from Village Hill Road Junction. Because that loop is no longer proposed as part of the Project, expansion beyond the existing fenced area of the substation will not be necessary.)

⁹ Prior to the development of the Lake Road Switching Station and Killingly Substation, this 345-kV transmission line was the 347 Line. Since then, only the line section from Killingly Substation to Sherman Road Switching Station retains the 347 circuit number.

¹⁰ Typical drawings of the equipment proposed for the Card Street Substation, Lake Road Switching Station, and Killingly Substation are included in Volume 7.

1.2.2.2 Lake Road Switching Station

CL&P's Lake Road Switching Station is located in the northwestern portion of the Town of Killingly, on an easement consisting of approximately 3.5 acres. The existing switching station, which was developed and interconnected in 2001, occupies approximately 3 acres of the total site.

The proposed new construction would include the addition of three 345-kV circuit breakers, six 345-kV disconnect switches, bus work, six surge arresters, 10 CCVTs, four potential transformers (PTs), two wave traps, and new protection and control equipment within the existing control house. These modifications would be accommodated within the existing developed (fenced) portion of the switching station.

1.2.2.3 Killingly Substation

Killingly Substation also is located in the northwestern portion of the Town of Killingly on approximately 29.4 acres of CL&P-owned property. The existing substation, which was developed in 2006, occupies approximately 5.6 acres of the total site.

For the Project, the new construction at Killingly Substation would entail the installation of two 345-kV transmission line terminal structures to support new 345-kV line conductors passing through the substation. These additions would be accomplished within the existing substation's fenced area. The new 345-kV transmission line extending between Lake Road Switching Station and the Connecticut / Rhode Island border would traverse Killingly Substation using these new structures, but would not electrically connect to the substation.