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PROPOSED NEW ELECTRIC TRANSMISSION LINE

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You asked for a summary of the proposal by Connecticut Light and Power (CL&P) to build a new transmission line in northeastern Connecticut and the alternatives CL&P considered in developing this proposal.

SUMMARY

In December 2011, CL&P submitted an application to the Connecticut Siting Council for a certificate of environmental compatibility and public need to build a new 345-kilovolt (kV) overhead transmission line. The line would extend between CL&P's Card Street substation in Lebanon and the Rhode Island border in Thompson, approximately 36.8 miles long. It would pass through the towns of Brooklyn, Chaplin, Columbia, Coventry, Hampton, Killingly, Lebanon, Mansfield, Pomfret, Putnam, and Thompson. The project would also involve modifications to the Card Street and Killingly substations and the Lake Road switching station. The proposal is part of the larger Interstate Reliability Project, which calls for the construction of new 345 kV lines in northern Rhode Island and south central Massachusetts.

The vast majority of the proposed line would be adjacent to an existing 345 kV line within CL&P's existing right of way (ROW). Most of the structures supporting the line would be 85 feet tall, somewhat taller than structures on the existing line. The estimated capital cost for the project (including substation and station costs) is \$218 million, assuming that CL&P's baseline design is used throughout. Over its 35-year life, the project would have a total cost (including interest and operating and maintenance costs) of \$319 million.

Among the alternatives CL&P considered in making its application were (1) taking no action, (2) meeting reliability needs by additional generation or demand-side (conservation) measures, and (3) using highway or other existing ROWs for the transmission line, CL&P believes that these alternatives are either infeasible, more expensive, or more environmentally harmful than its proposal. The application presents six alternative transmission options involving overhead and underground lines, which CL&P believes are feasible, although less desirable based on cost and other grounds, than its preferred alternative.

SITING COUNCIL PROCEDURE AND OTHER REVIEWS

Under [CGS § 16a-7c](#), when the Siting Council receives a certificate application for an energy facility, generally the Connecticut Energy Advisory Board must issue a request for proposals for alternatives. The deadline for submitting proposals can be up to 75 days from when the Siting Council receives the application. The board must evaluate any proposals it receives and submit its evaluation to the Siting Council. Under [CGS § 16-50p](#), the Siting Council must issue a decision on an original application for a transmission line or a substation associated with a transmission line within 12 months of the deadline for the board to accept applications for an alternative proposal.

In addition to a council certificate, the project would require approvals from various other state and federal agencies, including the U.S. Army Corps of Engineers ("Corps") and the Connecticut Department of Energy and Environmental Protection. If approved, CL&P plans on beginning construction on the line in early 2014 and the line going into service in 2015.

The entire 11-volume application (docket 424) is available at the council's website, www.ct.gov/csc. OLR report [2001-R-0657](#) provides a primer on how the Siting Council regulates energy facilities and how people can participate in its proceedings. OLR report [2006-R-0719](#) describes the factors the council considers in making its decisions on these facilities.

PROPOSED TRANSMISSION LINE

Route

CL&P has proposed building a new 345-kV overhead transmission line that would (1) connect its Card Street substation in Lebanon and its Lake Road switching station and Killingly substation in Killingly and (2) run to the Connecticut/Rhode Island border in Thompson. In conjunction with the development of the new line, CL&P would modify the substations and switching station. The Card Street substation is located near the Windham town line and state route 289. The Lake Road switching station and Killingly substation are located near the Putnam town line and Interstate 395. The transmission line would exit the state just north of the Putnam/Thompson line.

The proposed new line in Connecticut would run approximately 36.8 miles, crossing parts of 11 towns in northeastern Connecticut. The line would be adjacent to the existing 345-kV overhead transmission lines that presently occupy existing the CL&P ROW. Most of the existing CL&P ROW along the proposed line is 300 feet wide or wider, and is wide enough to accommodate a new 345-kV transmission line without acquiring new easements or rebuilding and reconfiguring the existing line. However, in the Mansfield Hollow area (0.9 mile in Mansfield and 0.5 mile in Chaplin), the existing ROW is 150 feet wide and traverses property owned by the federal government under the U.S. Army Corps of Engineers. The corps currently leases the property to the Connecticut Department of Energy and Environmental Protection, which manages it as the Mansfield Hollow State Park and the Mansfield Hollow Wildlife Management Area.

After investigating alternative routes and transmission line designs for the Mansfield Hollow area, CL&P determined the best option is to acquire an additional easement from the corps to build and operate a new overhead 345-kV line adjacent to the existing 345-kV line, using structures of similar height and appearance.

If the Corps does not grant an additional easement in the Mansfield Hollow area, CL&P proposes to remove and reconstruct the existing 345 kV line closer to the southern edge of the existing ROW and build the

new 345-kV overhead line adjacent to and north of the reconfigured line. While no additional easements would be required under this option, both the new and reconstructed lines through Mansfield Hollow would be built using steel monopole structures that are taller than the structures on the existing line.

Under either option, at the state border, the proposed new line would connect to a new 345-kV transmission line extending into Rhode Island and Massachusetts, to be constructed and operated by National Grid, USA. CL&P and National Grid would 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 are called the Interstate Reliability Project.

Figure 1 shows the proposed route of the project.

Figure 1: Proposed Transmission Line Route



Characteristics

The existing 345-kV line is supported mostly on wooden two-pole H-frame structures with a typical height of 80 feet. Under the proposal, most of the structures for the new line would be steel or laminated wood H-frames, with a typical height of 85 feet.

In certain areas along the route, CL&P proposes using taller steel poles. One of these areas is in Mansfield, through the 0.9-mile segment across federally-owned properties. The structures on the current line in these areas have a typical height of 115 feet, while those on the proposed line would have a typical height of 125 feet. In addition, to reduce electric magnetic field (EMF) exposures, CL&P proposes to use taller steel poles along parts of the line in Brooklyn, Coventry, and Mansfield that are near residential areas, schools, daycare centers, or playgrounds. In the affected parts of these towns, the typical structure height would be 110 feet compared to a typical 85 foot height for the existing line. In addition, a 0.6-mile segment of the existing 345-kV line in Putnam that has H-frame structures would be removed and rebuilt with taller, steel-pole structures.

CL&P's initial design would have placed the new support structures adjacent to the existing structures. But this would have placed 57 new structures in wetlands. As the design process progressed, CL&P shifted these locations, where practical, to reduce effects on wetlands and other environmental resources and to make construction easier. As a result, 33 of the 57 structures initially proposed to be located in wetlands were shifted to uplands.

Construction and Maintenance

If approved, the project would include the following work:

1. identifying the ROW boundaries (where necessary), vegetation clearing boundaries, and locations of proposed structures;
2. identifying and marking sensitive environmental resource areas and other areas to be avoided;
3. preparing material storage and staging sites to support construction, preferably in the immediate vicinity of the ROW;
4. installing erosion and sedimentation controls in accordance with best management practices;

5. clearing vegetation along (a) those portions of the ROW to be used for the construction of the new transmission lines, (b) areas that contain undesirable, tall-growing, woody species that could grow to interfere with the operation of the proposed transmission lines; and (c) existing or new access roads;
6. removing “danger trees” outside the limits of clearing, on or off the ROW, as necessary to protect the integrity of the proposed and existing transmission lines;
7. constructing new roads or improving existing access roads to provide a minimum travel-way of 12 to 16 feet;
8. preparing level work sites as necessary at new structures sites, which may involve grading and require the installation of a stable base for structure installation equipment.
9. constructing foundations and erecting and assembling new structures;
10. installing wires, which may involve the use of helicopters;
11. removing construction debris and restoring disturbed sites; and
12. maintaining temporary erosion and sedimentation controls until vegetation is re-established or disturbed areas are otherwise stabilized.

After installing the new line, CL&P would manage the ROW in accordance with its established vegetation management program. This program includes the removal of tall-growing trees and invasive woody shrubs) within the parts of the ROW occupied by transmission lines, as well as trimming or removing trees within adjacent areas that may grow closer than the minimum allowed distances to the line. Brush control within the ROW is performed every four years, and tree clearing and trimming along the edges of the ROW (as well as outside of the easement if necessary to remove danger trees) is performed every 10 years.

Rationale

According to CL&P, the Interstate Reliability Project would increase the capability of the transmission system to move power (1) into Connecticut from the rest of New England, (2) from power plants and

other resources in eastern New England to users in western New England, and (3) from resources in western New England to users in eastern New England.

According to CL&P, by reinforcing the electrical connections between key substations and switching stations in Connecticut, Rhode Island, and Massachusetts, the proposed improvements would address reliability standards violations that would otherwise occur in the future (CL&P must plan for the electrical system’s needs for a 10-year period). It would also eliminate violations of reliability standards existing in Rhode Island at current load levels, specifically overloads and non-compliant voltages. CL&P also argues that the project will potentially have environmental benefits, by providing access to out-of-state renewable energy resources.

The Interstate Reliability Project is one of four projects, collectively known as the New England East-West Solution (NEEWS) projects. The Siting Council has already approved one of these projects, the Greater Springfield Reliability Project. This project, which is under construction, includes the construction of 12 miles of new 345 kV lines in Connecticut and 23 miles of new lines in Massachusetts.

CL&P APPLICATION

In December 2011, CL&P submitted an application for a certificate of environmental compatibility and public need to the Siting Council for the Connecticut portion of the Interstate Reliability Project. The application consists of 11 volumes, as described in Table 1.

Table 1: Contents of CL&P’s Application

Volume	Contents
1	Detailed information concerning the proposed project, including the proposed route, transmission facilities design, construction and operation procedures, existing environmental conditions, potential environmental effects and mitigation measures, and electric and magnetic field (EMF) information.
1A	The project alternatives considered and detailed information concerning overhead and underground transmission line variations to portions of the proposed route.
2	Detailed information concerning wetlands and watercourse field investigations conducted along the proposed route.
3	Data regarding archaeological and historic resources in the project region and near the proposed route.
4	Technical reports concerning biological resources along the proposed route, including vernal pools and amphibian breeding habitat, breeding birds, and insects, as well as copies of correspondence between CL&P and regulatory agencies.
5	Detailed electric transmission system planning reports.

Table 1 (Continued)

Volume	Contents
6	Northeast Utilities standards and best management practices for erosion and sedimentation control, as well as vegetation management along ROWs.
7	Detailed drawings of the proposed modifications to the Card Street and Killingly substations and Lake Road switching station.
8	A visual resource assessment study of the proposed route, including photographic simulations that illustrate the anticipated appearance of the proposed transmission lines at specific visual resource sites along the proposed route.
9	Maps at a scale of 1" = 400', based on aerial photography, that show the location of the proposed route, Mansfield Hollow ROW options, and alternative routes in relation to land uses and environmental resources. The maps summarize the key resource features in the vicinity of and along the proposed route, Mansfield Hollow ROW options, and alternative routes. Cross-sections that illustrate the proposed configuration of the transmission lines along each alignment also are included.
10	Plan and profile drawings of the proposed line and cross-sections of the proposed route. Photographs of the existing ROW and photo-simulations that illustrate views of the ROW with the new 345-kV line are included.
11	Maps based on aerial photographs, at a scale of 1" = 100', that provide a closer view of the proposed route, including the locations of proposed structures; existing and potential access roads; environmental features such as wetlands, streams, vernal pools; and land uses.

Parts of transmission planning reports in volume 5 are redacted for public review to protect critical energy infrastructure information. CL&P will provide unredacted versions of these documents to the council and to qualified participants in the council proceedings, subject to a protective order that the council is expected to issue.

ALTERNATIVES ANALYSIS

2008 Analysis

The current application was preceded by a 2008 analysis conducted by CL&P, National Grid, and the Independent System Operator-New England, which administers the regional grid. That analysis considered various transmission alternatives to deal with reliability issues in southern New England. In addition to the alternative proposed in the current application, this analysis considered three alternatives for building a new 345 kV line connecting various substations and switching stations in southern New England. It also considered building a new 1,200 megawatt high-voltage direct-current transmission line between the Millbury switching station in Millbury, Massachusetts and the Southington substation in Southington, Connecticut. This plan also required a new 345-kV line from the Sherman Road Switching Station to the West Farnum Substation in Rhode Island.

Current Application

No Action. In its current application, CL&P considered a number of alternatives to the proposed line, including taking no action, using new generation or demand side measures to avoid the need to build a new line, and changing the route and characteristics of the line.

Under the no action alternative, the Interstate Reliability Project would not be developed and the electric transmission system would not be improved. CL&P rejected this alternative, finding that it would not resolve the regional electric reliability problems that CL&P, National Grid, and the Independent System Operator-New England that administers the regional grid have been studying for more than six years. Under this alternative, according to CL&P, the electric supply system in the region, particularly in southern New England, would not meet national and regional reliability standards.

Non-transmission Alternatives. CL&P also considered non-transmission including both generation and demand reduction alternatives. The application notes that, because there are transmission constraints in moving power from eastern to western New England (e.g., across the Connecticut/Rhode Island line) these alternatives would need to significantly increase resources, reduce demand, or both, on each side of the system in order to provide the capacity that could be needed under stressed conditions.

CL&P engaged a consulting firm, ICF International, Inc. to study the non-transmission alternatives. A copy of the ICF report is included Volume 5 of the application. ICF projected the generation and demand-side resources that could be made available in southern New England by 2015 and 2020, and simulated the operation of the New England transmission grid if these resources were developed in lieu of the transmission line project. According to the application, ICF concluded that any non-transmission alternative that could be identified would be “unprecedented in scope, immensely costly, difficult or impossible to implement, and less flexible and robust in operation than the proposed transmission solution.”

Transmission Lines. After CL&P selected a transmission line as its preferred alternative for the project, it conducted detailed studies to identify and evaluate potential routes and associated line configurations for the proposed line. All of these alternatives would connect CL&P’s Card Street and Lake Road stations with the National Grid facilities.

CL&P evaluated both overhead and underground transmission line designs, including alignments along existing ROWs, such as the Algonquin gas pipeline and state and federal highways in the northeastern part of the state.

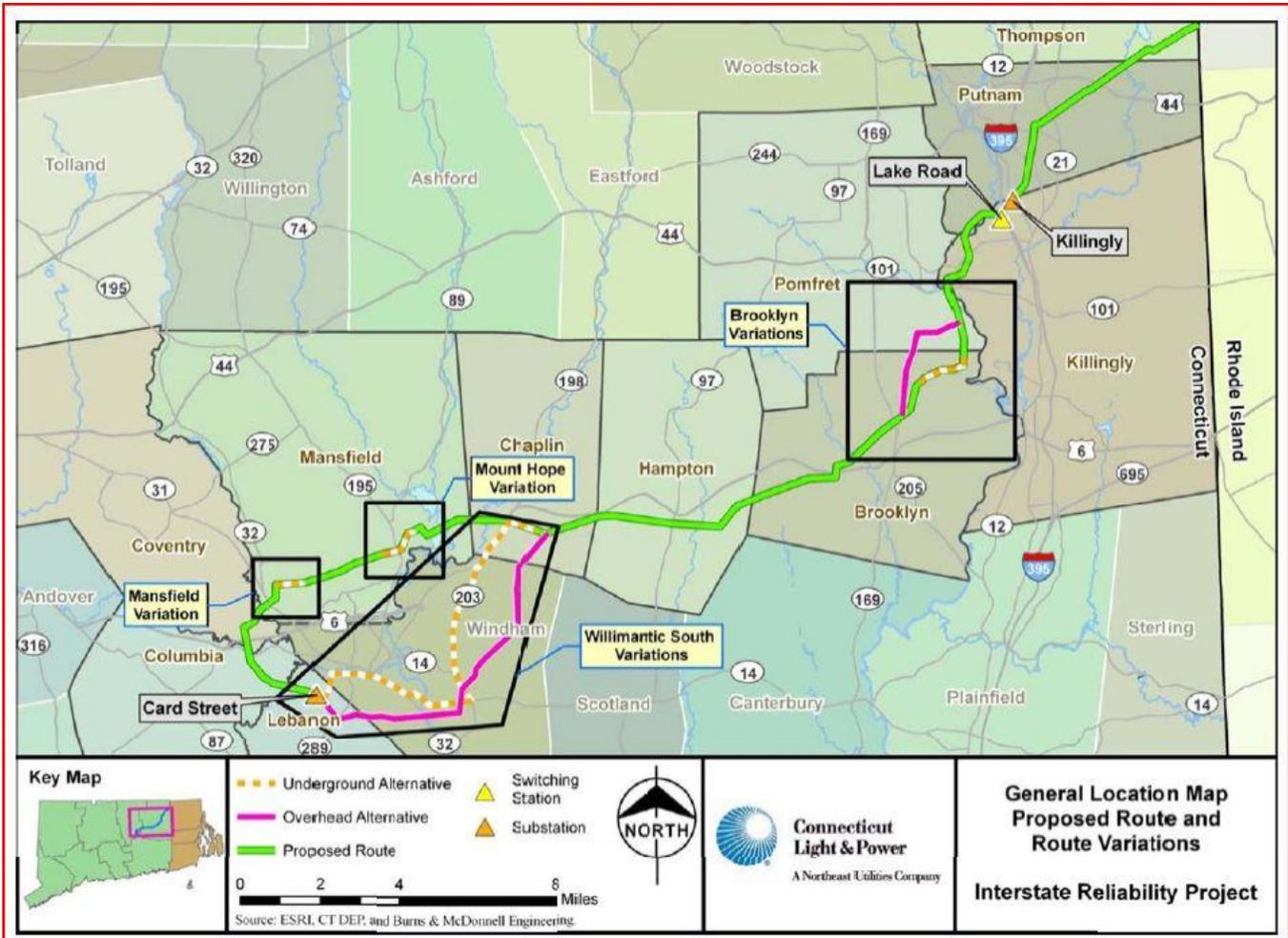
In addition to its proposed route, CL&P identified six route variations and transmission line configurations that it believes could potentially be developed. These variations were identified to avoid routing the new line overhead (1) on either the existing or expanded ROW through the 1.4 miles of federally-owned properties in the Mansfield Hollow area (the two Willimantic alternatives) or (2) near schools and other sensitive land uses as identified in CGS § 16-50p(i) (the remaining four alternatives). These alternatives would change the location of certain segments of the proposed route or place some segments underground. They are described in Table 2 and mapped in Figure 2.

Table 2: Alternative Transmission Line Routes

Alternative (towns)	Length (miles)	Description
Mansfield underground	0.7	Underground 345-kV cable system within existing CL&P ROW and two line transition stations within and adjacent to ROW. Cable system would generally be offset approximately 15 feet from the outside of CL&P's existing 345-kV line.
Mount Hope underground (Mansfield)	1.1	Same as Mansfield underground.
Brooklyn underground	1.4	Same as Mansfield underground.
Brooklyn overhead (Brooklyn, Pomfret)	3.3	Overhead line on new "Greenfield" 150-foot-wide ROW, easements for which would be acquired from private landowners.
Willimantic south underground (Lebanon, Windham, Chaplin)	10.7	Underground 345-kV cable system, within or adjacent to public roads except for a 0.6-mile underground segment along CL&P's existing transmission line ROW in Chaplin and one new line transition station on eastern end of cable system (western terminus would be at Card Street substation).
Willimantic south overhead (Lebanon, Windham, Chaplin)	9.4	Same as Brooklyn overhead.

Detailed technical information, impact analyses, and estimated costs were compiled for each of the six alternatives, and each was compared to the portion of the proposed route that would be replaced. Volume 9 of the application includes maps with environmental data for each of these six variations, at a comparable level of detail to that presented for the proposed route.

Figure 2: Alternative Transmission Line Routes



While CL&P believes that each of these options is feasible, it found that compared to its proposal, each of the alternatives was less desirable due to engineering, environmental, social, or cost factors.

During the alternatives analysis process, CL&P also identified design options for locating the new line across the 1.4-mile segment in or adjacent to the existing ROW in the Mansfield Hollow area. These options, which involve different transmission line structures and ROW widths, all represent feasible approaches for installing the new line across the federally-owned properties, according to CL&P. Depending on approvals from the council and the Corps, CL&P stated that it would be prepared to use any one of these options.

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