Connecticut Light & Power
A Northeast Utilities Company

NEW ENGLAND EAST WEST SOLUTION

DEVELOPMENT AND MANAGEMENT PLAN

FOR CONSTRUCTION OF THE

INTERSTATE RELIABILITY PROJECT

NEW 345-kV TRANSMISSION LINES
AND RELATED MINOR MODIFICATIONS
TO ADJACENT LINES

VOLUME 1

SUBMITTED FOR CONNECTICUT SITING COUNCIL APPROVAL

AUGUST 2013

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1. INTRODUCTION

1.1 PROJECT OVERVIEW AND PURPOSE OF THE PLAN

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]), will construct, operate, and maintain approximately 75 miles of new 345-kilovolt (kV) electric transmission lines and perform related modifications and improvements to existing 345-kV and 115-kV transmission lines and substation and switching station facilities in northeastern Connecticut, northwestern Rhode Island, and south-central Massachusetts (refer to Figure 1-1). These electric transmission system modifications, referred to as the Interstate Reliability Project (Project), will improve the bulk power electric transmission system in Southern New England and achieve future compliance with applicable national and regional reliability standards and criteria.

CL&P's portion of the Project, which will extend through 11 towns in northeastern Connecticut (refer to Figure 1-2), will consist of the following facilities:

- Approximately 36.8 miles of new overhead 345-kV electric transmission lines extending between CL&P's Card Street Substation in the Town of Lebanon, Lake Road Switching Station in the Town of Killingly, and the Connecticut/Rhode Island border (in the Town of Thompson). The new 345-kV overhead transmission lines (designated in the CL&P system as the 3271 Line and the 341 Line) will be aligned adjacent to the existing 345-kV overhead transmission lines that presently occupy existing CL&P rights-of-way (ROWs).[1]

- Related equipment additions and modifications at CL&P's existing Card Street Substation, Lake Road Switching Station, and Killingly Substation (in the Town of Killingly).

On December 23, 2011, CL&P submitted to the Connecticut Siting Council (Council, CSC) an Application for a Certificate of Environmental Compatibility and Public Need for the Connecticut portion of the Project (Council Docket No. 424). After public meetings, evidentiary hearings, and related technical reviews, the Council approved the Connecticut portion of the Project on December 27, 2012. Condition No. 3 of the Council's Decision and Order approving the Project requires that CL&P prepare a Development and Management (D&M) Plan, in whole or in parts, in compliance with Sections 16-50j-60 through 16-50j-62 of the Regulations of Connecticut State Agencies (RCSA; *Requirements for a D&M Plan, Elements of a D&M Plan, Reporting Requirements*).

[1] The new 3271 Line will extend approximately 29.3 miles from Card Street Substation to Lake Road Switching Station adjacent to CL&P's existing 330 Line, whereas the new 341 Line will extend approximately 7.5 miles from Lake Road Switching Station to the Connecticut / Rhode Island border adjacent to CL&P's existing 3348 Line and then the existing 347 Line.

Figure 1-1: Interstate Reliability Project: General Location Map

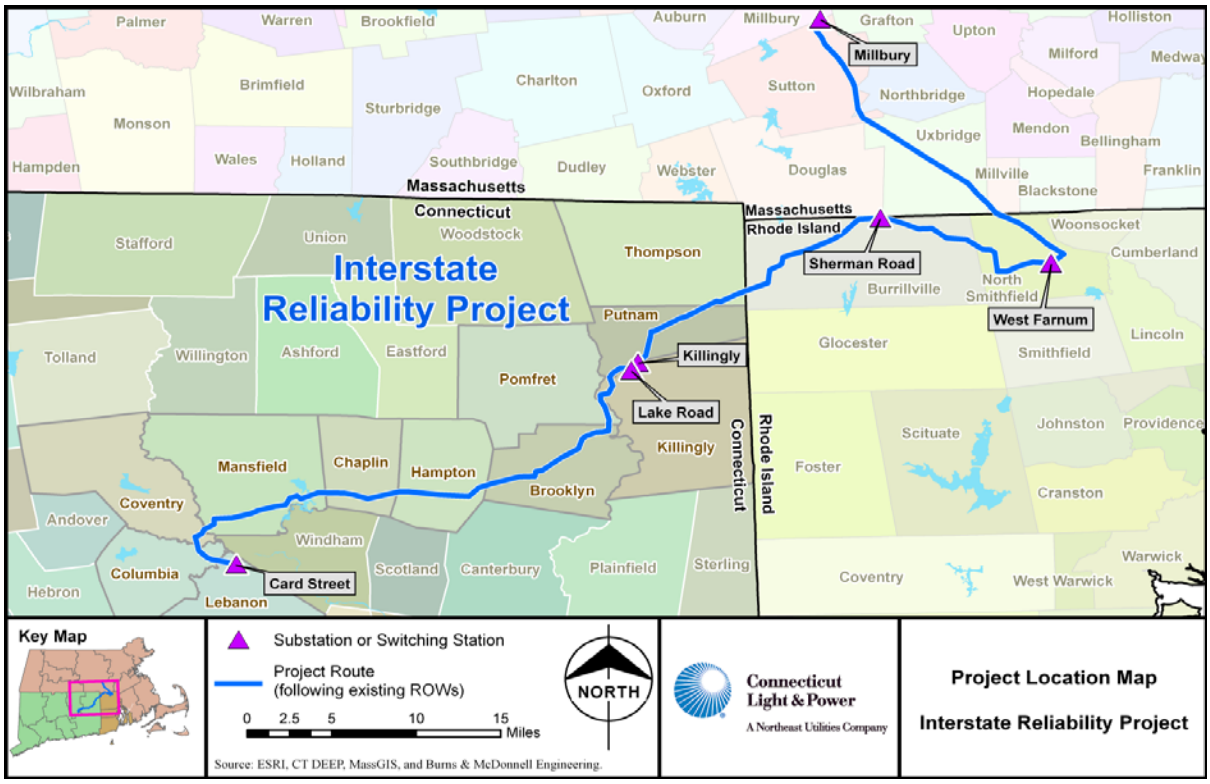
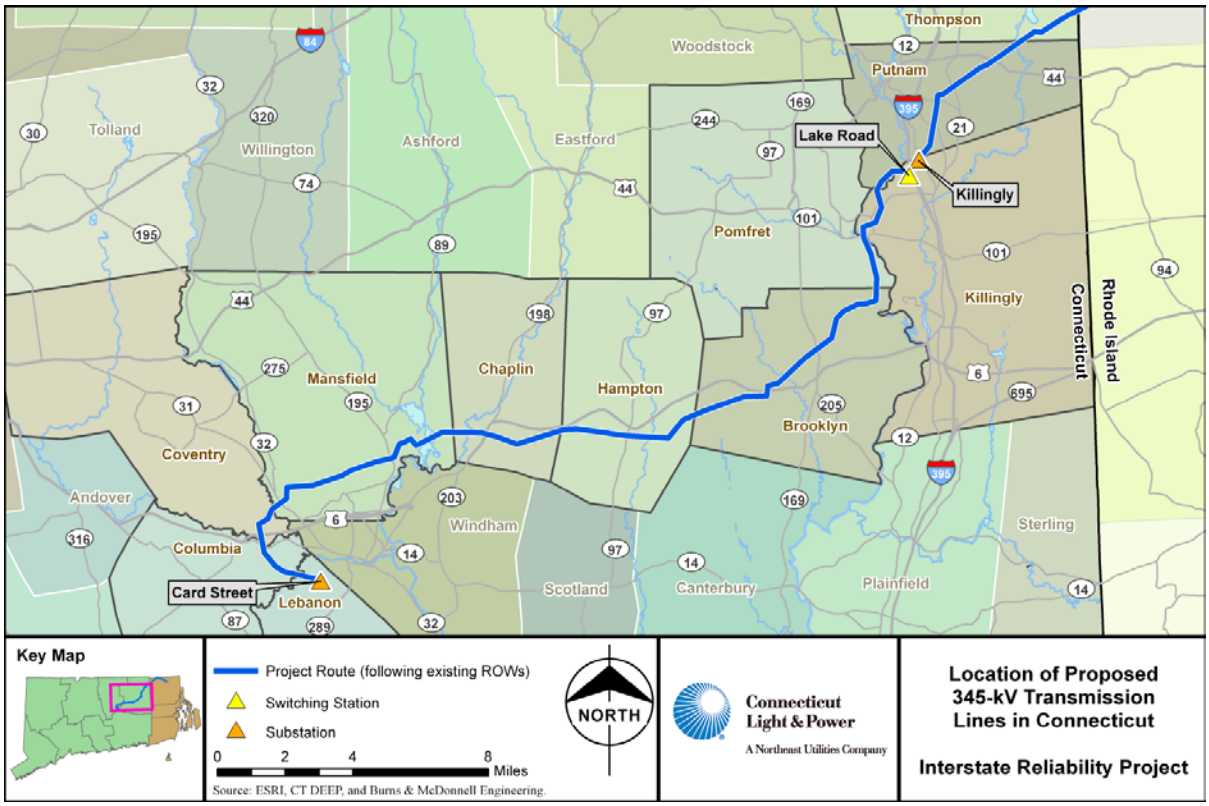


Figure 1-2: Interstate Reliability Project: Connecticut



Accordingly, CL&P has elected to prepare two D&M Plans for the Project, as follows:

- A D&M Plan that addresses all construction activities for the modifications to Card Street Substation, Lake Road Switching Station, and Killingly Substation; and

- A D&M Plan that addresses all construction activities for the overhead transmission lines.

This D&M Plan encompasses construction activities for the new 345-kV transmission lines and related minor modifications to adjacent 345-kV, 115-kV, and 69-kV transmission lines and distribution lines that presently occupy the ROWs to be used for the Project (Project ROWs). The new 345-kV transmission line construction and related activities will be located along the 36.8 miles of ROWs in the 11 Connecticut towns as summarized below:

Town	ROW (Miles)
Lebanon	0.6
Columbia	1.7
Coventry	1.2
Mansfield	6.4
Chaplin	3.3
Hampton	4.3

Town	ROW (Miles)
Brooklyn	7.2
Pomfret	1.7
Killingly	3.0
Putnam	5.6
Thompson	1.8

Except for approximately 5 acres of expanded easement across approximately 1.4 miles of federally-owned lands in the towns of Mansfield and Chaplin (referred to herein as the "Mansfield Hollow area"), the new 345-kV transmission lines will be accommodated within CL&P's pre-existing easements. CL&P is in the process of finalizing the acquisition of the approximately 5-acre expanded easement from the U.S. Army Corps of Engineers (USACE).

1.2 ORGANIZATION OF THE D&M PLAN

This D&M Plan consists of three volumes:

- **Volume 1** includes specific information relevant to the 345-kV transmission line construction and minor modifications to adjacent lines. The main text of Volume 1 (Sections 1 through 8) includes information and procedures that are pertinent to construction activities for the new 345-kV transmission lines and related modifications, including regulatory requirements, general Project construction procedures and special plans, overall construction schedule, environmental inspection, public outreach, and a process for notifying and requesting approval from the Council for changes to the D&M Plan.

  Table 1-1 summarizes each of the Council's D&M Plan requirements, pursuant to RCSA Sections 16-50j-60 through 16-50j-62, while Table 1-2 identifies the requirements pertaining to the transmission lines as contained in the Council's Decision and Order and Opinion for the Project. For each D&M Plan requirement, Tables 1-1 and 1-2 either identify the location in this D&M Plan where the requirement is addressed or state why the requirement is not relevant to the new 345-kV transmission lines.

Appendices to Volume 1 provide resource- or site-specific construction plans or information regarding the new 345-kV transmission lines and related minor modifications to adjacent lines, as follows:

- Vegetation Clearing Plan (Appendix A), including NU's Vegetation Clearing Specifications: *Right-of-way Vegetation Initial Clearing for 115- and 345-kV Transmission Lines* (OTRM 030.001) and *Vegetation Clearing Procedures and Practices for Transmission Line Sections* (OTRM 230) and CL&P's brochure regarding procedures for landowners to request timber cleared from the ROW on their property ("Making Requests for Wood" www.NUrightsofway.com)
- Wetlands and Waterbodies Avoidance and Minimization Protocols (Appendix B)
- Summary Report on Farmland Protection Measures and Consultations with Farmland Property Owners and Lessees (Appendix C)
- Wetland Invasive Species Control Plan (Appendix D)
- Vernal Pool Impact Minimization Plan (Appendix E)
- Post-Construction Electric and Magnetic Field Monitoring Plan (Appendix F)

- **Volume 2** includes approvals, permits, and best management practices (BMPs) pertinent to all Project construction activities, including not only the new 345-kV transmission line construction, but also (as applicable) the modifications at Card Street Substation, Lake Road Switching Station, and Killingly Substation. In particular, Volume 2 includes the following:
  - The Council's Decision and Order and Opinion for the Project (Attachment A)
  - Spill Prevention and Countermeasures Plan (Attachment B)
  - Guidance for Soils and Groundwater Management (Attachment C)
  - Snow Removal and De-Icing Procedures (Attachment D)
  - NU's *BMP Manual: Connecticut (Construction and Maintenance Environmental Requirements)* (Attachment E)
  - Connecticut Department of Energy and Environmental Protection (CT DEEP) General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities (Attachment F)
  - CT DEEP Stream Channel Encroachment Line Permit and Section 401 Water Quality Certification for the Interstate Reliability Project (SCEL-201205698, WQC-201205697) (Attachment G)
  - NU's *Environmental Rule ERTG-03 BMPs for Treated Wood Storage and Disposal* (Attachment H)

- Agency correspondence and public outreach documentation relevant to the D&M Plan process for the new 345-kV transmission lines and related minor modifications to adjacent lines (Attachment I)

- **Volume 3** consists of maps, drawings, and other details relevant to the construction of the 345-kV transmission lines and related minor modifications to adjacent lines, including:

  - Key Map, depicting the route of the new 345-kV transmission lines (scale 1"=2,000', U.S. Geological Survey topographic map base);

  - Cross-sections depicting the alignment of the new 345-kV transmission lines within CL&P's ROWs;

  - Mapsheets, at a scale of 1"=100' showing the location of the new 345-kV transmission lines, related modifications to adjacent lines, on and off-ROW access roads, and work pads in relation to environmental features, as well as a summary of the characteristics of each new transmission structure (structure number, type, height, finish, and foundation type);

  - Typical construction drawings of erosion and sedimentation controls and protection measures for use in active farmlands;

  - Detail sheets that summarize water resource impacts, threatened and endangered species protection measures, wetland invasive species control measures, and farmland protection procedures; and

  - Drawings of typical H-frame and monopole transmission structures, as well as structure foundation and grounding details.

Table 1-1
D&M Plan Directory
Interstate Reliability Project 345-kV Transmission Lines and Related Modifications
(Compliance with Regulations of Connecticut State Agencies [RCSA] Sections 16-50j-60, -61 and -62)

R.C.S.A Section	Description	D&M Plan (Section Reference, as Applicable)
16-50j-60	**Requirements for a D&M Plan**	
(a)	**Purpose.** The Council may require the preparation of full or partial D&M Plans for proposed energy facilities, modifications to existing energy facilities, or where the preparation of such a plan would help significantly in balancing the need for adequate and reliable utility services at the lowest reasonable cost to consumers with the need to protect the environment and the ecology of the state.	This D&M Plan applies to the installation of the new 345-kV lines and related minor modifications to adjacent lines.
(b)	**When required.** A partial or full D&M plan shall be prepared in accordance with this regulation and shall include the information described in RCSA Sections 16-50j-61 to 16-50j-62, inclusive, for any proposed energy facility for which the Council issues a certificate of environmental compatibility and public need, except where the Council provides otherwise at the time it issues the certificate. Relevant information in the Council's record may be referenced.	This D&M Plan includes all information applicable to the construction of the new 345-kV transmission lines and related minor modifications to adjacent lines. (A separate D&M Plan addresses the Project modifications to Card Street Substation, Lake Road Switching Station, and Killingly Substation.)
(c)	**Procedure for preparation**. The D&M plan shall be prepared by the certificate holder or the owner or operator of the proposed facility or modification to an existing facility. The preparer may consult with the staff of the Council to prepare the D&M plan.	This D&M Plan was prepared by CL&P.
(d)	**Timing of plan.** The D&M plan shall be submitted to the Council in one or more sections, and the Council shall approve, modify, or disapprove each section of the plan not later than 60 days after receipt of it. If the Council does not act to approve, modify or disapprove the plan or a section thereof within 60 days after receipt of it, the plan shall be deemed approved. Except as otherwise authorized by the Council, no clearing or construction shall begin prior to approval of applicable sections of the D&M plan by the Council.	This D&M Plan addresses the Council's requirements for the construction of the 345-kV transmission lines except for the list of contractor personnel as specified in Section 16-50j-61 (c)(8). Contact information for the prime contractor(s) for the transmission line work will be provided to the Council in a supplemental submission, after contract award, prior to the commencement of construction.
16-50j-61	**Elements of D&M Plan**	

R.C.S.A Section	Description	D&M Plan (Section Reference, as Applicable)
(a)	**Key Map**, 1"=2,000' USGS topographic map	Volume 3
(b)	**Plan Drawings**, 1"=100' or larger, and supporting documents, which shall contain the following information:	Maps and cross-sections are included in Volume 3.
1.	Edges of the proposed site and any existing site contiguous to or crossing the site, portions of the site owned by the company in fee, and the identity of property owners of record of the portions of the site not owned by the company in fee	Volume 3 maps
2.	Public roads and public land crossings or adjoining the site	Volume 3 maps
3.	Location of 50' contours along the site	Volume 3 maps
4.	Probable location, type, and height of the proposed facility and components (including each new transmission structure, position of guys, description of foundations, and locations of any utility or other structures to remain on the site or to be removed	Volume 3 maps and cross-sections.
5.	Probable points of access to the site, and the route and likely nature of accessways, including alternatives	Volume 3 maps
6.	Edges of existing and proposed clearing areas, the type of proposed clearing along each part of the site, and the location and species identification of vegetation that would remain for aesthetic and wildlife value	Volume 3 maps; Volume 1 Section 3.4 and Appendix A, Vegetation Clearing Plan
7.	Identification of sensitive areas and conditions within and adjoining the site, including but not limited to:	
	A. Wetland and watercourse areas regulated under C.G.S. Chapter 440 and any locations where construction may create drainage problems	Volume 1, Section 5.2; Volume 3
	B. Areas of high erosion potential	Volume 1, Section 5.1; Volume 3
	C. Critical habitats or areas identified as having rare, endangered, or threatened, or special concern plant or animal species listed by the state or federal government	Volume 1,Section 5.4; Volume 3 maps
	D. Location of known underground utilities or resources to be crossed (electric lines, fuel lines, drainage systems and natural or artificial public or private water resources)	Volume 3 maps
	E. Residences or businesses within or adjoining the site that may be disrupted during construction	Volume 3 maps
	F. Significant environmental, historic and ecological features (significantly large or old trees, buildings, monuments, stone walls or features of local interest)	Volume 1, Section 5.10 (cultural resources);Volume 3 maps depict general locations of culturally sensitive areas

R.C.S.A Section	Description	D&M Plan (Section Reference, as Applicable)
(c)	**Supplemental Information**	
1.	Plans (if any) to salvage marketable timber, restore habitat and maintain snag trees within or adjoining the site	Volume 1, Section 3.4; Appendix A, Vegetation Clearing Plan
2.	All construction and rehabilitation procedures with reasonable mitigation that shall be taken to protect areas and conditions identified in 7(b), above, including but not limited to:	
	A. Construction techniques at wetland and watercourse crossings	Volume 1, Section 5.2, Appendix B; Volume 2 Attachment E (NU's BMPs), Volume 3 maps
	B. S & E control and rehabilitation procedures, consistent with the CT Guidelines for Soil Erosion and Sediment Control, as updated and amended for areas of high erosion potential	Volume 1, Section 3, Section 5.1, Volume 2, Attachment E, BMPs; Volume 3
	C. Precautions and all reasonable mitigation measures to be taken in areas within or adjoining the site to minimize any adverse impacts of such actions or modifications endangered, threatened, or special concern plant or animal species listed by federal or state agencies and critical habitats that are in compliance with federal and state recommended standards and guidelines, as amended	Volume 1, Section 5.4; Volume 3
	D. Plans for modification and rehabilitation of surface, drainage, and other hydrologic features	Volume 1, Sections 3.8, 5.2; Appendix B; Volume 2, Attachment E, BMPs
	E. Plans for watercourse bank restoration in accordance with Chapter 440 of the C.G.S.	Volume 1, Section 5.2 and Appendix B; Volume 2, Attachment E, NU's BMPs; Volume 3
	F. Plans for the protection of historic and archaeological resources with review and comment from a state historic preservation officer of the CT Department of Economic and Community Development (DECD) or its successor agency	Volume 1, Section 5.10; Volume 2, Attachment I (Agency Correspondence)
3.	Plans for the method and type of vegetation clearing and maintenance to be used within or adjacent to the site	Volume 1, Section 3.4 and Appendix A
4.	Location of public recreation areas or activities known to exist or being proposed in or adjacent to the site, together with copies of agreements between the company and public agencies authorizing the public recreation use of the site to the extent of the company's rights thereto	Volume 1, Section 5.6; Volume 3 maps
5.	Plans for ultimate disposal of excess excavated material, stump removal, and periodic maintenance of the site	Volume 1, Section 5.7 and Volume 2, Attachment C

R.C.S.A Section	Description	D&M Plan (Section Reference, as Applicable)
6.	Locations of areas where blasting is anticipated	None anticipated; refer to Volume 1, Section 5.19
7.	Rehabilitation plans, including but not limited to reseeding and topsoil restoration	Volume 1, Section 3.8; Volume 2, Attachment E BMPs
8.	Contact information for the personnel of the contractor assigned to the project	To be provided after transmission line contract award, prior to commencement of contractor's work on site.
9.	Such site-specific information as the CSC may require	Refer to Table 1-2: List of requirements per Docket 424 Decision and Order and Opinion
(d)	**Notice** A copy, or notice of the filing, of the D&M Plan, or a copy, or notice of the filing of any changes to the D&M Plan, or any section thereof, shall be provided to the service list and the property owner of record, if applicable, at the same time the plan, or any section thereof, is submitted to the CSC	Volume 1, Section 7
(e)	**Changes to the Plan** The CSC may order changes to the D&M plan, including but not limited to vegetative screening, paint color, or fence design at any time during the preparation of the plan	As applicable; refer to Volume 1, Section 7.2 for discussion of CL&P's Change Notice process
16-50j-62	**Supplemental Reporting Requirements**	
(a)	**Site Testing and Staging Areas** The certificate holder, or facility owner or operator, shall provide the CSC with written notice of the location and size of all areas to be accessed or used for site testing or staging areas. If such an area is to be used prior to approval of the D&M plan, the CSC may approve such use on terms as it deems appropriate.	Volume 1, Sections 3.3, 7.1 and 7.2; Volume 3 identifies work pads for the transmission line construction. No site testing is planned. The locations of contractor yards and material staging areas will be identified by the contractor and will be submitted to the Council for review and approval prior to use, pursuant to the Change Notice process described in Section 7.2.
(b)	**Notice**	
1.	The certificate holder, or facility owner or operator, shall provide the CSC, in writing with a minimum of two weeks advance notice	Volume 1, Section 7.1 summarizes notification

R.C.S.A Section	Description	D&M Plan (Section Reference, as Applicable)
	of the beginning of:	procedures
	A. Clearing and access work in each successive portion of the site, and	
	B. Facility construction in that same portion	
2.	The certificate holder, or facility owner or operator, shall provide the CSC with advance written notice whenever a significant change of the approved D&M plan is necessary. If advance written notice is impractical, verbal notice shall be provided to the CSC immediately and shall be followed by written notice not later than 48 hours after the verbal notice. Significant changes to the approved D&M plan shall include, but not be limited to, the following:	Volume 1, Section 7.2 includes CL&P's D&M Plan Change Notice process
	A. The location of wetland or watercourse crossing	
	B. The location of an accessway or structure in a regulated wetland or watercourse area	
	C. The construction or placement of any temporary structures or equipment	
	D. A change in structure type or location including, but not limited to, towers, guy wires, associated equipment or other facility structures	
	E. Utilization of additional mitigation measure, or elimination of mitigation measures. The CSC or its designee shall promptly review the changes and shall approve, modify, or disapprove the changes in accordance with subsection (d) of Section 16-50j-60 of the RCSA	
3.	The certificate holder, or facility owner or operator, shall provide the CSC with a monthly construction progress report or a construction progress report at intervals determined by the CSC or its designee, indicating changes and deviations from the approved D&M Plan. The CSC may approve changes and deviations, request corrections, or require mitigation measures.	Volume 1, Section 7.3
4.	The certificate holder, or facility owner or operator, shall provide the CSC with written notice of completion of construction and site rehabilitation.	Volume 1, Section 7.1
(c)	**Final Report** The certificate holder, or facility owner or operator, shall provide the CSC with a final report for the facility not later than 180 days after completion of all site construction and site rehabilitation. The report shall identify:	Volume 1, Section 7.3
1.	All agreements with abutters or other property owners regarding special maintenance precautions	

R.C.S.A Section	Description	D&M Plan (Section Reference, as Applicable)
2.	Significant changes of the D&M plan that were required because of property rights of underlying and adjoining owners for other reasons	
3.	The location of construction materials which have been left in place including, but not limited to, culverts, erosion control structures along watercourses and steep slopes, and corduroy roads in regulated wetlands	
4.	The location of areas where special planting and reseeding have been done	
5.	The actual construction cost of the facility, including but not limited to the following costs:	
	A. Clearing and access	
	B. Construction of the facility and associated equipment	
	C. Rehabilitation; and	
	D. Property acquisition for the site or access to the site	
(d)	**Protective Order** The certificate holder, or facility owner or operator, may file a motion for protective order pertaining to commercial or financial information related to the site or access to the site.	N/A

Table 1-2
D&M Plan Directory of Docket No. 424 Decision and Order and Opinion Requirements
Interstate Reliability Project 345-kV Transmission Lines and Related Modifications

Condition or Page Number	Description	D&M Plan (Section Reference, as Applicable)
Condition Number	**Decision and Order**	
(1)	The Certificate Holder shall construct the proposed transmission line overhead along the Interstate route with potential route and/or configuration variations noted under Condition numbers 3(p) and 3(q) of this Decision and Order. The new transmission line shall be placed primarily on H-frame structures except in Segment 9 between Lake Road Junction and Lake Road Switching Station in Killingly where the existing and proposed lines would be supported on vertical steel structures; and in the areas of the federally-owned Mansfield Hollow property and Hawthorne Lane Alternative, details of which shall be submitted prior to construction as noted below. Also, structure #39 on the property of Highland Ridge Golf Range shall be constructed as a steel monopole	Volume 1, Section 3, and Volume 3 The Volume 3 maps and cross-sections identify structure configurations. (The steel monopole structure on the Highland Ridge Golf Range also is designated as NU Structure No. 10739.)
(2)	The Certificate Holder shall construct the additions to Card Street Substation, Lake Road Switching Station, and Killingly Substation, as proposed.	Refer to separate D&M Plan for modifications to the switching station and substations
(3)	The Certificate Holder shall prepare a Development and Management (D&M) Plan, whole or in parts, for this project in compliance with Sections 16-50j-60 through 16-50j-62 of the Regulations of Connecticut State Agencies. The D&M Plan shall be served on the Towns of Lebanon, Columbia, Coventry, Mansfield, Chaplin, Hampton, Brooklyn, Pomfret, Killingly, Putnam and Thompson for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:	Refer to Volume 1, Section 8; Volume 2, Attachment I (Agency Correspondence and Public Outreach Documentation)
	a. A detailed site plan showing the placement of the access roads, structure foundations, equipment and material staging areas for the overhead route;	Volume 3 maps
	b. An erosion and sediment control plan, consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control as amended;	Volume 1, Section 5.1; Volume 2, Attachment E, NU's BMPs; Volume 3
	c. A spill prevention and countermeasures plan;	Volume 2, Attachment B
	d. Provisions for crossing inland wetland and watercourses for the route;	Volume 1, Section 5.2 and Appendix B; Volume 2, Attachment E, NU's BMPs; Volume 2, Attachment G (CT DEEP permit); Volume 3 maps

Condition or Page Number	Description	D&M Plan (Section Reference, as Applicable)
	e. Details of ground disturbance;	Volume 3 maps
	f. Vegetative clearing plan;	Volume 1, Appendix A
	g. A wetland restoration plan;	Volume 1, Section 5.2 and Appendix B
	h. Invasive species control plan;	Volume 1, Appendix D
	i. Provisions to manage the discovery of undocumented Native American Archaeological resources;	Volume 1, Section 5.10
	j. A post-construction electric and magnetic field monitoring plan;	Volume 1, Section 5.17 and Appendix F
	k. A schedule of construction hours during nights and/or weekends and mitigation of lighting and noise;	Volume 1, Section 4, Section 5.8
	l. A plan to minimize air quality effects during construction;	Volume 1, Section 5.5
	m. A blasting plan, if necessary;	Volume 1, Section 5.19
	n. Identification of developed areas for staging and equipment lay down, field office trailers, sanitary facilities and parking before establishing a new area;	Volume 1, Section 3.2; Volume 3 maps depict work pads along the Project ROWs. Contractor yards and material staging sites will be provided to the Council later for review and approval
	o. Plans and strategies to prevent the use of the right-of-way by all-terrain vehicles;	Volume 1, Section 5.14
	p. Details of the configuration of the line structures within the federally-owned Mansfield Hollow State Park and Wildlife Management Area;	Volume 1, Section 5.6.2, Volume 3 (maps 15-19) and XS-3, XS-5
	q. Details of the route and line configuration for the segment of the line that crosses Hawthorne Lane in Mansfield; and	Volume 1, Section 5.18; Volume 3 maps and XS-HL-1
	r. Details of protection measures for active farmland, including a report of consultations with the owners of agricultural properties to identify active farmland and assess protection of agricultural soils.	Volume 1, Appendix C, Report on Farmland Protection Measures and Consultations with Farmland Property Owners and Lessees
(4)	The Certificate Holder shall comply with the Department of Energy	Volume 1, Section 5.4

Condition or Page Number	Description	D&M Plan (Section Reference, as Applicable)
	and Environmental Protection recommendations, or coordinate with the Department of Energy and Environmental Protection, for construction of the route in the area of endangered, threatened, or special concern species identified along the Interstate route in Connecticut.	
(5)	The Certificate Holder shall conform to the Council's Best Management Practices for Electric and Magnetic Fields.	Project represents BMPs for EMF, per the Council's Decision and Order
(6)	The Certificate Holder shall comply with all future electric and magnetic field standards promulgated by State or federal regulatory agencies. Upon the establishment of any new standards, the facilities granted in this Decision and Order shall be brought into compliance with such standards.	Volume 1, Section 5.17
(7)	The Certificate Holder shall obtain necessary permits from the United States Army Corps of Engineers and the Connecticut Department of Energy and Environmental Protection prior to the commencement of construction, in areas where said permits are required.	Volume 1, Section 2; Volume 2, Attachments F and G (CT DEEP permits)
(8)	The Certificate Holder shall hire an independent environmental inspector, subject to Council approval, to monitor and report on the installation of the overhead transmission system and provide a bi-weekly report to the Council.	Volume 1, Section 6.1
(9)	The Certificate Holder shall provide to the Council an operating report within three months after the conclusion of the first year of operation of all facilities herein, and annually thereafter for a period of three years, with information relevant to the overall condition, safety, reliability, and operation of the transmission systems.	Volume 1, Section 7.3
(10)	This Decision and Order shall be void if all construction authorized herein is not completed within four years of the effective date of the Decision and Order, or within four years after all appeals to this Decision and Order have been resolved.	Volume 1, Section 4 (schedule for Project construction)
Page No.	**Opinion**	
3	The Council will order Interstate be constructed as proposed along the existing CL&P ROW using an overhead line configuration.	Volume 1, Volume 3
4	The Council will require the construction of a single taller steel monopole structure on Highland Ridge Golf Range property in Mansfield, currently owned by Richard Cheney. This would allow the golf range greater use of its property while still supporting the proposed transmission line, and would not increase project cost.	Refer to new Structure No. 39 (10739), Volume 3, Mapsheet 8
4	**RE: General D&M Plan.** The Council will order CL&P to submit a Development and Management (D&M) Plan for the Connecticut portion of Interstate prior to commencement of construction and that	Volumes 1 - 3

Condition or Page Number	Description	D&M Plan (Section Reference, as Applicable)
	provides details regarding the construction of the project, including transmission structure locations, clearing and access roads.	
4	**RE: Undergrounding Distribution Lines.** While the Council recognizes that electric distribution line siting is not under its jurisdiction, the Council urges CL&P to place electric distribution lines underground at areas where the proposed transmission line would cross. Undergrounding short sections of electric distribution lines would reduce visual impact associated with the crossing at a similar cost.	Letter provided separately to the Council on May 17, 2013
5	**Re: Mansfield Hollow.** Without deference to Connecticut ratepayers, USACE indicated a preference for the 4.8-acre Minimal ROW expansion option. However, there is currently no official decision of USACE. Therefore, the Council will order that the 345-kV route be approved through the federally-owned property but that the final configuration of the structures and lines is determined in the D&M Plan phase of the docket.	Volume 1, Section 5.6.2; Volume 3 maps, XS-3 and XS-5
6	**Re: Hawthorne Lane Alternative Option.** The Council finds that the Hawthorne Lane Alternative is a well thought out plan with minimal adverse impact. The Council will leave the final decision on this portion of Interstate to the D&M Plan.	Volume 1, Section 5.18; Volume 3 (maps and XS-HL-1)
9	**RE: Grading, Filling, and Site Restoration.** The Council will require the inclusion of grading and filling details in the D&M Plan for Interstate, with the aim of restoring as many areas as possible to pre-construction conditions following the installation of transmission structures and lines.	Volume 1, Section 3; Volume 3
9	**RE: Agricultural Soils Protection**. The Council will order CL&P to address in its D&M Plan the protection of valuable agricultural soils, whether by consulting with landowners who actively farm the ROW, or, elsewhere along the ROW, by working with state or regional agencies to identify valuable soils and manage their disposition appropriately during construction.	Volume 1, Appendix C; Volume 3 maps
9	**RE: Wetland Impacts**. The Council will require that the D&M Plan for Interstate provide detailed plans showing all wetland impacts. On the basis of this detail, the Council may require further wetlands mitigation, which may include compensatory options, under the jurisdiction of DEEP.	Volume 1, Section 5.2 and Appendix B; Volume 3 maps and water resource impact table
9	**RE: Wetlands and Watercourses.** The primary temporary impacts would be potential erosion and sedimentation into wetlands and watercourses during construction of transmission structures and access roads. Other temporary impacts include possible fuel spills into wetlands and watercourses from the operation of construction equipment, and possible adverse effects on wetlands and watercourses from temporary vegetative clearing related to construction. The Council will require that the D&M Plan include specific programs to	Volume 1, Sections 3.8, 5.1, 5.2, and 6.1, Appendices A, B, D, and E,; Volume 2, Attachments B through G; Volume 3

Condition or Page Number	Description	D&M Plan (Section Reference, as Applicable)
	minimize all such temporary impacts and to restore areas affected by such temporary impacts as much as possible to their pre-construction condition. Further with that aim, the Council will order that an environmental inspector be hired to monitor compliance with the D&M Plan during construction and to monitor restoration for a period afterward.	
10	**RE: Vegetation.** The Council will order an Invasive Species Control Plan for the project, developed in consultation with the USACE, DEEP and other agencies. This plan shall identify measures for controlling invasive plants listed on the Connecticut Invasive Plant List – October 2011. Also, through conditions to be applied in the D&M Plan, the Council will encourage the continuance of vegetative maintenance practices, including those related to herbicide application and to invasive species that protect native plants and wildlife.	Volume 1, Appendix D
10	**RE: Lepidoptera.** Mitigation to minimize impact to Lepidoptera involves maintaining its habitat. Lepidoptera host plant communities were found along the ROW. CL&P would install exclusion fencing to protect plant communities. If exclusion fencing is not feasible, mitigation would include avoiding permanent impact to important vegetative areas to the extent practicable; limiting construction to existing dirt access roads; creating a Vegetation Management Plan to reduce potential colonization by invasive species and promote the growth of native host plant species; and performing additional rare species surveys along certain areas of the ROWs.	Volume 1, Section 5.4; Volume 3 maps
10	**RE: Wood Turtle.** The Council will order that CL&P comply with DEEP recommendations, to the extent feasible, for wood turtles, including: minimizing the removal of low-growth vegetation in areas adjacent to rivers/streams documented to support wood turtles; using erosion and sedimentation controls to minimize the deposition of sediment into wetland areas and to preclude wood turtles from accessing active construction areas; and ensuring construction contractors are able to identify wood turtles and know proper handling and care procedures if one is encountered. Also, a DEEP-approved turtle monitor would be present during construction in wood turtle habitats. If found, wood turtles would be removed from the active area and placed in the direction they were moving. **RE: Eastern Hognose Snake.** The eastern hognose snake and eastern ribbon snake are state-listed species identified as potentially occurring near portions of the proposed route. Both snake species are typically dormant from November 1 through April 1. The Council will order that CL&P comply with DEEP recommendations, to the extent feasible, for the eastern hognose snake and eastern ribbon snake, including: training construction contractors to identify the snakes properly handle and care for the snakes if encountered; and maintaining the presence of a DEEP-approved snake monitor during construction. Any snakes that are encountered would be removed from the active workspace.	Volume 1, Section 5.4 (Note: CT DEEP does not require special protection measures for wood turtles, which have not been found along the Project ROWs. Protocols for the protection of state-listed species observed in the vicinity of the ROWs [including the Eastern hognose snake] are included in Section 5.4, and in Volume 3 [mapsheets and Detail Sheet 5].)

Condition or Page Number	Description	D&M Plan (Section Reference, as Applicable)
11	**RE: Noise and Air Quality.** Operation of the Interstate lines will not be a significant source of audible noise. Any noise from heavy machinery during construction of Interstate would be short-term. The Council will condition the D&M Plan, however, to schedule construction periods during reasonable day-time hours. Operation of the transmission lines would not impact air quality. Air quality effects from constructing Interstate would be temporary. The Council will condition the D&M Plan so that such effects would be mitigated by properly maintaining vehicles and equipment to limit emissions, watering access roads to suppress fugitive dust, and using crushed stone aprons at access road entrances from public roads to minimize tracking of soil onto pavement.	Volume 1, Sections 5.5 and 5.8
13	**RE: Mount Hope Montessori School.** Discussion during the proceedings for this docket brought up an option of CL&P providing vegetative screening on the Mount Hope Montessori School property. The Council encourages planting of this screening and will order that vegetative screening at the school be discussed in the D&M Plan for this docket.	Volume 1, Section 5.20
15	**RE: Independent Environmental Inspector.** In order to verify compliance with the Council's Decision and Order, the Council will require the Certificate Holder to hire an independent inspector(s), subject to Council approval, to document compliance with environmental requirements, prepare status reports, and act as a liaison between the Council, and the Certificate holder's environmental inspector and contractors. This independent inspector will provide bi-weekly progress reports in writing to the Council and to the chief elected official, or their representative, of each municipality traversed by the proposed project describing all significant construction activities and all associated environmental effects. This independent inspector shall have formal training and experience in civil and environmental engineering and have sufficient oversight and authority to stop construction practices that are inconsistent with the Council's Decision and Order; the approved D&M Plan; or that may cause significant damage or disruption to the environment.	Volume 1, Section 6.1
16	**RE: General D&M Plan Requirements.** To ensure that the proposed project is properly developed, the Council will require the Certificate Holder to submit a D&M Plan which will include, among others, detailed site plans identifying structure locations; an erosion and sediment control plan consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control; a Spill Prevention, Control, and Countermeasures Plan; provisions for revegetation and maintenance of the proposed ROW; provisions for inspection and monitoring of the proposed ROW; pre-construction and post-construction measurements of electric and magnetic fields.	Volumes 1, 2, and 3

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2. REGULATORY APPROVALS AND CONSULTATIONS

2.1 REGULATORY APPROVALS AND REQUIREMENTS

This D&M Plan conforms to the specifications of Sections 16-50j-60 through 16-50j-62 of the RCSA (*Requirements for a D&M Plan, Elements of a D&M Plan, Reporting Requirements*); incorporates CL&P's commitments as contained in the record of the Council's Docket 424 regulatory process; and reflects adherence to the conditions of the Council's certificate for the Project and other relevant, previously received or anticipated regulatory approvals. The federal and state permits and approvals needed for the Project are listed in Table 2-1. Copies of the Council's approval and CT DEEP permits are provided in Volume 2, including:

- The Council's Decision and Order and Opinion for the Project (refer to Volume 2, Attachment A);
- The CT DEEP *General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities*, which applies to the management of the discharge of stormwater and dewatering wastewaters from construction sites (Volume 2, Attachment F); and
- The CT DEEP Stream Channel Encroachment Line Permit and Section 401 Water Quality Certification for the Project, issued May 7, 2013 (Volume 2, Attachment G).[2]

2.2 CONSULTATIONS

During the preparation of this D&M Plan, CL&P consulted with representatives of the 11 towns traversed by the 345-kV transmission lines and related minor line modifications, as well as with representatives of various state and federal agencies, including the USACE, CT DEEP, State Historic Preservation Office (SHPO)[3], and Connecticut Department of Agriculture. In addition, CL&P contacted property owners along the transmission line ROWs, including owners and lessees of active farmlands.

[2] Pursuant to Connecticut Public Act 13-205 (*An Act Concerning Administrative Streamlining at the CT DEEP*), approved June 21, 2013, CT DEEP has determined to eliminate the SCEL program beginning October 1, 2013. Connecticut instituted the SCEL program more than 50 years ago as a mechanism for controlling development in flood-prone areas. Subsequently, other regulations, such as those administered by the Federal Emergency Management Agency (FEMA), were established to govern activities in floodplains, making the SCEL program duplicative. The elimination of the SCEL program does not affect the Project construction activities, which will be performed as specified in this D&M Plan and in accordance with regulatory requirements.

[3] For the review of this Project, the Office of State Archaeology (OSA) is representing the SHPO.

Table 2-1
Permits, Reviews, and Approvals Required for the Project

Agency	Certificate, Permit, Review, Approval or Confirmation	Activity Regulated
FEDERAL		
USACE, New England District	Section 404 CWA Compliance with National Historic Preservation Act (NHPA), Section 106 EA./FONSI/RONA; Easement Expansion Approval	Discharge of dredge or fill material into waters of the U.S. (wetlands or watercourses) Real Estate Approval: easement expansion across Mansfield Hollow properties
U.S. Fish and Wildlife Service	Coordinates with USACE regarding endangered or threatened species	Activities that may affect federally-listed endangered or threatened species (none for Project)
U.S. Environmental Protection Agency	Provides input to USACE permit application review	Activities that may affect water, air, or other resources
Federal Aviation Administration	Resolution of Notices of Presumed Hazard for structures near Windham and Danielson Airports	Transmission line structure marking/lighting for mitigation of hazards to air traffic
CONNECTICUT		
Connecticut Siting Council	Certificate of Environmental Compatibility and Public Need (Docket 424, December 27, 2012; refer to Volume 2, Attachment A) D&M Plan approvals	General transmission line need, siting, construction, environmental compatibility, safety, and operation / maintenance and ROW management procedures
CT DEEP	401 Water Quality Certification (refer to Volume 2, Attachment G)	Conformance to Section 401 of the CWA; Section 401 approval from CT DEEP is required prior to USACE permit issuance
	General Permit (refer to Volume 2, Attachment F)	Stormwater management during construction
	Stream Channel Encroachment Line (SCEL) Permit (refer to Volume 2, Attachment G and to footnote on previous page)	Span of Willimantic River SCEL (no new transmission line structures will be located within the SCEL)
	Threatened, Endangered, and Special Concern Species (refer to Volume 2, Attachment G)	Approval of species-specific mitigation plans, 401 Water Quality Certification approval
CT DEEP Public Utilities Regulatory Authority	Approval pursuant to C.G.S. Section 16-243	Method & Manner of Construction Approval to Energize Lines
SHPO	Approval of proposed Project consistency with the NHPA; comments during Council and USACE processes	Construction and operation activities that may affect archaeological or historic resources.
Connecticut Department of Transportation (CDOT)	Encroachment permits	Transmission line crossings of state highways
	Coordination of transmission line structure lighting near the Windham and Danielson airports (operated by CDOT)	Airport approach lighting, based on FAA consultations

During consultations with town representatives, property owners and lessees, and the interested public, CL&P provided information regarding the D&M Plan process, the planned transmission line construction activities, and CL&P's outreach procedures and points-of-contact prior to and during construction. CL&P also issued a draft of this D&M Plan for public review and comment and held two public open houses to allow further opportunities for public input. Additional information regarding CL&P's public outreach process is included in Section 8 and in Volume 2, Attachment I.

CL&P consulted with federal and state agencies both as part of permitting efforts and as part of the preparation of resource-specific protection measures included in this D&M Plan. For example, CL&P coordinated with the Connecticut Department of Agriculture regarding the Project's outreach to property owners and lessees of active farmlands and farmland protection measures (refer to Appendix C) and with the CT DEEP regarding threatened and endangered species. The results of CL&P's consultations with property owners and lessees of active farmlands located along the transmission line ROWs are summarized in Appendix C of this Volume, and are reflected on the Volume 3 maps. Similarly, the results of CL&P's coordination with CT DEEP are reflected in Section 5 and appendices to this Volume, in the CT DEEP permits in Volume 2 (refer to Attachments F and G), and on the Volume 3 maps.

In addition, as specified in the D&M Plan requirements, RCSA Section 16-50j-61(c)(2)(F), CL&P consulted with the SHPO (OSA) regarding the potential effects of the 345-kV transmission line and construction and related line modifications on significant archaeological or historic resources and the measures to mitigate such effects, as necessary. Correspondence received to date from the SHPO and other agencies concerning the transmission line construction activities is included in Volume 2, Attachment I.

Consultations Regarding the Mansfield Hollow Area

Subsequent to the issuance of the Council's Decision and Order approving the Project, CL&P completed negotiations with the USACE regarding the expansion of CL&P's existing 150-foot-wide easement across two segments of federally-owned lands, totaling approximately 1.4 miles. The two federally-owned segments traversed by CL&P's ROW are among 2,300 acres that the USACE leases to the CT DEEP, which manages the property as Mansfield Hollow State Park, Mansfield Hollow Lake, and Mansfield Hollow Wildlife Management Area (WMA). The property is collectively referred to as "the Mansfield Hollow area".

CL&P's existing 150-foot-wide ROW extends across approximately 0.9 mile of federal lands in the Town of Mansfield (Mansfield Hollow State Park and WMA) and 0.5 mile in the Town of Chaplin (WMA). To accommodate the new 345-kV line adjacent to the existing 345-kV line while maintaining required clearances between conductors and vegetation, CL&P proposed to expand the easement on federal property by 25 feet to the north in Mansfield and by 35 feet to the north in Chaplin. This easement expansion totals approximately 5 acres, including 2.6 acres in Mansfield and 2.4 acres in Chaplin.

In accordance with the National Environmental Policy Act, in November 2012, the USACE prepared and issued for public review and comment a draft Environmental Assessment (EA) / Finding of No Significant Impact (FONSI) / Record of Non-Applicability (RONA) that evaluated the proposed 5-acre easement expansion and alternatives, and found that the 5-acre easement expansion would not adversely affect the environment. After receiving no comments on the draft EA/FONSI/RONA during the public review period, the USACE finalized the EA/FONSI/RONA in January 2013 and, on February 5, 2013, issued the signed FONSI, endorsing the 5-acre easement expansion.

The USACE is proceeding with the preparation of documentation for the conveyance to CL&P of the additional 5-acre easement. CL&P anticipates that this conveyance will be issued in conjunction with the USACE Section 404 Clean Water Act permit for the Project.

Pursuant to the USACE's approval of the approximately 5-acre easement expansion and in accordance with the Council's Decision and Order, Condition 3(p), CL&P has incorporated in this D&M Plan details of the transmission line configurations within the federally-owned lands in the Mansfield Hollow area (refer to Section 5.6.2, and Volume 3, XS-3 and XS-5, maps 15-19).

Consultations Regarding the Hawthorne Lane ROW Shift

After the issuance of the Council's Decision and Order approving the Project, CL&P also completed negotiations with private landowners in the Hawthorne Lane area of the Town of Mansfield. As a result of these negotiations, the landowners granted CL&P new easement rights to allow a shift in the ROW that will place the new and existing transmission lines farther from four homes.

Pursuant to the Council's Decision and Order, Condition (3q), details regarding the route and line configuration for the Hawthorne Lane ROW Shift are described in Section 5.18 and illustrated in Volume 3 (refer to map 15 and XS-HL-1).

3. GENERAL CONSTRUCTION PROCEDURES

This section describes the construction procedures for the new 345-kV transmission lines (Sections 3.1 through 3.8) and for the related minor modifications to adjacent lines (Section 3.9).

Each new 345-kV transmission line will be installed adjacent to an existing 345-kV transmission line, and along some ROW segments, also adjacent to existing 115-kV and 69-kV transmission lines and 23-kV distribution lines. In most areas, the new 345-kV line conductors will be horizontally arranged and supported by multi-pole steel-pole structures (H-frame family).

Steel monopole structures will be used in certain locations, such as at the Highland Ridge Golf Range, the Hawthorne Lane and Mansfield Hollow areas (in the Town of Mansfield), between Lake Road Junction and Lake Road Switching Station (in the Town of Killingly), and at a few ROW angles where the line conductors will be supported in vertical or delta configurations. Volume 3 identifies the characteristics of each new 345-kV line structure and includes plan view drawings of each of the structure types that will be used on the Project.

The new 345-kV lines will be installed using a sequential, phased, construction approach. This section summarizes the typical overhead transmission line construction activities and identifies plans and procedures that will apply to all such work. Additional special construction procedures and/or mitigation measures, as described in Section 5 and in appendices to this volume as well as in Volume 2, Attachments B through H, will be implemented to:

- Protect, or minimize impacts to, environmental resources (such as active farmlands, water resources, state-listed threatened endangered species, public recreational areas, archaeological sites);

- Limit construction-related effects on the public (noise and lighting mitigation, air quality protection);

- Address additional construction work that will be performed to install and power aviation warning lights, in accordance with FAA requirements, on specific transmission line structures; and

- Provide further information as requested by the Council (e.g., details of protection measures for active farmlands, the route and line configuration in the Hawthorne Lane area in the Town of Mansfield, the configuration of the line structures within the federally-owned Mansfield Hollow area in the towns of Mansfield and Chaplin, and vegetative screening at the Mount Hope Montessori School).

The Volume 3 maps include site-specific information regarding transmission line structure characteristics (i.e., structure number, type, height, finish, and foundation), environmental features

along the ROWs, property owners, construction work areas, and the locations where special resource protection measures will be implemented.

3.1 CONSTRUCTION MANAGEMENT AND CONTACT INFORMATION

CL&P expects to award a contract for the transmission line work in late 2013. After contract award but prior to the commencement of the contractor's on-site work on the new 345-kV transmission lines or related line modifications, CL&P will provide the Council with contact information for the prime construction contractor, consisting of the name of the firm, name of primary contact, corporate address, telephone number, and e-mail.

The Project transmission line construction will be overseen by personnel from CL&P and CL&P's construction manager, Burns & McDonnell Engineering (BMcD), as well as subconsultants to CL&P and BMcD. BMcD supervisory personnel will directly monitor construction activities, including adherence to engineering, safety, and environmental requirements, and will manage other subconsultants involved in monitoring construction activities.

3.2 GENERAL CONSTRUCTION SEQUENCE: OVERVIEW

CL&P will construct the proposed transmission lines in several stages, some overlapping in time. The following summarizes the sequence of activities for the construction of the overhead transmission lines:

- Prepare material staging sites (e.g., storage, staging and laydown areas) to support the construction effort.
- Establish construction field office area(s), typically including space for an office trailer, equipment storage and maintenance, sanitary facilities, and parking.
- Survey and stake the ROW boundaries (where necessary), vegetation clearing boundaries, and new structure locations.
- Mark the boundaries of previously delineated wetland and watercourse areas, including vernal pools.
- Identify and mark areas to be avoided or otherwise protected (e.g., sensitive cultural or environmental resource areas).
- Identify other areas, as appropriate, where special construction considerations will apply (e.g., active farmlands, where the farmland protection measures will be implemented; stone walls that are culturally significant or that require particular construction treatment pursuant to landowner agreements).
- Perform vegetation clearing.
- Install erosion and sedimentation controls.
- Construct new access roads or improve existing roads. Prepare level work pads as necessary at new structure sites and conductor pulling sites.

- Construct foundations and erect/assemble new structures.
- Install shield wires and conductors.
- Install structure grounding systems, including counterpoise (where needed).
- Remove temporary roads and construction debris and restore disturbed sites.
- Maintain temporary erosion and sediment controls until vegetation is re-established or disturbed areas are otherwise stabilized.

3.3 CONSTRUCTION FIELD OFFICES, CONTRACTOR YARDS, AND STAGING AREAS

To support the construction of the new 345-kV transmission lines, construction field offices, contractor yards, and staging areas (including equipment and material staging sites, temporary storage areas, and laydown areas) will be required. These sites typically will be 2 to 5 acres. The preferred locations for temporary storage and staging sites are on CL&P property, along or in the general vicinity of the ROWs. If CL&P property is not suitable, previously developed lands (e.g., parking lots) or vacant land will be considered.

The Project construction contractor will be responsible for identifying proposed locations for contractor yards, field construction offices, and staging areas, and for entering into agreements with the property owner for the use of such sites during construction. In accordance with the Change Notice Approval Process described in Section 7.2, the proposed locations of these construction support areas will be submitted to the Council staff for review and approval prior to use.

3.4 VEGETATION REMOVAL

Vegetation removal, the first step in the preparation of the ROW for construction, will be performed as described in the *Vegetation Clearing Plan* (refer to Appendix A). The Volume 3 maps identify vegetation clearing limits for construction along the ROWs. Within these limits, tall-growing tree species will be removed to meet the established minimum vegetation clearances from the new transmission line conductors. Along presently un-managed portions of the ROWs, the vegetation removal limits also represent the "new edge of ROW vegetation management" as illustrated on the cross-sections in Volume 3.

Within the vegetation clearing limits for construction, other types of vegetation (e.g., shrubland) also will be removed as needed for transmission line construction. Some clearing thus will be performed within presently managed portions of the ROWs. Outside of the vegetation clearing limits shown on the Volume 3 maps, trees and herbaceous or low-growing scrub/shrub species will only be cleared as needed to facilitate Project construction activities along on- and off-ROW access roads.

Further, after initial vegetation removal (particularly after the new conductors are installed), trees adjacent to cleared areas may need to be selectively removed or pruned to achieve clearances from conductors.

Temporary erosion and sedimentation controls may be installed before vegetation removal, depending on site-specific characteristics. After vegetation removal, soil erosion and sedimentation controls typically will be installed around work limits (e.g., access roads, work pads) in or near wetlands, streams, and other water resources. (Refer to the typical drawings of erosion and sedimentation control measures in the BMP Manual [Volume 2, Attachment E] and in Volume 3.)

In addition, during this phase of construction, exclusion fencing or other types of boundary markings will typically be installed to demarcate areas of restricted construction access or environmental or cultural sensitivity.

3.5 ACCESS ROADS AND WORK PADS

3.5.1 Access Roads

On-ROW access roads will provide the principal means for equipment and material to reach transmission line structure locations. The locations of existing and planned on-ROW access roads (including alternative road alignments) are illustrated on the Volume 3 maps.

In some areas, to avoid traversing along the ROWs over rugged terrain or through sensitive environmental or cultural resources, access roads to the ROW will be developed across private property or across land owned by CL&P ("off-ROW access roads"). The Volume 3 maps illustrate potential off-ROW access roads and identify the property owner, parcel (line list) number, and the public road from which the road will provide access to the ROW.

Table 3-1 lists the potential off-ROW access roads. CL&P has initiated discussions with the applicable private landowners seeking the rights to use such off-ROW access roads and has, in some cases, completed environmental and cultural resource field reviews to evaluate the potential impacts that would occur from the use of these access roads. If CL&P cannot obtain the rights to an off-ROW access road, either an on-ROW access road will be used or an alternative off-ROW access road will be investigated.

To support the heavy construction equipment required to install 345-kV transmission line structures and foundations, all access roads (on- or off-ROW) must be sufficiently wide, with a stable base and grades that typically must be 10% or less. Access roads will have a typical 16-to-20-foot-wide travel way and, overall, a 20-to-25-foot-wide footprint (including road shoulders). However, access road widths will vary depending on site-specific conditions (principally slope and presence of wetlands) and on factors such as the amount of grading (cutting and filling) required and on whether a particular section of road must accommodate equipment turning radii and/or equipment passing/turn-out locations.

Table 3-1
Off-ROW Access Roads*

Town / Volume 3 Map No.	Line List No.	Off-ROW Access Road Nos. (Nearest Transmission Line Structure)
Lebanon		
1	3001	4
Columbia		
4, 5	30046, 30047	23
5	30047	23; 6538A
Coventry		
5	30056, 30057, 30058	26
Mansfield		
10	30109	54-55, 55
11	30111.01, 30111.02, 30114	57
15	30163, 30165	82, 83
Chaplin		
20	30209 (Park Drive)	106
21	30213	109-110
21	30219, 30219.01, 30220	113-114
23	30226	120
Hampton		
24	30243	126, 128
Brooklyn		
33	30285, 30287	171-172
38, 39	30335, 30337	201, 201-202, 202-203
39, 39A	30337, 30339	204
40	30340	208, 209
43, 44	30368	219-221, 221, 222, 223, 224
Pomfret		
47	30380	238
Killingly		
47, 47A, 48	30389, 30390	240, 241
53	30420, 30420.01	264
Putnam		
51	30413.01	257
56, 57	31024	283, 284-285
62	31086	312
63	31094, 31097.01	318

*CL&P will use off-ROW access roads only after receipt of landowner approval. Any off-ROW access road use will be in accordance with relevant Project regulatory requirements, including the Council-approved D&M Plan.

CL&P's existing access roads for maintaining the lines that presently occupy the ROWs will have to be upgraded and widened for the new transmission line construction. Access road improvements typically will include removing adjacent vegetation and widening roads as needed to provide a minimal travel width (additional width will be necessary as discussed above).

Access roads in upland areas will likely be improved by installing clean processed rock and/or gravel. In some locations, particularly on steep slopes and at intersections with public roads, asphalt millings will be used to improve road stability and vehicle traction. CL&P also will require the construction contractor to use BMPs (refer to Attachment B, Volume 2) as warranted by site-specific conditions to maintain access road stability and minimize the potential for erosion and sedimentation.

Where access roads traverse streams or wetlands, special construction procedures involving the use of culverts, timber mats, or equivalent will be used. Existing culverted crossings may also be improved. (Refer to the *Wetlands and Waterbodies Avoidance and Minimization Protocols* in Appendix B). Within and near wetlands and watercourses, erosion and sedimentation controls will be installed as necessary before the commencement of any improvements to or development of access roads.

Some access roads will be needed only during construction and thus will be used temporarily, whereas other access roads will be left permanently for maintenance access to the new transmission lines. Typically, no new permanent access roads will be located across active farmlands, within 100-year floodplains or floodways, on residential properties, within state-designated threatened and endangered species habitat, or sensitive cultural resource areas. Most access roads across water resources will be temporary, with permanent access roads in wetlands and across streams only in accordance with CT DEEP and USACE approvals. In other areas along the ROWs, permanent access roads may be maintained to reach new structure sites or to allow for ROW management activities.[4]

At points of intersection with public roads, CL&P will install signs as needed along the on- or off-ROW access roads specifying that the roads are for construction purposes and are restricted from public use. In addition, where on- or off-ROW access roads intersect with public roads, rock aprons or equivalent will be installed to minimize tracking of dirt from the ROW onto the public road as a result of construction vehicle movements. Public roads in the vicinity of access roads may also be periodically swept to remove dirt that is tracked from construction activities.

After the completion of Project construction, the ROW will be monitored, pursuant to CL&P's General Stormwater Permit from CT DEEP (refer to Volume 2, Attachment F), until restoration is deemed to be successful, which typically is defined as suitable revegetation or otherwise stabilization of areas affected by construction. Access road conditions will also be monitored during this Project ROW inspection effort. Project personnel will identify areas of concern on access roads on steep slopes or on slopes leading to water resources, and these areas will be noted in patrol tools that will be

[4] After the new transmission lines are installed, access roads will be left in place in uplands only if CL&P obtains landowner approval to do so. Based on landowner input, some access roads will be reduced to a width that is sufficient for future line maintenance needs. The Volume 3 maps identify potential permanent and temporary access roads.

used by CL&P maintenance personnel, who perform inspections each year to assess and identify any line maintenance or ROW vegetation management needs. They will note erosion conditions that have developed in these locations, and the locations will then be scheduled for remedial maintenance work.

3.5.2 Work Pads

Work pads will be required at each transmission line structure site, as well as at conductor and optical groundwire (OPGW) pulling sites and at locations where temporary guard structures will be erected during conductor installation. These work pad locations are depicted on the Volume 3 maps.

At each transmission line structure site, a work pad will be required to stage structure components for final on-site assembly and to provide a safe, level base for the construction equipment used to install foundations and erect the structure. The size and dimensions of the work pad at each structure location will vary based on site-specific conditions; however, a typical working surface for a pad will average about 100 feet by 120 feet.

A typical (upland) installation of a work pad at a structure location involves several steps, beginning with the removal of vegetation where necessary. The work pad site then will be graded to create a level work area and, if necessary, the upper 3 to 6 inches of topsoil (which is typically unsuitable to support the necessary construction activities) will be removed. The topsoil will be temporarily stockpiled within the ROW. A filter fabric layer then may be installed over the excavated area. A rock base, which allows drainage, will be layered on top of the filter fabric (if used). Additional layers of rock with dirt/rock fines will typically be placed directly over this rock base. Finally, a roller typically will be used to flatten and compact the pad. These work pads sometimes can be modified and contoured to the surrounding area to minimize impacts.

Pulling work pads, which will be required in certain locations along the ROW for conductor and OPGW installation, typically will be 100 feet by 200 feet, but can be as large as 100 feet by 300 feet. Pulling work pads will be constructed using similar techniques to those described for the work pads at structure locations. Typically, temporary guard structures will also require work pads of approximately 50 feet by 80 feet, with an associated 20-foot-wide access road.

In areas where work pads must be located in wetlands, timber mats may be used to construct the pads. Alternatively, a base layer of large rock may be used to allow water to flow underneath the pad. Smaller rock will be layered on top of larger rock, followed by the final layer of gravel intermixed with soil.

Upon completion of construction, work pads will typically be removed. All work pads located in wetlands will be removed. The rock base and fabric materials will be excavated and removed for off-site disposal. Timber mats, where used for crane support in wetlands, will similarly be removed. The topsoil layer will be re-spread over the work pad site and the area will be returned to pre-construction grade, to the extent practical and consistent with CL&P's ROW maintenance program.

3.6 STRUCTURE INSTALLATION

3.6.1 Foundation Types and Excavation

The new 345-kV transmission line structures either will be direct embedded or will require drilled shaft or alternate foundations. H-Frame and guyed structures will typically be direct embedded (i.e., no concrete foundations). All others will typically have a drilled-shaft foundation. The Volume 3 maps identify the foundation type for each new transmission line structure.

Mechanical excavators (drill rigs) and pneumatic hammers will be used to excavate areas for all line structure foundations. Fencing or other barricades will be placed around or over open foundation excavations during non-working hours.

Based on the results of borings taken at the new transmission line structure locations, blasting is not expected to be required for the new line construction. If blasting is required, a controlled drilling and blasting plan will be developed by a certified blasting contractor in compliance with state and local regulations. Section 5.19 includes the basic elements of such a plan. Residents would be contacted in advance of the blasting, and pre-blast surveys would be performed as appropriate. In the unlikely event that there is damage to a property as a result of blasting, CL&P will compensate the property owner for the actual damage.

Excavated material will either be reused on-site or disposed of off-site in accordance with the specifications of the *Guidance for Soils and Groundwater Management* (refer to Volume 2, Attachment C).

If groundwater is encountered in excavations, the water will be pumped from the excavated area and discharged in accordance with applicable requirements, including the procedures in Volume 2, Attachment C. The water may be discharged on-site into an appropriate sediment control basin, pumped into a temporary fractionization (frac) tank and then discharged into the municipal stormwater system, or pumped into a tanker truck for disposal at appropriate wastewater treatment facilities. Residual silt/sediment collected at the bottom of the frac tanks will be disposed off-site at an appropriately designated disposal facility. Where the ROW intersects public roads containing stormwater systems, catch-basin inlet protection will be installed as needed to block sedimentation or construction debris from entering storm sewers.

3.6.2 Structure Placement

Structures (galvanized steel poles and arms) will be delivered to installation locations in sections, then assembled and installed with a crane. Insulators (typically gray in color) connecting hardware and conductor pulling blocks will be installed on most structures at this time. Direct-embedded poles that are not self-supported (typically heavy angle or deadend) will be guyed and anchored to the ground.

3.6.3 Structure Grounding

In addition to the natural grounding of the transmission line structures that is provided by their foundation contacts with earth, a ground ring and ground rods will be buried around each foundation (refer to Volume 3, Detail Sheet 12). The ground ring will be installed after the completion of the foundation and the installation of the structure, but before shield wires are installed. The need for and location of counterpoise or additional ground rods (forms of supplemental grounding for transmission line structures) will be determined based on soil resistivity and/or footing resistance testing, which will be performed as part of the construction process.

Where required, counterpoise wires will extend longitudinally from the ground rings around the transmission line structures. Small equipment (e.g., a small excavator or backhoe) will typically be used to bury the counterpoise wires; the small equipment will excavate a narrow (approximately 12 inches wide) trench, into which the counterpoise wire will be fed. Ground rods, which may be used in conjunction with counterpoise, will typically be buried between or near the ground rings.

3.7 CONDUCTOR STRINGING

The installation of the overhead line conductors and shield wires will require the use of pulling and tensioning equipment, and reels of conductor, which will be positioned at pre-determined locations (temporary pulling work pads) along the ROWs at intervals of 1 to 3 miles. Helicopters also may be used to install pulling ropes at the commencement of the conductor/shield-wire pulling process. Temporary pulling work pad sites are illustrated on the Volume 3 maps.

The wires will be pulled under tension to avoid contacting the ground and other objects. The remaining insulators and hardware will then be installed at angle and deadend structures. Finally, in accordance with industry standards and design specifications, the conductors and shield wires will be pulled to their design tensions and attached to the hardware. Linemen in bucket trucks will perform this operation.

3.8 ROW CLEANUP AND RESTORATION

ROW cleanup and restoration activities will include the removal of construction debris, signs, flagging, fencing, temporary access roads, and work pads. Areas affected by construction will be re-graded as practical and stabilized using revegetation or other measures.

Materials used in temporary access road and work-pad construction, as well as other construction debris, will be removed from the ROW. Such materials will either be properly disposed of or otherwise re-purposed.

Areas affected by construction generally will be re-graded (back-bladed) to approximate preconstruction contours, unless otherwise noted in a landowner agreement. Some areas (e.g., slopes,

bluffs) affected by construction activities cannot be fully restored to original contours. Such areas will be stabilized as warranted by site-specific conditions.

To restore areas affected by construction in actively used farmlands, the soil may be de-compacted by disking or using equivalent methods (refer to the farmland protection measures in Appendix C and in Volume 3). In wetlands and at watercourses, temporary crossings will be removed and the affected areas re-graded to match the contours of areas outside of the construction work zone, to the extent applicable.

After final grading, upland areas affected by construction will be seeded with appropriate seed mixes and fertilized as appropriate. Seed mix(es) will be selected by CL&P to provide a quick vegetative cover until vegetation recolonizes the ROW naturally (refer to Section 5 of NU's *BMP Manual* [Volume 2, Attachment E]). In most locations, native vegetative communities are expected to re-establish dominance along the ROWs. Supplemental erosion and sedimentation controls (e.g., erosion control blankets, mulch) will be used as appropriate based on site-specific conditions and the time-of-year in which final grading is performed. In some areas, permanent erosion and sedimentation controls, such as water diversion bars or crushed stone, will be installed as appropriate.

Wetland areas affected by construction will be stabilized with annual rye grass, a wetland seed mix, or an equivalent mix (40 pounds/acre, unless standing water is present), which will serve to provide a temporary vegetative cover until wetland species become reestablished. No fertilizer, lime, or mulch will be applied in wetlands unless specified by the USACE or CT DEEP regulatory approvals for the Project. For wetlands located in active farmlands, re-seeding will be performed in accordance with USACE / CT DEEP permit requirements and / or landowner agreements.

Temporary erosion and sedimentation controls will be left in place and maintained until final stabilization is achieved. Steep areas may be stabilized with jute netting, pre-made erosion and sedimentation control fabric containing seed, mulch, and fertilizer, or the equivalent.

Stone walls affected by construction will typically be rebuilt by CL&P's construction contractor, as required by agency permits and/or landowner agreements. Signs and flagging denoting wetlands, streams, and other environmentally or culturally sensitive resource avoidance or protection areas will remain in place as needed, typically until the completion of ROW restoration activities. CL&P will determine when the signs and / or flagging can be removed.

Restoration typically will be deemed successful, based on the effectiveness of stabilization measures (such as percent vegetative cover) as defined in accordance with Project-specific permit and certificate requirements. Based on the results of post-construction inspections of ROW stabilization, CL&P will determine the appropriate time frame for removing temporary erosion controls.

Vegetative species compatible with the use of the ROWs for transmission line purposes are expected to regenerate naturally over time. CL&P will promote the re-growth of desirable species by implementing vegetation management practices to control tall-growing trees, and where practicable, undesirable invasive species, thereby enabling native plants to dominate the ROWs. Vegetation

management practices along the ROWs also will conform to Project-specific conditions regarding habitat restoration and enhancement as may be included in approvals from the Council, CT DEEP, and USACE.

Permanent Access Roads

The locations of proposed permanent access roads (including existing access roads) that will be used to maintain the transmission lines are identified on the Volume 3 maps. New permanent access roads across streams and wetlands will be installed pursuant to the conditions of Project approvals from the CT DEEP and the USACE.

3.9 MODIFICATIONS TO ADJACENT LINES

In addition to the installation of the new 345-kV transmission lines, the Project will include:

- Guy-wire and anchor relocations and additions of ground wires on some of the existing transmission line structures that occupy the ROWs;
- The addition of one new pole on the existing 69-kV transmission line in the Town of Columbia; and
- The relocation of several poles of an existing distribution line in the Town of Putnam to maintain clearance from the new 345-kV line conductors.

The construction activities required for these minor modifications are discussed below.

3.9.1 Guy-Wire and Anchor Relocations: Existing 345-kV and 115-kV Lines

To construct the new 345-kV transmission lines along the Project ROWs, the guy wires on 31 existing 345-kV transmission line structures and two 115-kV transmission line structures will have to be permanently relocated. The guy wire relocations are required to avoid conflicts with Project construction equipment and to facilitate access to the transmission lines for maintenance. The Volume 3 maps identify these 33 structure locations, which are summarized, by town, as follows:

- Columbia: Structures 9011, 9014*, 9019*
- Coventry: Structures 9027* and 9033
- Mansfield: Structures 9041*, 9061*, 9068, 9077, and 9088
- Chaplin: Structures 9099* and 9103*
- Hampton: Structures 9123, 9126, and 9157
- Brooklyn: Structures 9163*, 9173, 9182, 9195, 9207, 9209*, and 9213*
- Pomfret: Structure 9237
- Killingly: Structures 9240, 7337, 7341, 9253*, 9255, and 9259
- Putnam: Structures 9287*, 9301*
- Thompson: Structures 9319 and 9330

*Indicates work in wetland potentially required.

At 11 of these 33 structures, work in wetlands will be required, either to remove the existing guy wire anchors or to install permanent guy wire anchors and wires at relocated sites. The guy relocation work will be performed during line outages, and will be conducted after access roads for Project construction are installed.

To relocate existing guy wires, the wires first must be removed from their existing anchor points. A small hole will be excavated to expose the below-ground anchor and the guy wire will be cut off. Old wires may be removed entirely or reused, depending on factors such as the location of the new permanent anchor and on the amount of wire needed. The existing anchors (plate or screw type) will be left in place. Where existing guy anchors are located in wetlands, construction equipment will require access in the wetland to remove the guy wires.

Permanent guy anchors will consist of screw-type anchors, grouted rock anchors, or plate anchors. Relocated guy anchors will not be placed in wetlands, except where required to maintain the proper tension for structure stability. In such locations, measures will be taken to minimize wetland impacts, including limiting the amount of concrete backfill on anchors placed in wetlands. After the guy anchor is installed, wetland soils will be replaced over the top of the anchor.

The exact procedures for guy anchor relocation will vary, depending on site-specific conditions at the time of construction.

3.9.2 Ground-Wire Additions: Existing 345-kV Line Structures

CL&P will install additional ground wires on one pole of 20 existing wood-pole structures in the existing 345-kV lines. All of these existing structures are configured as three-pole structures at angle locations where the lines turn to the right (as viewed to the east). The existing structures on which these ground wires will be installed are shown on the Volume 3 maps and listed as follows:

- Columbia: Structures 9011, 9014, and 9019
- Mansfield: Structures 9061, 9068
- Chaplin: Structures 9099, 9103
- Hampton: Structures 9123, 9126, and 9157
- Brooklyn: Structures 9163, 9173, 9195, 9209, and 9213
- Pomfret: Structure 9237
- Killingly: Structures 9253, 9259
- Putnam: Structure 9301
- Thompson: Structures 9330

CL&P will place three ground wires on the existing inside pole from the top of the pole down to a location approximately 20 feet below the existing conductor elevation. No work pads will be required at the existing structure sites for this construction activity.

3.9.3 New Transmission Line Structure: 69-kV Line

Along the ROW in the Town of Columbia between Willimantic Road and the Hop River (refer to Volume 3, Mapsheet 5), CL&P will install one new steel-pole (double-circuit) structure in its existing 69-kV (800/900) Line, which is aligned adjacent to and west of the new 345-kV line. The new structure (No. 6538A) will split the approximately 900-foot span between existing structures 6538 and 6539 into two spans, thereby preventing the nearest 69-kV conductor from swinging into the new 345-kV line under high wind conditions.

The new 69-kV line structure will be installed using the same construction procedures as described for the 345-kV line. The location of the new 69-kV line structure, as well as the work pad and access road that will be required for the construction of the new structure, are illustrated on Map 5 in Volume 3.

Short-term outages of each 69-kV circuit will be required to safely install the new 69-kV line structure.

3.9.4 Distribution Line Pole Relocations

In the vicinity of Heritage Road in the Town of Putnam (refer to Volume 3, Map 57), several existing distribution line poles located within the ROW will be removed and relocated to achieve required conductor clearances from the new 345-kV transmission lines. All construction activities, including work pads and access roads, relating to the pole relocation work will be within the existing ROW. Temporary outages on the distribution line will be required for this work.

All pole removal work, including the removal of pole butts, temporary storage of poles, and disposition of poles (if not relocated) will be in accordance with the latest version of NU's *Environmental Rule ERTG-03 BMPs for Treated Wood Storage and Disposal* (refer to Volume 2, Attachment H).

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4. CONSTRUCTION SCHEDULE, OUTAGES, AND WORK HOURS

4.1 CONSTRUCTION SCHEDULE, INCLUDING OUTAGES

The new 345-kV transmission lines and related minor modifications to adjacent lines are scheduled for construction between the first quarter of 2014 and the end of 2015. Some Project mobilization activities may occur in late 2013, and some ROW restoration activities will likely extend into 2016. Line outages will be required for portions of the line construction.

As currently planned, the general schedule for the construction of the new transmission line and related line modifications is as follows[5]:

General Construction Dates*	Transmission Line and Related Line Modification Construction Activity
Quarter 4, 2013	Construction contract award; establish material laydown yards and field offices, begin receiving materials. (Note: No on-ROW work is expected to be performed in 2013.)
Quarters 1 - 2, 2014	Contractor mobilization and construction work on ROW and off-ROW access roads, as applicable.
Quarter 1, 2014 – Quarter 4, 2015	Perform construction (vegetation removal, access road/work pad installation, structure foundations, structure installation, wire stringing, ROW clean-up and restoration**, etc.), as summarized in Section 3. The new 345-kV transmission line also will be connected to the Card Street Substation and Lake Road Switching Station, and interconnected to the National Grid system.
Quarter 4, 2015	Line testing, energization, ROW cleanup and restoration. Final ROW revegetation and verification of final stabilization pursuant to regulatory requirements will likely extend into 2016)

* Construction schedule is dependent on the receipt of D&M Plan approval from the Council and the issuance of the USACE Section 404 permit. Schedule may change in accordance withl receipt of these approvals.

**Where feasible, restoration may begin on some portions of the ROW when line installation work is completed.

[5] This construction schedule is subject to change, depending on the receipt of the USACE permit and on outage schedules.

During Project construction, outages will be required on some of CL&P's existing transmission and distribution lines that occupy the Project ROWs, including existing 69-kV, 115-kV and 345-kV transmission lines, as well as on distribution lines along which certain poles will be relocated. The outages, which must be coordinated with and approved by the Connecticut Valley Electric Exchange (CONVEX), will be required for certain construction activities, including cutovers into the Card Street Substation, Lake Road Switching Station, and Killingly Substation. These outages are expected to occur between the first quarter of 2014 and the last quarter of 2015.

After CL&P retains a construction contractor(s) for the Project and identifies and schedules the outages, a more specific construction schedule will be developed. The CONVEX- and CL&P-approved timing of these transmission and distribution line outages, and associated outages for the substation and switching station work, will dictate parts of the planned construction schedule.

4.2 WORK HOURS

Construction work hours will typically consist of a 10-hour period between 7:00 AM and 7:00 PM, six days per week (Monday through Saturday). During these hours, construction will generate noise, which will vary depending on the type of activity performed. Construction workers may arrive for work and leave work outside of these times.

Typical Construction Work Window: Monday-Saturday 7:00 AM-7:00 PM

However, certain activities, such as those that must be performed during CONVEX-approved outages, will involve work during non-typical hours, in some cases on a continuous (24-hour) basis and/or on Sundays. The performance of these activities during non-typical work hours can be critical for completing the required tasks within the allowed outage durations and returning equipment to service as expeditiously as possible, thus avoiding the need to dispatch higher cost generation "out of merit" (which would result in higher costs to customers).

5. SPECIAL CONSTRUCTION PROTOCOLS AND PROCEDURES

This section provides resource-specific protocols and procedures applicable to the 345-kV transmission line construction. Appendices to this volume present related plans for the protection of environmental resources during construction, such as during vegetation removal (*Vegetation Clearing Plan*, Appendix A, including NU's standards for vegetation clearing), and during work in or near water resources (*Wetlands and Waterbodies Avoidance and Minimization Protocols*, Appendix B; Wetland Invasive Species Control Plan, Appendix D, Vernal Pool Impact Minimization Plan, Appendix E). Appendices also provide information addressing specific Council requirements, including a summary report on CL&P's consultations with property owners and lessees of active farmlands and farmland protection measures (Appendix C) and a *Post-Construction Electric and Magnetic Field Monitoring Plan* (Appendix F).

Volume 2, Attachment E, includes standard BMPs that will apply to Project construction, as well as plans and guidance applicable to Project-wide construction activities (e.g., *Spill Prevention and Countermeasures Plan*, Attachment B; *Guidance for Soils and Groundwater Management* Attachment C; *Snow Removal and De-Icing Plan*, Attachment D).

5.1 EROSION AND SEDIMENTATION CONTROL PLAN

CL&P will install erosion and sedimentation control measures during transmission line construction to avoid or minimize the potential for surface water runoff, erosion, and sedimentation to occur outside of work limits. These measures will comply with the *2002 Connecticut Guidelines for Erosion and Sediment Control*, as well as with NU's BMPs (refer to Volume 2, Attachment E) and CT DEEP and USACE permit conditions. NU's BMPs incorporate and are consistent with the *2002 Connecticut Guidelines for Erosion and Sediment Control* (refer to Volume 2, Attachment E, p. 1-4 for a list of the guidance documents used in preparing NU's BMPs).

Volume 3 includes typical drawings regarding erosion and sedimentation control measures (refer to Detail Sheets 6 and 7). The Volume 3 maps also show areas of highly-erodible soils. These erosion-prone areas were identified based on slope and soils susceptible to terrace-escarpment-type erosion, as identified by the CT DEEP. Further, the Volume 3 maps identify work pad sites where CL&P must prepare grading plans pursuant to Condition 6 of the CT DEEP's 401 Water Quality Certification and SCEL permit for the Project and, additionally, where CL&P must provide, pursuant to Condition 6 of the CT DEEP permit, a plan to minimize ROW access road erosion at two locations in the Town of Thompson (refer to Volume 2, Attachment G).

Pursuant to Section 22a-430b of the Connecticut General Statutes, construction activities, such as the Project, that will result in the disturbance of 1 or more total acres of land area must comply with the CT DEEP's *General Permit for the Discharge of Stormwater and Dewatering Wastewaters*

Associated with Construction Activities ([General Permit]; refer to Volume 2, Attachment F). Pursuant to the requirements of this General Permit, prior to the start of construction, CL&P will submit to CT DEEP a Registration Form and will prepare a Project-specific *Stormwater Pollution Control Plan*.

5.2 WATER RESOURCES

5.2.1 Surface Water Resource Crossing Summary

As shown on the Volume 3 maps and summarized below, various water resources (wetlands, watercourses, lakes, and ponds) are located along the Project ROWs or along or near proposed off-ROW access roads. Potential water resource impacts as a result of Project construction, including off-ROW access roads, are tabulated in Volume 3, Detail Sheets 1 and 2.

Specifically, the new 345-kV transmission lines will:

- Extend across 104 watercourses, including 54 perennial waterbodies and 50 intermittent watercourses. The primary waterbody crossings are the Tenmile River, Hop River, Willimantic River, Mansfield Hollow Lake, Quinebaug River, and Fivemile River.

  - ✓ No new transmission line structures will be located in any watercourses or waterbodies.

  - ✓ No construction access will be required across larger rivers, streams, or Mansfield Hollow Lake.

  - ✓ Temporary construction access, involving the installation of temporary culverts or timber mats (or equivalent bridges), will be required along access roads across smaller streams or wetlands. Work pads required for new transmission line structure installation will be placed over small streams at certain structure sites (refer to Table 5-1).

  - ✓ Permanent culverts will be installed at six stream crossings and one wetland crossing (refer to Table 5-2).

  - ✓ Existing culverts will be used or replaced at various stream crossings (refer to the Volume 3 maps).

Table 5-1
List of Watercourse and Wetland Crossings Where Temporary Culverts or Mats Will Be Installed

Town / Volume 3 Map No.	Wetland/Watercourse* Designation	Crossing Type	
		Access Road	Work Pad
Lebanon			
1	W20-1, W20-3	X	
Columbia			
3	W20-13	X	Structure 15
4	W20-23	X	
Mansfield			
8	S20-6	X	
8	S20-7	X	
9	S20-9 (Conantville Brook)	X	Structure 49
10	S20-11	X	
10	S20-12	X	
12	S20-16 (W20-55)		Structure 63
12	S20-17B (W20-58)	X	
17	S20-20 (W20-67 / W20-68)	X	
Chaplin			
18	S20-21 (W20-69)	X	
18	W20-70	X	
19	W20-75, W20-76	X	
19	S20-24 (W20-76/77)		Structure 100
19	S20-25 (W20-80)	X	
19/20	S20-26 (W20-81)	X	
20	S20-27 (W20-81)		Structure 104
23	S20-30 (W20-91)	X	
Hampton			
24	S20-32 (Merrick Brook) (W20-94)	X	
26	S20-34(W20-100)		Structure 135
26	S20-34 (W20-100)		Structure 136
27	S20-37		Structure 141
27	S20-38		Structure 143
28	S20-40A (W20-115)	X	
29	S20-41B (W20-117)	X	
Brooklyn			
31	S20-41D	X	Structure 164
31	S20-41E	X	
35	S20-42A (W20-138)		Structure 183
37	S20-45 (Tanner Brook) (W20-145)	X	
39	S20-47	X	
39	S20-48 (White Brook) (W20-153)	X	
39	S20-49 (White Brook) (W20-153)	X	
39	S20-153	X	
40	S20-49	X	
40	S20-49A	X	
40	S20-49B	X	Structure 208
41	S20-51 (White Brook) (W20-157)	X	
41	S20-52 (Creamery Brook)	X	
Pomfret			
44	S20-54A	X	
44	S20-54	X	
49	S20-57 (W20-170A)		Structure 251
Killingly			

Town / Volume 3 Map No.	Wetland/Watercourse* Designation	Crossing Type	
		Access Road	Work Pad
50	S20-57A (W20-171)	X	
Putnam			
58	S20-60D (W20-187)		Structure 291
59	W20-191	X	
60	S20-61A (Lippitts Brook) (W20-193)	X	
60	W20-194	X	
61	S20-62		Structure 311
62	S20-63 (Munson Brook) (W20-198)	X	
62	W20-199	X	
Thompson			
64, 65	S20-66 (Teft Brook) (W20-207)	X	
66	S20-68 (W20-211)	X	

Table 5-2
Proposed New Permanent Culverts along Access Roads

Stream Name* / Number (Town)	Volume 3 Map Number	Associated Wetland	Vernal Pool To Be Permanently Impacted	Stream Type	Fisheries Classification	Within FEMA Flood Zone	Watershed Size Above Culvert (acres)	Access Road Type
S20-8 (Mansfield)	9	W20-43	-	P	AA/ warm-water	No	13.4	Existing
S20-28 (Chaplin)	22	W20-88	-	I	AA	No	48.2	Existing
S20-29 Buttonball Brook (Chaplin)	22	W20-89	CH-14 (access road)	P	AA/ cold-water	No	28.3	Existing
S20-35 (Hampton)	26	W20-101	HA-5	I	A	No	23.1	Existing
S20-36 (Hampton)	27	W20-103	-	I	A	No	30.2	New Permanent
W20-203 (Hampton)	27	-	-	-	-	No	-	New Permanent
S20-41A Humes Brook (Hampton)	29	W20-118	-	I	A	No	69.8	New Permanent

* Named streams are listed by name and Project number. Un-named streams are identified by Project number.

- Require the following work within wetlands:[6]

  - ✓ Forested vegetation will be removed within the new 345-kV conductor clearance zones and as otherwise required for construction (refer to the limits of vegetation clearing for construction illustrated on the Volume 3 maps). Danger and hazard trees also will be removed as necessary. Access routes will be required for clearing crews across and within wetlands; such routes will not necessarily be the same as temporary or permanent access roads used for other aspects of construction. Approximately 48 acres of forested wetlands will be permanently converted to scrub-shrub wetland habitat.

  - ✓ Temporary access roads and work pads will be located in wetlands where no upland alternatives are available. Approximately 37 acres of wetlands will be temporarily affected by such construction activities.

  - ✓ Permanent access roads and new transmission line structures will be placed in wetlands where no upland sites are available. Approximately 1 acre of wetland will be filled as a result of the installation of permanent access roads (0.9 acre) and new structures (<0.1 acre).

5.2.2 Water Resource Crossing Techniques

All crossings of water resources and other construction activities in wetlands and watercourses will be performed in accordance with the Council's requirements, the conditions of USACE and CT DEEP regulatory approvals, and NU's BMPs (refer to Volume 2, Attachments A, E, F, and G).

In addition, to avoid or minimize the potential for impacts during Project construction activities involving water resource crossings or work in areas near water resources, CL&P will require construction contractors to follow the Project's *Wetlands and Waterbodies Avoidance and Minimization Protocols.* These Protocols, which are included in Appendix B, also provide water resource restoration measures.

The Volume 3 maps identify the locations of watercourse crossings and indicate where culverts (temporary, permanent, or replacement) or mat spans will be installed.

The construction techniques to be used at each water crossing will depend on site conditions at the time of construction and will be determined by CL&P or its construction management representative. Any crossings or culverts will be placed or sized to maintain water flows and avoid flooding. Appropriate erosion control measures will be employed to avoid and/or minimize impacts at watercourse crossings. All temporary crossing materials will be removed following the completion of construction.

[6] Of the wetlands within the Project ROWs, 222 meet both federal and state wetland jurisdictional criteria; whereas five meet the criteria (based on soils) only as state wetlands. The state-only wetlands are W20-5, W20-162, W20-164, W20-172, and W20-178. Not all of these wetlands will be directly affected by construction activities (refer to the Volume 3 maps).

5.2.2.1 Watercourse Crossing Methods

The new transmission lines will span all of the watercourses along the Project ROWs. However, access roads and work pads will have to traverse watercourses in some locations. The following methods will be used when watercourse crossings are necessary.

Access Roads. Where streams must be crossed, temporary culverts or bridges consisting of timber mats or equivalent will be used. Temporary metal bridges will typically be installed where culverts or timber mat spans cannot be effectively used.

At certain stream crossings, existing culverts along existing on-ROW access roads will be either replaced with new culverts (temporary or permanent) or left in place and reinforced with additional cover material or timber mats. If a longer culvert is needed to replace an existing culvert during construction to temporarily provide a wider travel area for large construction equipment/vehicles, it will be installed for construction and then cut back to its pre-construction length.

Work Pads. At some new transmission line structure locations, construction work pads will extend over small, un-named watercourses. At these locations, the work pads cannot be moved to avoid the watercourses due to factors such as the location and type of structure (e.g., angle) or terrain.

CL&P will use work-pad construction techniques that minimize disturbance to the streams. Options for these techniques, which will be determined on a site-specific basis by CL&P or CL&P's construction management representative, will include:

- Span the streams with timber mats used to create the construction work pads.
- Install temporary culverts to carry stream flows beneath the work pads, which will then be constructed over the culverts.

5.2.2.2 Wetland Crossing Methods

"Access routes" across wetlands for vegetation clearing equipment only. Temporary access routes will be created and used only by the vegetation clearing crews and will be removed as clearing activities advance along the ROWs. Clearing crews must be able to access areas where vegetation removal is required for construction activities and within the clearance zones of the new 345-kV line conductors, as well as to reach on- or off-ROW danger or hazard trees. (Refer to the *Vegetation Clearing Plan* in Appendix A).

The location and type of access routes within each wetland will be determined at the time of construction (based on site-specific conditions) by CL&P or CL&P's construction management representative / forester, in consultation with the Project clearing contractor. However, timber mats or corduroy roads (logs) are typical options. Vegetation clearing also may be performed when the ground is frozen, when less temporary equipment support is typically needed for work in wetlands.

Improvements to existing access roads. Existing access roads along the ROWs are nominally about 12 feet wide, which is not wide enough to accommodate the large equipment needed to install the new 345-kV transmission lines. Thus, existing access roads will be improved to create a typical travel surface approximately 16 to 20 feet wide; including road shoulders, a typical construction access road will be 20 to 25 feet wide. Additional width will be needed in certain areas to accommodate equipment turning radii, pull over (passing) lanes, and/or to negotiate steep or otherwise difficult topography.

New construction access roads through wetlands. New temporary construction access roads across wetlands will be established using timber mats, gravel overlying geotextile fabric, or equivalent. New permanent access across wetlands will be established using gravel. Such new access roads will also require 16- to 20-foot-wide or more travel widths and will involve a total width of approximately 20 to 25 feet (wider in certain areas to allow for equipment turning radius or passing lanes).

In larger wetlands that have a deep organic layer or are prone to extended inundation, the lower portion of the crushed stone access roads may remain in place, if approved by the CT DEEP and USACE, to provide a permanent access road base for future use during line maintenance and ROW management. In such cases, the fill used to construct the access roads would be removed to the approximate pre-construction elevation. The underlying material would provide a firm base for equipment access or for the future placement of temporary timber mats to allow equipment used in line maintenance or ROW management activities to cross these larger wetland systems.

All other timber mat or gravel access roads in wetlands will be removed in their entirety after construction. Permanent access across wetlands will only be as specified in the CT DEEP and USACE Project-specific regulatory approvals.

Transmission Line Structures in Wetlands. In general, where a new structure must be located in a wetland, timber mats will be used to create a temporary work pad for construction support. In some wetland areas, however, field conditions (such as thickness of organic soils, depth of water, or sloping terrain, etc.) may require the use of a temporary crushed stone pad to provide a safe working surface.

5.2.3 Flood Zones and Stream Channel Encroachment Lines

The new 345-kV transmission lines will span the state-designated Stream Channel Encroachment Lines (SCEL) associated with the Willimantic River, as well as flood zones, as designated by the Federal Emergency Management Agency (FEMA), along this river and various other watercourses in each of the 11 towns along the Project ROWs. The new transmission lines also will span FEMA-designated floodways associated with five watercourses. The Volume 3 maps illustrate the boundaries of the Willimantic River SCEL, as well as FEMA-designated floodways, 100-year floodplains, and 500-year floodplains.

The CT DEEP will eliminate the SCEL program effective October 1, 2013 (refer to the footnote in Section 2.1). Construction activities in flood zones, including the Willimantic River SCEL (which corresponds to FEMA flood zone boundaries, will conform to the requirements of CT DEEP's 401

Water Quality Certification and SCEL permit for the Project (refer to Volume 2, Attachment G; see particularly Special Condition 7 and General Condition 6(d) and 6 (g)).

Pursuant to CL&P's agreement with CT DEEP, prior to the commencement of construction activities, CL&P will contact the floodplain coordinator in each of the 11 Project towns. CL&P will provide each town's floodplain coordinator with information regarding the types of construction activities that will occur within 100-year floodplains in the municipality.

No new transmission line structures or new permanent access roads will be located within the Willimantic River SCEL or within any floodways. However, 36 new transmission line structures will be placed within 100-year floodplains associated with 14 waterbodies.

Temporary construction work pads and access roads will be located within certain 100- and 500-year floodplains (refer to the Volume 3 maps). Such temporary facilities will be constructed using timber mats or aggregate materials (rock). Within 100- and 500-year floodplain areas, timber mats will be anchored to avoid or minimize the potential for flotation in the event of a flood. The specific method used for anchoring the construction mats will be selected by CL&P's construction contractor, after taking into consideration site-specific conditions. Typical options will be to anchor the construction mats with stakes and/or to anchor the mats to each other.

After the completion of transmission line installation, temporary access roads and work pads within 100-year floodplains will be removed. Similarly, any existing access roads within FEMA-designated 100-year floodplains that are improved for use during the construction of the transmission lines will be restored to pre-construction conditions after the completion of Project work activities.

5.2.4 Aquifer Protection

North of State Route 12 (Killingly Avenue) in the Town of Putnam, the ROW extends across the eastern edge of a Level A Aquifer Protection Area (APA) (No. 112), as mapped by the CT DEEP. Approximately 3.3 acres of the ROW are located within the APA (refer to Volume 3, maps 55, 56, and 57).

No new transmission line structures will be placed along the ROW in this area, but three new structures (Nos. 283, 284, and 285) will be located adjacent to the edge of the APA. In addition, new and existing access roads will be required for construction along the ROW in and near the APA (refer to Volume 3, maps 56 and 57).

To avoid or minimize the potential for spills related to construction activities in the APA, construction activities will be performed in accordance with Condition 8 of the CT DEEP 401 Water Quality Certification and SCEL permit (refer to Volume 2, Attachment G, Special Condition 8). Vehicle maintenance, storage, and refueling will be performed a minimum distance of 100 feet from the APA, to the extent practicable. If necessary to complete emergency maintenance, or store and/or refuel less mobile equipment (e.g., drill rigs or cranes) in or within 100 feet of the APA, the construction contractor will be required to use appropriate secondary containment devices. In

addition, each construction vehicle will be required to have a spill kit containing materials with the capacity to absorb up to 5 gallons of liquid for use during emergencies.

Storage of hazardous materials within 100 feet of the APA also will be minimized to the extent practicable. If circumstances do not allow this, the contractor will be required to deploy secondary containment devices.

5.2.5 Drainage

Areas where existing surface drainage patterns could pose concerns during construction were noted during field constructability reviews of the Project ROWs. To avoid or minimize erosion and sedimentation and to maintain hydrology and drainage patterns, CL&P will require its construction contractor to assess such areas and implement BMPs as appropriate to site-specific situations. CL&P also will require its contractor(s) to work in accordance with NU's BMPs and the conditions in the CT DEEP regulatory requirements that pertain to stormwater management and drainage (refer to Volume 2, Attachments E, F, and G).

5.3 VERNAL POOLS AND AMPHIBIAN BREEDING HABITAT

As shown on the Volume 3 maps, 88 vernal pools are located within the Project ROWs. No new transmission line structures will be located in vernal pools, but improvements to four existing on-ROW access roads will affect vernal pools. Vegetation removal also will be required in or near vernal pools.

The measures that CL&P will implement to avoid or minimize impacts to vernal pools are described in the *Project-Wide Avoidance and Minimization Protocol for Vernal Pools* (Appendix E).

In addition, the Project ROWs include 29 amphibian breeding habitats (refer to the Volume 3 maps). CL&P has designed the Project facilities to avoid or minimize work in these habitats where possible. However, some of these habitats encompass large wetland complexes that extend linearly along the ROWs, within which construction activities will be required.

Table 5-3 summarizes the mapped amphibian breeding habitats in which Project construction activities will occur. In such areas, CL&P will implement typical wetland mitigation measures (refer to Appendix B).

Table 5-3: Summary of Project Facilities in Amphibian Breeding Habitats

Town and Volume 3 Map Number	Wetland Number	Amphibian Breeding Habitat (ABH) Number	Existing Conditions (Facilities in ABH)		Project Facilities in ABH		
			Structures or Guy Anchors	Access Roads	Temporary Work Pad	Permanent Structures or Guy Anchors	Access Roads
Chaplin							
17/18	W20-68	MA-1/CH-1-ABH	Yes (9091)		Yes		Yes
19	W20-77	CH-2-ABH	Yes (9099 / 9100)		Yes		
19/20	W20-81	CH-3-ABH		Yes	Yes	Yes	Yes
22	W20-88	CH-5-ABH		Yes			Yes
22	W20-89	CH-6-ABH		Yes			Yes
23	W20-91	CH-7-ABH	Yes (9119)		Yes		Yes
Hampton							
26	W20-100	HA-1-ABH			Yes		
28	W20-112	HA-3-ABH					Yes
28/29	W20-116	HA-4-ABH					Yes
29	W20-117	HA-5-ABH					Yes
Brooklyn							
30/31	W20-120	HA-6/BR-1-ABH			Yes	Yes	
31	W20-122	BR-2-ABH		Yes			Yes
31/32	W20-122	BR-3-ABH		Yes	Yes		Yes
39A/40	W20-153	BR-5-ABH			yes		Yes
Putnam							
59	W20-191	PU-3-ABH			Yes	Yes	Yes
Thompson							
63/64	W20-203	TH-1-ABH		Yes	Yes		Yes

Note: The Volume 3 maps identify the locations of mapped amphibian breeding habitats that are within the Project ROWs, but not directly affected by Project facilities.

5.4 PROTECTION MEASURES FOR STATE-LISTED SPECIES

5.4.1 Overview

As part of the planning for the Project, CL&P consulted with the CT DEEP, Natural Diversity Database (NDDB)[7] to:

- Determine whether any species listed by the state government as threatened, endangered, or species of special concern are known to occur along or in the vicinity of the Project ROWs, as identified by NDDB records;
- Verify the need for field surveys to provide more specific information regarding the species that could potentially occur along portions of the ROWs;
- Present the results of field surveys; and
- Identify measures to protect or otherwise avoid or mitigate impacts to those species found to occur in the Project area.

At the recommendation of the NDDB, during 2008-2011, CL&P commissioned field surveys to determine if certain state-listed species occur along the Project ROWs. Based on the results of these surveys and further consultations with CT DEEP, on December 20, 2012, CL&P prepared a *State-Listed Species Technical Memorandum* (Technical Memorandum) that summarized the state-listed species consultation process and described proposed impact avoidance and minimization measures for state-listed species that could be affected by the Project.

On February 21, 2013, CL&P revised and re-issued a Technical Memorandum, incorporating the results of NDDB's review. The revised Technical Memorandum reflects CL&P's and the NDDB's agreement concerning the measures to be implemented to avoid or minimize impacts during Project construction and subsequent long-term ROW management to protect the identified state-listed species and their habitats. As such, the Technical Memorandum supersedes any mitigation measures that CL&P proposed in its Application to the Council.

This section summarizes the protection, mitigation, and management measures included in the Technical Memorandum.[8] CL&P will implement these measures, as appropriate, during the construction of the Project. The protection, mitigation, and management measures are consistent with the Council's approval of the Project[9] and with Special Condition 3 of the CT DEEP's SCEL Permit and Section 401 Water Quality Certification for the Project (refer to Volume 2, Attachment G).

[7] CL&P also consulted with the U.S. Fish and Wildlife Service regarding federal-listed species. No such species are found in the Project area.

[8] The Technical Memorandum includes confidential mapping regarding state-listed species locations and thus is not provided for public review.

[9] State-listed species impact mitigation and protection measures are discussed in the Council's Opinion (Docket 424), p. 10. In its Application to the Council (Volume 1, pp. 6-49 to 6-51), CL&P anticipated that mitigation and avoidance measures may be required for the wood turtle (*Glyptemys insulpta*), which was identified in NDDB

The general locations of state-listed species habitat to be protected during construction are identified on the Volume 3 maps. CL&P's construction contractor will be required either to avoid such areas or to implement special procedures for minimizing adverse effects to listed species during construction activities. In addition, implementation of measures to avoid or otherwise protect state-listed species will be emphasized in the Project environmental training, which CL&P will require construction personnel to attend prior to performing work on the ROWs.

5.4.2 Eastern Ribbon Snake (*Thamnophis sauritus*)

Species Designation: Species of Special Concern
General Habitat: Wet sedge meadows and the upland edges of ponds and streams
ROW Areas of Habitat Concern:

- Town of Chaplin, east of Chewink Road, between existing Structures 9111 and 9113. (Volume 3, maps 21 and 22)
- Town of Hampton, west of Pudding Hill Road, existing Structure 9133 to Structure 9136. (Volume 3, map 26)
- Town of Killingly, from existing Structure 9246, northeast to Lake Road. (Volume 3, map 49)
- Town of Putnam, from existing Structure 9291 northeast to the northeastern end of wetland W20-191. (Volume 3, maps 58 and 59)

General Protective Measures:

A contractor awareness program will be developed and implemented prior to construction. The main objectives of this program will be to educate the contractors' field personnel regarding:

a. The identification of the Eastern ribbon snake and its habitat. The contractors' field personnel will be shown photographs of Eastern ribbon snakes, and will be provided with information about the species' preferred habitat so that they will know where it would most likely be found.
b. The proper procedures to follow should an Eastern ribbon snake be observed in an active work space.

Site-Specific Impact Avoidance and Minimization Measures:

During the Eastern ribbon snake's active period (April 1 through October 31), all active construction work spaces within or near the portions of the ROW listed above will be investigated daily by a CL&P Environmental Inspector prior to the commencement of construction activities. Any Eastern ribbon snakes found within active construction workspaces shall only be removed by a Project Environmental Inspector, who is designated and qualified to do so. If it is necessary to move a snake from an active work space, it will be moved to a safe location in the general vicinity of the ROW.

records as potentially occurring in the vicinity of the Project ROW near the Quinebaug River in the Town of Pomfret. The Council's Opinion also anticipated that CT DEEP could require CL&P to implement measures to avoid or mitigate potential impacts to the wood turtle. However, CL&P's subsequent consultations with NDDB revealed that no special avoidance or mitigation measures would be required for the wood turtle.

5.4.3 Eastern Hognose Snake (*Heterodon platirhinos*)

Species Designation: Species of Special Concern
General Habitat: Woodlands with sandy soil, fields, and farmland
ROW Areas of Habitat Concern:

- Town of Mansfield, east of Storrs Road, from existing Structure 9072 northeast to existing Structure 9080. (Volume 3, maps 14 and 15)

General Protective Measures:

A contractor awareness program will be developed and implemented prior to construction. The main objectives of this program will be to educate the contractors' field personnel regarding:

a. The identification of the Eastern hognose snake and its habitat. The contractors' field personnel will be shown photographs of Eastern hognose snakes, and will be provided with information about the species' preferred habitat so that they will know where it would most likely be found.

b. The proper procedures to follow should an Eastern hognose snake be observed in an active work space.

Site-Specific Impact Avoidance and Minimization Measures:

During the Eastern hognose snake's active period (April 1 through October 31), all active construction work spaces within or near the portion of the ROW listed above will be investigated daily by a CL&P Environmental Inspector prior to the commencement of construction activities. Any Eastern hognose snakes found within active construction work spaces shall only be removed by a Project Environmental Inspector, who is designated and qualified to do so. If it is necessary to move a snake from an active work space, it will be moved to a safe location in the general vicinity of the ROW.

5.4.4 Aquatic Snail (*Gyraulus circumstriatus*)

Species Designation: Species of Special Concern
General Habitat: Inland bodies of fresh water (generally less than 3 meters deep)
ROW Areas of Habitat Concern:

- Town of Mansfield, from existing Structure 9085 northeast to existing Structure 9086.
  (Volume 3, map 16; Mansfield Hollow Lake: Project construction will not directly affect the lake.)

Site-Specific Impact Avoidance and Minimization Measures:

a. To minimize the potential for sediments resulting from construction activities reaching Mansfield Hollow Lake, CL&P will explain to the contractors that strict adherence to the Project's erosion and sedimentation control requirements (refer to NU's BMPs in Volume 2,

Attachment E) is a standard expectation. During construction activities, BMPs (such as silt fence, staked bales, filter socks, other temporary stabilization), and re-vegetation of disturbed areas will be used. All erosion and sedimentation controls will be removed upon final stabilization of the site.

b. A minimum 25-foot buffer along the shoreline of Mansfield Hollow Lake will be established and maintained. Within this buffer, all tree and shrub species capable of growing to mature heights greater than 30 feet will be removed in order to comply with federally mandated clearance requirements between the overhead transmission line conductors and any vegetation. However, all other vegetation removal from within the buffer will be minimized to the extent practicable.

5.4.5 Moustached Clubtail Dragonfly (*Gomphus adelphus*)

Species Designation: State Threatened
General Habitat: Cold-water rivers with gravelly or rocky bottoms
ROW Areas of Habitat Concern:

- Town of Chaplin, from existing structure 9095 east to existing structure 9096.
  (Volume 3, map 18; Natchaug River: Project construction activities will not directly impact the river.)

Site-Specific Impact Avoidance and Minimization Measures:

a. To minimize the potential for sediments resulting from construction activities reaching the Natchaug River, CL&P will communicate to the contractors that strict adherence to the Project's erosion and sedimentation control requirements (refer to the BMPs in Volume 2, Attachment E) is a standard expectation. During construction activities, BMPs, such as silt fence, staked bales, filter socks, and re-vegetation of disturbed areas will be utilized. All erosion and sedimentation controls will be removed upon final stabilization of the site.

b. A minimum 25-foot buffer along the banks of the Natchaug River will be established and maintained. Within this buffer, all tree and shrub species capable of growing to mature heights greater than 30 feet will be removed in order to comply with federally mandated clearance requirements between the overhead transmission line conductors and any vegetation. However, all other vegetation removal from within the buffer will be minimized to the extent practicable.

5.4.6 Brook Floater (*Alasmidonta varicosa*) and Eastern Pearlshell Mussel (*Margaritifera margaritifera*)

Species Designation: Brook floater = State Threatened; Eastern pearlshell mussel = Species of Special Concern
General Habitat: Natchaug River
ROW Areas of Habitat Concern:

- Town of Chaplin, from existing Structure 9095 east to existing Structure 9096.

(Volume 3, map 18; Natchaug River: Project construction activities will not directly impact the river.)

Site-Specific Impact Avoidance and Minimization Measures:

a. To minimize the potential for sediments resulting from construction activities reaching the Natchaug River, CL&P will communicate to the contractors that strict adherence to the Project's erosion and sedimentation control requirements (refer to the BMPs in Volume 2, Attachment E) is a standard expectation. During construction activities, BMPs, such as silt fence, staked bales, filter socks, and re-vegetation of disturbed areas will be utilized. All erosion and sedimentation controls will be removed upon final stabilization of the site.

b. A minimum 25-foot buffer along the banks of the Natchaug River will be established and maintained. Within this buffer, all tree and shrub species capable of growing to mature heights greater than 30 feet will be removed in order to comply with federally mandated clearance requirements between the overhead transmission line conductors and any vegetation. However, all other vegetation removal from within the buffer will be minimized to the extent practicable.

5.4.7 Moths and Butterflies (Lepidoptera)

Summary of Surveys:

In response to the CT DEEP's recommendation that surveys of the Project ROWs be performed for Lepidoptera (moths and butterflies), CL&P retained the University of Connecticut's Center for Conservation Biology (CCB). The purpose of the CCB's investigations was to identify occurrences of State-listed Lepidoptera and to survey of some of the host plant community types known to be associated with the State-listed species.[10]

Species Name and Designation:

During the surveys, 10 state-listed Lepidoptera species were found along the ROWs:

- *Apamea burgessi* (Burgess Cutworm) - Special Concern
- *Callophrys irus* (Frosted Elfin) - Threatened
- *Erynnis brizo* (Sleepy Duskywing) - Threatened
- *Erynnis persius* (Persius Duskywing) - Endangered
- *Euchlaena madusaria* (Scrub Euchlaena) - Special Concern
- *Eucoptocnemis fimbriaris* (no common name) - Special Concern
- *Hemiaris gracilis* (Slender Clearwing) - Threatened
- *Hemileuca maia* (Buck Moth) - Endangered
- *Metarranthis apiciaria* (Barrens Metarranthis) - Endangered
- *Sympistis perscripta* (=*Lepipolys perscripta*) (Scribbled Sallow) - Special Concern

[10] The CCB's *Final Report Insect Survey for the Interstate Reliability Project* (April 18, 2011; *Final Insect Report*) is included in Volume 4 of CL&P's Application to the Council.

General Habitat:

The CCB distinguished and mapped five plant communities and host plant species that particularly support these populations:

- Bluestem grassland (*Schizachyrium scoparium* and/or *Andropogon virginicus*)
- Low bush blueberry (*Vaccinium angustifolium* and/or *V. pallidum*)
- Scrub oak (*Quercus ilicifolia*)
- Wild indigo (*Baptisia tinctoria*)
- Bluestem-scrub oak-low bush blueberry mosaic

Specific Areas of Habitat Concern:

At two locations, site-specific mitigation measures will be implemented during construction:

a. From existing Structure 9258 (new Structure 260) west of the Quinebaug River in Putnam to existing Structure 9273 (new Structure 277) northeast of Park Road in Putnam (Volume 3, maps 52 to 55); and

b. From existing Structure 9323 (new Structure 330) northeast of Elmwood Hill Road in Thompson to the Connecticut/Rhode Island border (Volume 3, map 66).

In addition, construction activities will be minimized to the extent practicable along portions of the ROWs where the CCB identified host plant communities, as illustrated on the Volume 3 maps.

Impact Minimization and Management Measures:

The CCB concluded that the Project will have a long-term beneficial impact on the moth and butterfly species that use scrub-shrub habitat, which will increase as a result of the construction and management of the new 345-kV transmission lines. Further, CL&P will implement both short- and long-term measures to avoid and minimize impacts to mapped host plants and host plant community associations during construction and to promote host plant habitat during ROW management.

Short-term (Construction Phase) Measures

Project construction activities, including vegetation clearing and the development of access roads and work pads, will temporarily affect the mapped host plants and plant community associations. In the "Specific Areas of Habitat Concern" identified above, to the extent practicable, CL&P will minimize temporary, short-term impacts to the host plants and plant community associations by minimizing mowing and ground disturbance outside of the areas required to safely complete the necessary vegetation removal and construction activities.

During pre-construction environmental training, CL&P will inform construction contractor personnel of the approximate boundaries of the CCB-mapped host plant and plant community associations. The intent will be to increase general awareness about the locations of the mapped host plant and plant community

associations and to emphasize that impacts to these areas will be minimized to the extent practicable. With the exception of scrub oak, contractors will not be trained to identify individual plant species.

Prior to the commencement of construction activities in the "Specific Areas of Habitat Concern", the boundaries of the host plant and plant community associations identified by the CCB will be flagged by CL&P's Environmental Inspectors.

Future Management Measures

As recommended by the CCB, CL&P modified its Integrated Vegetation Management (IVM) program to include scrub oak as a compatible ROW species that will not be removed during future ROW management. Other Lepidoptera host plant species (e.g., lowbush blueberry, bluestem) are shrub or grassland species that CL&P already considers compatible with overhead transmission line ROWs. Therefore, preservation of some of the host plant species is already occurring along CL&P's ROWs in general.

The CCB also recommended the management of invasive species as a key measure for conserving and promoting host plant populations. CL&P's IVM program already includes provisions for the control of certain invasive shrubs. The removal of these and other woody, invasive shrubs during routine ROW vegetation management will continue to assist in promoting the growth of native species, including the host plants identified by the CCB.

5.5 AIR QUALITY PROTECTION (MINIMIZATION OF DUST AND VEHICLE IDLING PROTOCOL)

Dust Suppression and Anti-Tracking Pads

To minimize short-term adverse effects to air quality during construction, access roads and staging areas will be graveled and may be watered, as necessary, to suppress fugitive dust emissions. Additionally, crushed stone aprons will be installed at all gravel or dirt access road entrances to public roadways, with the objective of minimizing tracking of soil onto the roadway. Paved roads at the intersection with ROW access roads will be periodically swept, as necessary to remove excess dirt tracked onto the pavement from the ROW.

Construction Equipment: Idling vs. Warm-up During Cold Weather

Vehicle emissions will be limited by requiring contractors to properly maintain construction equipment and vehicles, and by minimizing the idling time of diesel construction equipment in accordance with regulatory standards. Idling requirements are as follows:

Unnecessary construction equipment and vehicle idling expends fuel, increases costs, and causes air pollution. For the Project, pursuant to Connecticut requirements (RCSA 22a-174-18), the allowable idling time for vehicles of all kinds, including diesel construction equipment, is 3 minutes.

However, under winter work conditions (when the ambient temperature is below 20 degrees Fahrenheit) the following apply:

- Construction equipment may require longer periods to warm up after overnight shut down or other extended periods of inactivity. Such "warm up" periods, as required to bring the equipment up to a safe operating temperature (as defined by the equipment manufacturer), are exempt from the idling time limit. However, most diesel engines take 3 minutes or less to warm up (contractors should consult the engine manufacturer's recommendations).

- Construction equipment may have to idle for longer periods to operate defrosting or heating equipment to ensure the safety or health of the driver.

Note: "Idling" is defined as the period when mobile construction equipment is not in motion or is not otherwise actively performing its designated function. Thus, "idling" does not apply to the use of certain types of mobile construction equipment (e.g., cranes, cement mixers) that may be stationary, but is actively operating, at a work site.

5.6 PROCEDURES FOR CROSSING PUBLIC TRAILS, PRESERVED / PROTECTED OPEN SPACE, AND RECREATIONAL AREAS

The new 345-kV transmission lines will cross various public trails and recreational areas, including:

- Mansfield Hollow State Park, Mansfield Hollow Lake, and portions of the Mansfield Hollow WMA;

- The Nipmuck Trail (a Connecticut Forest and Park Association [CFPA]) public trail (two crossings);

- Two state-designated trails managed by the CT DEEP (i.e., the Airline State Park Trail [crossed twice] and Hop River Trail); and

- The Tracey Road Trail, a paved urban walking/biking path designated by both CT DEEP and CDOT.

In addition, the transmission line ROWs also traverse state forest land, private hunting/conservation lands, and State Route 169, a National Scenic Byway. These and other designated open space and public use areas traversed by the 345-kV transmission line ROWs are listed in Table 5-4 and illustrated on the Volume 3 maps.

Table 5-4
Public Trails, Recreational Areas, and Designated Open Space Crossed by or Abutting the 345-kV Transmission Lines*

Location (Town)	Volume 3 Map Number	Line List (Parcel) No.	Description (Owner or Primary Stakeholder)
Lebanon			
	1-2	30005	Airline State Park Trail (Southern Section) (CT DEEP)
Coventry			
	5	30055	Hop River State Park Trail (CT DEEP)
	6-7	30072, 30075	Flanders River Road Town Open Space (Town of Coventry)
Mansfield			
	8	30096, 30100	Highland Road Town Open Space (Town of Mansfield)
	12	30117	Nipmuck Trail, West Branch (CFPA)
	12	30118, 30119, 30120	Town Open Space (Town of Mansfield)
	15-17	30163, 30165	Mansfield Hollow State Park, Mansfield Hollow Lake, & WMA (CT DEEP and USACE)
	15	30163, 30165	Mansfield Hollow Dam Levee Trail (within Mansfield Hollow State Park) (CT DEEP and USACE)
	15-16	30163, 30165	The Red Trail (within Mansfield Hollow State Park) (CT DEEP and USACE)
	17	30168	Nipmuck Trail, East Branch (CFPA, located on NU property)
Chaplin			
	18-19	30186, 30188, 30189	Mansfield Hollow WMA / Natchaug River (CT DEEP and USACE)
	22	30220	Natchaug State Forest, Air Line State Park Trail (North Section) [abuts ROW] (CT DEEP)
Hampton			
	24	30240	Airline State Park Trail (Northern Section) (CT DEEP)
Brooklyn			
	36-37	30318	Milo Appley Conservation Showcase and Trails (Eastern CT Conservation District)
	41	30342	Wolf Den Land Trust White Brook Wildlife Sanctuary (Eastern CT Forest Landowners Association / Wolf Den Land Trust)
	43-44	30368	Quinebaug River Trail (adjacent to ROW) (NU, trails managed by Town of Brooklyn)
Pomfret			
	47	30380	Town Open Space (near Quinebaug River) (Town of Pomfret)
	47	30381	Public Canoe / Kayak Boat Launch (adjacent to ROW at State Route 101) (NU; The Last Green Valley)
Putnam			
	54	31012	Tracey Road Trail (Town, CT DEEP, CDOT)
	63	31092	Lower Pond Reserve (Wyndham Land Trust, Inc.)
Thompson			
	63	31096	Lower Pond Reserve (Wyndham Land Trust, Inc.)
	64-65	31113	Tamler Preserve – Wyndham Land Trust (includes trail, not crossed)

* Notes:
(1) No trails or public recreational lands traversed or abutting the ROW in the towns of Columbia or Killingly.
(2) Public access is not available or encouraged to some land trust and open space parcels.

5.6.1 Consultations and Site-Specific Plans

CL&P has or will consult with the owners or managers of each of the recreational and open space properties to discuss the Project, review the types of construction activities that will be performed on each property, and solicit input regarding the appropriate methods (if any) to be used during construction to minimize disruptions to the public while maintaining public safety. These consultations generally will address the following topics, as applicable to each property:

- Use and placement of construction warning signs
- Bike and pedestrian offset gates
- Public safety (flagmen)
- Temporary trail re-routing or closure during certain construction activities
- Trail and/or pavement protection from heavy construction equipment
- Construction schedule
- Schedule constraints, if any, for construction activities due to peak recreational use periods or site-specific activities (e.g., hunting season in the WMA)
- Regular correspondence and updates, including the use of the Project website to provide construction status and schedule information
- Restoration of areas affected by construction

Based on the consultations, CL&P will develop site-specific mitigation plans, as appropriate, for use during construction across the publicly-accessible recreational areas. Some of the open space parcels identified in Table 5-4 are not currently accessible to the public; as a result, site-specific mitigation plans are not expected to be required in such locations.

5.6.2 Mansfield Hollow Area

Along the 36.8-mile Project route in Connecticut, the only areas where the new 345-kV transmission lines cannot be effectively located within CL&P's existing easements are along two ROW segments through federally-owned lands, totaling approximately 1.4 miles, where CL&P's existing ROW is 150 feet wide. Collectively referred to as the Mansfield Hollow area, these two segments are

- Segment 1: An approximately 0.9-mile segment of CL&P's existing transmission line ROW traverses Mansfield Hollow State Park, including an approximately 600-foot span of Mansfield Hollow Lake, as well as portions of the WMA (Town of Mansfield, Tolland County); and

- Segment 2: CL&P's existing transmission line ROW traverses a second portion of the WMA for approximately 0.5 mile across and in the vicinity of the Natchaug River (Town of Chaplin, Windham County). (Refer to Figure 5-1)

Within the Mansfield Hollow area, the ROW traverses the State Park, WMA, and several public-use recreational hiking trails, as well as Mansfield Hollow Lake and the Natchaug River (refer to Table 5-4).

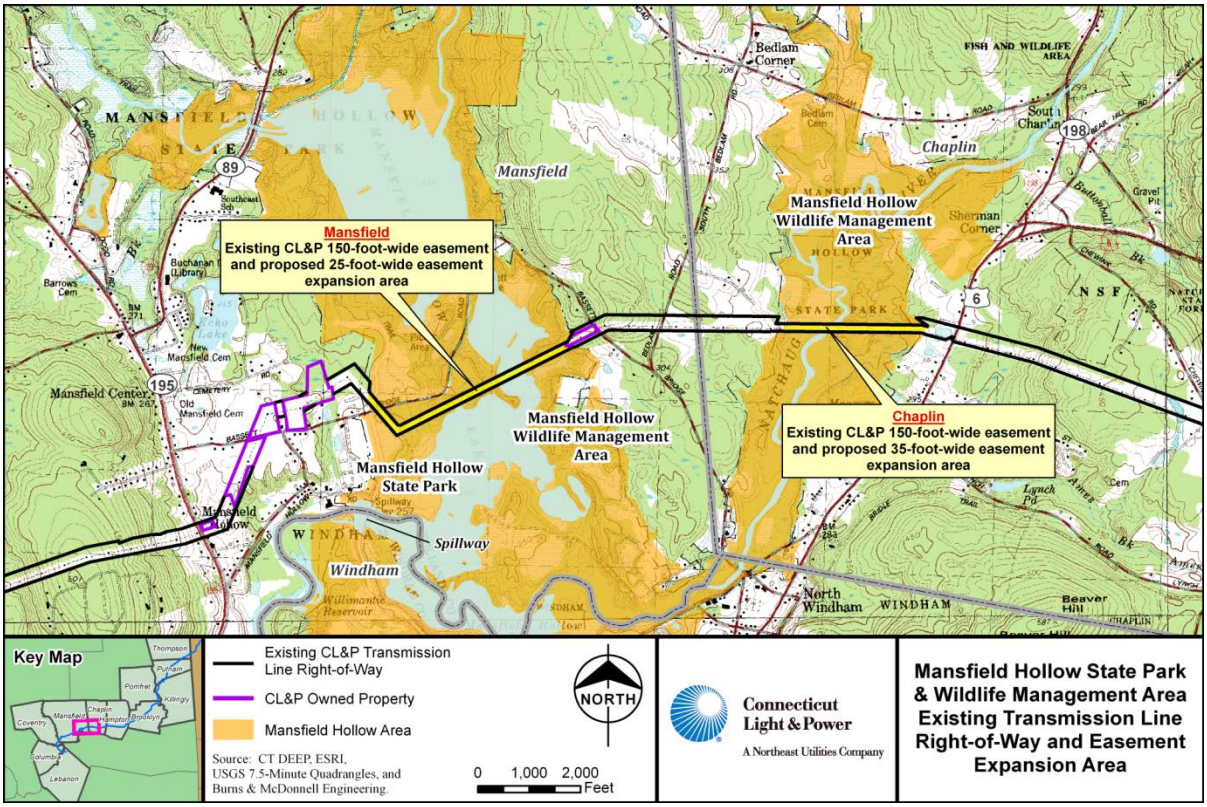

Figure 5-1: Location of the Mansfield Hollow Area, Segments 1 and 2

To accommodate a new 345-kV transmission line adjacent to the existing 330 Line across the Mansfield Hollow area (while maintaining clearances from conductors and vegetation and avoiding the need for electrical outages), CL&P requested and will receive from the USACE a conveyance of expanded easement rights, totaling approximately 5 acres. Pursuant to this conveyance, the existing ROW will be expanded by 25 feet to the north through Segment 1 and by 35 feet to the north through Segment 2, thereby allowing the construction of the new 345-kV transmission line, on steel monopoles with vertically arranged conductors, north of and adjacent to the existing 345-kV line.

The vertical configuration of the new transmission line in relation to the expanded ROW through Segments 1 and 2 is depicted on the Volume 3 cross-sections, XS-3 and XS-5, respectively. The Volume 3 maps (15-17 for Segment 1 and 18-19 for Segment 2) depict environmental features in relation to the construction areas (access roads, work pads at structure sites, for conductor pulling, and at guard structure sites) that will be required to install the new 345-kV transmission line in the Mansfield Hollow area.

Consultations Prior to and During Construction

CL&P will coordinate with the USACE, CT DEEP, the CFPA, the towns of Mansfield and Chaplin, and the Friends of Mansfield Hollow regarding appropriate mitigation measures for use during the construction period within the state park and WMA, as well as across the Nipmuck Trail. These measures

will be designed to provide for the safety of the public in general and of hikers using the trails during the construction period and to minimize potential effects on the recreational users of these resources. Construction activities at and near these locations will be confined to the approved utility easement and access roads.

Mitigation measures expected to be used to inform and protect the public during construction in the state park and WMA include the placement of construction warning signs along Bassetts Bridge Road near the ROW, signs along the hiking trails, hiking trail detours, and use of fencing (e.g., temporary orange "snow" fencing or equivalent) as necessary around work sites. CL&P also will provide construction updates, identifying construction locations and schedules, on its Project website. The information also will be provided to the agencies, the towns of Mansfield and Chaplin, and the CFPA for inclusion on their websites, if desired.

Construction Schedule

- **Construction activities in the Mansfield Hollow area will not commence on the expanded ROW until the USACE issues the Project's Section 404 permit and the conveyance of the expanded easement rights.**

- **CL&P will consult with the CT DEEP and the USACE to identify possible construction scheduling to minimize impacts to recreational uses and to discuss ROW restoration techniques.**

Primary construction activities in the Mansfield Hollow area include vegetation removal, structure installation, and conductor and shield wire stringing. Upon completion of these activities, ROW restoration and revegetation will occur. To the extent practicable based on the timing of the receipt of regulatory approvals, CL&P will endeavor to remove forested vegetation along the ROW on federal properties between August 1 and April 1, outside the typical bird nesting season.

Construction Procedures

To construct the new transmission line within the Mansfield Hollow area, CL&P will adhere to the standard construction procedures identified in this D&M Plan, the procedures described in this section, and any additional requirements that may be included in the Project's Section 404 permit from the USACE or in the final expanded easement agreement between the USACE and CL&P. CL&P will coordinate with the USACE's Mansfield Hollow Project Manager and the CT DEEP regarding the disposition of vegetation cleared from the ROW.

As illustrated on the Volume 3 maps, CL&P will confine all work pads, access roads, and other activities associated with the construction of the new 345-kV transmission line in the Mansfield Hollow area to the CL&P ROW, except for the following:

- At the Bassetts Bridge Road crossing in Mansfield Hollow State Park (refer to Volume 3, Map 15), the road grade is higher than the ROW. To allow construction equipment to more easily

access the ROW from Bassetts Bridge Road, CL&P will request approval from the USACE for the development and use of temporary access roads on either side of Bassetts Bridge Road.

- During construction, any trees located outside the existing and expanded easement that pose a danger or hazard to the integrity of the new transmission line will be removed in accordance with mandatory safety standards for overhead transmission line operation. Danger or hazard tree removal, if required, will be coordinated with the USACE's Mansfield Hollow Project Manager.

  To construct the new transmission line in the Mansfield Hollow area, vegetation will be removed along the northern portions of the ROW/expanded ROW as illustrated on the Volume 3 maps and summarized as follows:

  – Along Segment 1, woody vegetation will be removed along a 50-foot-wide area (encompassing both a 25-foot-wide portion of the existing 150-foot-wide ROW that is not presently managed and the 25-foot-wide expanded easement area).

  – Along Segment 2, woody vegetation will be removed along a 40-foot-wide area (including a 5-foot-wide portion of the existing ROW that is not presently managed and the 35-foot-wide expanded easement area).

    (*Notes*: 1. Scrub-shrub vegetation along the ROW on the slopes adjacent to Mansfield Hollow Lake and abutting the Natchaug River will not have to be removed because no new structures will be installed in these areas. Instead, in these areas, tree removal or trimming will be performed as required to conform to conductor separation specifications in overhead transmission line standards. 2. **Existing woody vegetation within the southern portion of the existing ROW (i.e., the un-managed portions of the existing ROW adjacent to and south of the existing 330 Line), will not be cleared as part of the Project**.

In select locations, access roads will be wider to accommodate the turning radii of the large equipment used in the construction of the transmission line facilities. In addition, where access roads must extend down slopes, additional grading will be required to create a safe travel surface for construction equipment. In such instances, the travel-way width of the access roads will be approximately 30 feet wide.

ROW Restoration

Temporary access roads, work pads, and all other construction materials will be removed. In Segment 2 (Chaplin), the temporary culverts installed along access roads across wetlands also will be removed.

Disturbed upland areas will be re-graded to approximate pre-construction elevations and then re-seeded and stabilized as necessary with mulch. Wetland areas will be re-seeded and stabilized with a native seed mix and then allowed to revegetate naturally (mulch will not be used).

Construction debris will be hauled off the ROW for disposal. No piles of debris will be left on the ROW.

Vegetative materials cut along the ROW and not otherwise provided to the USACE or CT DEEP for productive use may be piled, scattered, or chipped on the ROW, depending on site-specific environmental

features. No wood piles for wildlife habitat will be created without the prior approval of the USACE Mansfield Hollow Project Manager.

To restore the portions of the open field affected by construction along the ROW near Bassetts Bridge Road in Mansfield (refer to Map 15 in Volume 3), the soil may be de-compacted by disking, if warranted.

Temporary erosion and sedimentation controls will be maintained until vegetation is re-established or disturbed areas are otherwise stabilized. Areas of exposed soils on steep slopes may be stabilized with jute netting or pre-made erosion control fabric containing seed, mulch, and fertilizer. No plastic erosion-control netting will be used on federal property.

After site stabilization is achieved, all temporary erosion and sedimentation controls that are not biodegradable (e.g., geotextile material, twine, stakes) will be removed from the ROW and disposed of properly.

Special Mitigation

In accordance with Condition 9 of the CT DEEP's 401 Water Quality Certification for the Project, concurrent with construction activities near Mansfield Hollow Lake (Segment 1), CL&P will install "tree drops" along both sides of the lake shoreline along the ROW. Such "tree drops", which will involve submerging felled trees and securing them to the lakeside using either a hinge-cut technique or by direct anchoring, create and enhance in-lake habitats for resident fish populations. CL&P will coordinate with the CT DEEP Inland Fisheries staff (860.295.9523) at least 14 days prior to and during this work.

Long-Term ROW Management

After the installation of the new 3271 Line, 150 feet of the total new 175-foot-wide ROW along Segment 1 and 180 feet of the 185-foot-wide ROW in Segment 2 will be managed to promote low-maturing vegetative species (e.g., dogwood, blueberry, viburnum, mountain laurel, juniper, spicebush, winterberry). All routine ROW management work will be performed in accordance with CL&P's *Specification for Rights-of-Way Vegetation Management* (2011).

To mitigate for temporary impacts from construction activities along Segments 1 and 2, site-specific wetland enhancement activities, such as wetland invasive species control and monitoring, will be undertaken along the ROW within the Mansfield Hollow area. Invasive species monitoring and control procedures will be implemented in accordance with CL&P's agreement with CT DEEP (refer to the *Wetland Invasive Species Control Plan* in Appendix D).

5.7 HANDLING AND DISPOSITION OF EXCAVATED SOIL, GROUNDWATER, RECYCLABLE MATERIALS, AND WASTES

The construction contractor(s) will be responsible for the proper handling and disposal of all excess soils, groundwater, recyclable materials, and other wastes generated during the construction process.

Excess excavated soil and groundwater (if encountered in structure foundation excavations) will be handled and disposed of in accordance with the procedures specified in the *Guidance for Soils and Groundwater Management* (refer to Volume 2, Attachment C).

Recyclable materials will be removed from the ROWs and transported off-site for appropriate re-use or salvage, pursuant to CL&P policies. General waste materials and debris other than soil and groundwater will be collected in receptacles at the work sites or in secured containers, either at designated locations along the ROWs or at contractor staging areas or yards. Containers that are not removed or emptied at the end of the work day will be inspected regularly until removed for off-site disposal at approved, regulated waste disposal sites.

In no case will solid or liquid wastes (except for excess soil or groundwater, if appropriate) be buried or otherwise disposed of on the ROWs or at contractor staging areas or yards.

5.8 LIGHTING AND NOISE MITIGATION

The 345-kV transmission line construction activities will result in localized and short-term increases in ambient noise levels in the vicinity of work sites. Construction-related noise will occur as a result of the operation of equipment and vehicles, including vegetation removal equipment, jackhammers, drilling rigs and cranes. Helicopters also may be used to install transmission line components.

Other potential noise-generating activities may include blasting and the use of implosive connectors (for conductor installation). At this time, CL&P does not anticipate that blasting will be required or that implosive connectors will be used on the Project. Should one or both of these techniques be needed, the procedures presented in Section 5.19 will apply to the preparation of appropriate site-specific plans.

Because noise attenuates with distance, the effects of construction-generated noise will depend on the noise source location in relation to noise receptors.

Temporary noise impacts associated with construction will be minimized because the ROWs extend across relatively remote areas and because noise from construction will be relatively short-term and limited primarily to daylight hours (i.e., between 7 AM and 7 PM) when human sensitivity to sound is lower. In addition, CL&P will require its contractor to properly maintain and muffle equipment and vehicles to minimize noise emissions.

The 345-kV transmission line construction work will be performed principally during daylight hours. Therefore, temporary lighting is not expected to be required on a routine basis. If needed to accomplish specific tasks that cannot otherwise be suspended at nightfall, construction lighting will be focused on the targeted work areas and will have only a short-term and localized effect.

5.9 SITE ACCESS, TRAFFIC CONTROL, AND CONSTRUCTION SIGNS

During construction, the access to the Project ROWs will be via the public road network. On- and off-ROW access roads will provide direct ingress/egress to construction work sites, as illustrated on the Volume 3 maps.

To minimize the potential for traffic issues during construction, CL&P (or CL&P's construction contractor) will develop access and traffic control plan(s), working with representatives of the affected towns. Such plan(s), which will be implemented by CL&P's construction contractor, will define traffic-control requirements and identify measures for safe ingress and egress to the ROWs for construction equipment and other vehicles (e.g., at construction work sites along public roads, signs will be erected to indicate the presence of construction work zones and flaggers or police personnel may be used to direct traffic, as needed).

The construction contractor will be responsible for posting and maintaining construction warning signs, in accordance with state and local requirements, along public roads in the vicinity of the work areas along the ROWs. Signs will be consistent with the federal *Manual of Uniform Traffic Control Devices* ([MUTCD], 2009 edition, as revised May 2012, or the latest version)[11]. Flagmen and other traffic control measures may also be used as necessary.

5.10 CULTURAL RESOURCES

5.10.1 Protection Measures

CL&P's cultural resource consultants have coordinated with the Office of State Archaeology ([OSA] representing the SHPO) and conducted extensive surveys of the transmission line ROWs, resulting in the identification of various archaeological sites and features determined to be of importance. Volume 2, Attachment I includes correspondence from the OSA commenting on CL&P's surveys for archaeological and historic resources along the transmission line ROWs.

Sites determined eligible for the National or State Registers of Historic Places (NRHP/SRHP) have been or will be avoided or protected, if possible. For any NRHP/SRHP eligible sites that cannot otherwise be avoided or protected, CL&P will develop mitigation strategies, which may include data recovery sufficient to document significant information that may otherwise be lost due to direct Project effects. All

[11] Connecticut has adopted the federal MUTCDs.

avoidance and/or protection measures and mitigation strategies will be developed in consultation with SHPO (OSA) and other consulting parties, as applicable.

To protect the integrity of the cultural resources, the locations of such sites and features are not specifically identified in this D&M Plan. Instead, a separate *Historic Resources Management Plan* (HRMP) will be prepared and submitted for the OSA's review and approval. The HRMP, which will not be distributed to the general public, will identify the locations of cultural resources of concern[12] along the Project route and will define site-specific measures to either avoid or minimize impacts to such areas during construction. CL&P's commitment to develop the HRMP would demonstrate compliance with the National Historic Preservation Act, and would therefore be a pre-requisite for the issuance of the USACE Section 404 permit.

During construction, CL&P's construction contractor will be required to adhere to the approved HRMP. Signs and boundary fencing will be installed to protect sensitive cultural resources as needed on a site-specific basis. CL&P's Environmental Inspectors will monitor the contractor's compliance with the HRMP. Further, CL&P will retain a cultural resource monitor, who will be on-site or on-call during construction.

5.10.2 Unanticipated Cultural Resources Discovery Procedures

CL&P will require all contractor personnel to attend Project-specific environmental training, a component of which will include procedures for generally identifying and protecting cultural resources. The training will describe the procedures to be followed should unanticipated potential cultural materials be discovered during construction. Specifically, construction personnel will be instructed to stop the task that resulted in the potential discovery and inform CL&P.

In addition, CL&P will have a professional archaeological consulting firm on-call and available to respond to potential unanticipated cultural resource discoveries. Construction work at the potential cultural resource discovery site will not resume until authorized by the professional archaeologist and CL&P.

5.11 CONSTRUCTION EQUIPMENT / VEHICLE WASHING AND CLEANING

With the exception of cement trucks, no construction equipment or vehicle washing will be allowed on the ROWs.

[12] Cultural resources of concern include archaeological sites eligible for or listed on the NRHP/SRHP, as well as other features such as certain stone walls.

Cement truck wash-out will be allowed only in designated locations, which will be selected to minimize the potential for off-site environmental impacts. All wash-out areas will include measures to control and contain wash-water and to collect the cement wash-off for off-site disposal.

Erosion and sedimentation controls deployed at designated wash-out areas will conform to the relevant provisions of the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control* (as amended), NU's *BMP Manual*, and the CT DEEP's *General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities* (refer to Volume 2, Attachments E and F).

As required pursuant to the *Wetland Invasive Species Control Plan* (refer to Appendix D), construction vehicles, equipment, and mats also must be cleaned to prevent the transport of invasive wetland species. The cleaning protocol will typically involve the use of shovels, brooms, and/or compressed air to remove visible dirt from construction equipment, vehicles, and timber mats.

5.12 WATER SOURCES

Water may be required for dust suppression or other construction activities. The contractor's water sources must be pre-approved by CL&P.

5.13 UTILITY CROSSINGS

Above-ground utilities and marked underground utilities are identified on the Volume 3 maps. During construction, CL&P's contractor will use "Call Before You Dig" to identify the locations of buried utilities in relation to the ROWs. With the exception of a natural gas transmission pipeline and sewer line, the known buried utilities are located within public roads. As part of Project construction, no excavation is planned in the vicinity of any underground utilities, including natural gas transmission and distribution lines.

However, should any excavation near underground pipelines carrying natural gas or other combustible materials be deemed necessary, CL&P will coordinate with representatives of the affected utility company and will require that the transmission line construction contractor adhere to special precautions, such as the use of "soft digging" techniques (e.g., manual or vacuum excavation) in the immediate vicinity of the underground lines.

Access roads for the new 345-kV transmission line construction will parallel or cross an Algonquin Gas Transmission System (Algonquin Gas) pipeline ROW in the towns of Killingly, Putnam, and Thompson. Where these access roads extend across the pipeline ROW, CL&P will add temporary cover or implement other measures, based on consultations with Algonquin Gas, to protect the buried pipeline.

5.14 METHODS TO PREVENT OR DISCOURAGE UNAUTHORIZED USE OF THE ROWS, INCLUDING ATVS

CL&P's existing transmission line easements restrict the types of activities that can be conducted within the ROWs, and typically prohibit the construction of buildings, pools, and other structures within the ROWs. CL&P also has policies for addressing requests from property owners and other parties external to CL&P. These policies outline an evaluation process and provide guidelines for allowing certain uses (e.g., driveways or parking lots) where appropriate. Requests prohibited by the easement agreements, or otherwise posing safety, engineering, environmental, or other concerns are rejected.

Connecticut law prohibits the operation of ATVs on private land without the written permission of the landowner (Connecticut General Statutes Section 14-387). CL&P does not grant permission to use ATVs on its properties or easements.[13]

- **Prior to the start of construction, CL&P will send a letter to the police department in each of the 11 Project towns, reaffirming its policy on ATV use of its transmission line ROWs and requesting that the police give particular consideration to enforcing the prohibition on ATV use of the ROWs.**

Where CL&P holds an easement as opposed to land ownership in fee, CL&P must receive landowner approval prior to installing fences, gates, etc. along the ROWs. CL&P will coordinate with landowners and agencies, as appropriate, to discourage unwarranted access onto and use of its ROWs. Accordingly, CL&P will:

- Install signs warning the general public of the hazards posed by contact with the high voltage transmission lines and indicating that it is unlawful to operate ATVs on private land without the written permission of the landowner; and

- Consider, based on consultation with and approval of the landowner, the installation of fences, gates, barricades, berms, or vegetative screens to discourage access onto the ROWs. The type of measure considered for a particular area will depend on site-specific conditions and landowner preferences.

CL&P will report unlawful ATV use on the Project ROWs to the local police.

5.15 FAA NOTICE OF PRESUMED HAZARD STRUCTURES

As part of the Project planning, CL&P consulted with the Federal Aviation Administration (FAA) regarding the heights of the transmission line structures near the Windham Airport in Willimantic and the

[13] CL&P contractors and employees may use ATVs for construction and maintenance activities.

Danielson Airport in Killingly, which are located 3,700 feet and 2,850 feet, respectively, from segments of the ROWs. Both airports are owned and operated by CDOT.

In response to CL&P's initial consultations, the FAA issued Notices of Presumed Hazards (NPHs) for certain existing and new line structures near both airports. The FAA's determinations for issuing the NPHs were based on the proximity of the existing and new structures to aircraft flight paths and runways associated with the two airports, taking into consideration topography and structure heights.

After the issuance of the NPHs, CL&P coordinated with the FAA to define mitigation measures for the structures receiving NPHs. Such mitigation measures can include using lights and/or marking on the new structures and marker balls on shield wires, to increase visibility to air traffic. In total, CL&P identified nine structures near the Windham Airport and 11 structures near the Danielson Airport that potentially require measures to improve visibility to air traffic. The FAA is in the process of reviewing the mitigation options.

CL&P also has consulted with CDOT, which operates the two airports. CDOT plans mitigation (lighting) for the existing 345-kV transmission line structures that received NPHs, and has already received FAA approval for its mitigation plan. Correspondence from CDOT regarding its mitigation plan is included in Volume 2, Attachment I.

CL&P anticipates that CDOT's FAA-approved mitigation may be coordinated with CL&P's proposed structure mitigation, thereby potentially minimizing the overall number of structures on which lights or other mitigation must be added. However, the exact number of structures on which mitigation measures will be required cannot be determined until the FAA review of CL&P's plan is completed.

As a result, the Volume 3 maps identify: (1) the structures on which lights will be required under either CDOT's or CL&P's mitigation proposal (structures are labeled as "FAA Lighting Required"); and (2) the structures on which lights may be required, based solely on CL&P's mitigation proposal, without taking into consideration the CDOT lighting mitigation ("Potential FAA Lighting Required").

When aviation warning recommendations are finalized with the FAA and CDOT, CL&P will design a power supply for the required lighting. Although solar power is an option being considered for powering the lights on the transmission line structures, distribution service lines are more commonly used. Typically, such distribution lines would be aligned within CL&P's existing ROWs. The installation of such distribution lines could involve vegetation removal, access roads, and work pads.

5.16 WINTER WORK, ROW STABILIZATION, AND ROW MONITORING PROTOCOL

Because the 345-kV transmission line construction will require approximately two years, work activities will be conducted during the winter months. Winter work activities will be conducted to minimize or avoid adverse environmental impacts. Snow removal and the use of de-icing procedures at construction

sites will be in accordance with the *Snow Removal and De-Icing Plan* included in Volume 2, Attachment D.

In addition, after the installation of the new transmission lines, it is likely that some ROW clean-up or restoration work will be completed too late in the season to initiate permanent stabilization of disturbed areas (including temporary staging areas that may require reseeding) until the following spring. In such cases, temporary erosion and sedimentation controls will be left in place and augmented if necessary. These measures will be periodically inspected and maintained until permanent site stabilization can be completed.

All erosion and sedimentation control practices and over-winter monitoring will be in accordance with NU's BMP Manual, the CT DEEP's *General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities,* the Project's 401 Water Quality Certification and SCEL Permit (refer to Volume 2, Attachments E, F, and G), and any relevant conditions of the USACE Section 404 permit.

5.17 POST-CONSTRUCTION EMF MONITORING PLAN

Pursuant to Condition 3(j) of the Council's Decision and Order, CL&P has prepared a post-construction electric and magnetic field monitoring plan for the 345-kV transmission lines. This plan is included in Appendix F.

5.18 HAWTHORNE LANE ROW SHIFT

In the Town of Mansfield, CL&P's existing 300-foot-wide ROW extends across Hawthorne Lane, a cul-de-sac, and the driveways to four homes that are located off Hawthorne Lane. These homes were built within the last 10 to15 years. CL&P's existing 345-kV line (i.e., the 330 Line) is aligned along the southern portion of the existing ROW.

At present, views of the 330 Line from the four homes are substantially screened by intervening trees, located principally on the northern portion (unoccupied) of CL&P's ROW. CL&P originally planned to construct the new 345-kV transmission line to the north of the 330 Line, resulting in the removal of the existing tree screening between the lines and the Hawthorne Lane homes and placing the new 345-kV line closer to the homes.

In 2008, the owners of the four Hawthorne Lane homes approached CL&P and proposed a shift of the ROW to the south in connection with the construction of the new 345-kV line. To enable the ROW shift, the Hawthorne Lane landowners granted new easement rights to CL&P over a triangular-shaped area that extends to the south by approximately 225 feet at its widest, in exchange for CL&P's release of approximately the equivalent acreage from the north part of the existing easement. In addition, the Town of Mansfield modified a conservation restriction (created in 2002 when the Hawthorne Lane subdivision

was established) to allow a 0.32-acre portion of the ROW shift to extend across the open space property. This shift preserves the existing tree screen for (and reduces magnetic fields at) the four homes.

In response to the finalization of a land swap with affected private property owners, CL&P has incorporated the Hawthorne Lane ROW Shift into the Project. The details of the route and line configuration along this 0.3-mile ROW segment are illustrated on Map 15 and XS-HL-1 in Volume 3.

Two existing 330 Line structures (Nos. 9079 and 9080) will be removed from the existing ROW and replaced by steel monopoles along the new easement. All pole removal work, including the removal of pole butts, temporary storage of poles, and disposition of poles will be in accordance with NU's BMPs and the latest version of NU's *Environmental Rule ERTG-03 BMPs for Treated Wood Storage and Disposal* (refer to Volume 2, Attachments E and H, respectively).

The steel monopoles will support the 330 Line conductors here in a vertical configuration. As a result, one span of the existing 330 Line will be relocated to the south within the new (shifted) easement and one span will be shortened. One new 345-kV steel-monopole line structure (No. 81) will be built adjacent to and north of the relocated 330 Line and will support the new line's conductors in a vertical configuration.

5.19 BLASTING PROCEDURES

If blasting is subsequently determined to be required to facilitate line construction, CL&P will retain a certified blasting specialist (blasting contractor licensed by the Connecticut Commissioner of Public Safety) to develop a site-specific blasting plan, in compliance with state and local regulations and CL&P guidelines. The plan will take into consideration local geologic conditions and the locations of nearby transmission line structures and other development, as well as the performance of pre- and post-blast surveys of nearby properties, as necessary. The blasting plan will typically address the following:

- Location(s) along the ROW where blasting would be performed and general summary of work to be performed.
- List of permits required (e.g., from local Fire Marshal).
- Blasting schedule (days and hours per day).
- Safety meetings to be held prior to the performance of the blasting.
- Noise monitoring.
- Traffic control measures, as warranted.
- The blasting plan would be provided to the local Fire Marshal and to the Council for review and approval.

Prior to either blasting or implosive connector work, CL&P would conduct community outreach to inform local officials and the public about the planned work and about any pre- and post-work inspections, as necessary, of properties abutting the work sites. Typically, the construction contractor would arrange for pre- and post-work inspections of abutters' properties. CL&P would coordinate directly with town officials, including notifications to the local police and fire departments regarding the schedule for the work.

CL&P will submit any site-specific blasting plan(s) to the Council pursuant to the "Project Change Approval Process" included in Volume 1, Section 7 of this D&M Plan.

5.20 MOUNT HOPE MONTESSORI SCHOOL LANDSCAPING

Pursuant to the Council's recommendation (Docket 424 Opinion, p. 13), Project representatives met with officials of the Mount Hope Montessori School on April 11, 2013 to discuss the design of a vegetative screen. CL&P thereafter prepared and provided to School representatives for review and approval a vegetative screening plan, which specifies the installation of a combination of tall-growing evergreen and deciduous species (e.g., spruce, red maple, arborvitae). On August 1, 2013, School representatives approved the plan.

In accordance with the approved plan, the majority of the vegetative plantings will be on school property, with some of the smaller-growing arborvitaes on the edge of CL&P property, outside of any vegetation removal limits required to maintain conductor clearances. When planted, the evergreen trees will be approximately 8 feet in height and the red maples will typically be 12 - 14 feet tall. CL&P will provide a two-year warranty for the vegetative species.

CL&P expects to install the plantings before the commencement of transmission line construction activities in the vicinity of the School.

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6. ENVIRONMENTAL INSPECTION

6.1 INDEPENDENT ENVIRONMENTAL CONSULTANT

Pursuant to Council's Decision and Order (Condition 8) and Opinion (page 15), CL&P has hired an independent environmental inspector(s), subject to approval by the Council. The independent environmental inspector(s), who have formal training and experience in civil and environmental engineering, will perform the following functions:

- Monitor the construction of the new 345-kV transmission lines, related line modifications, and station modifications, including restoration, for consistency with the Council-approved D&M Plans for the Project.

- Provide a bi-weekly monitoring report to the Council, with copies to the Chief Elected Officials (or their representatives) of the towns traversed by the Project facilities.

- Coordinate with CL&P's environmental compliance team (refer to Section 6.2).

The independent environmental inspector can notify the CL&P environmental compliance team to stop construction practices that are inconsistent with the Decision and Order or this approved D&M Plan or that may cause significant damage to the environment that is not otherwise approved in the Decision and Order or Project environmental permits.

6.2 CL&P'S ENVIRONMENTAL COMPLIANCE PROGRAM

The Project construction contractor(s) will be required to comply with all applicable environmental regulatory requirements, as well as with the Council-approved D&M Plans. To verify the contractors' environmental compliance, CL&P will dedicate to the Project a team of management and field personnel, who will routinely monitor Project construction activities for conformance to the D&M Plans and to other Project-specific permits and approvals.

The Project's field environmental compliance program will include environmental inspectors, who will be assigned to monitor Project construction. The Project team will coordinate with the Council's independent environmental inspector(s), assist CL&P in preparing required notices and reports to the Council, and provide Project-specific environmental training to all construction contractors and other field personnel.

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7. NOTICES AND REPORTS

7.1 NOTICES TO THE COUNCIL: START AND COMPLETION OF CONSTRUCTION (INCLUDING ACCESS AND VEGETATION CLEARING)

Pursuant to RCSA Section 16-50j-62(b)(1) and (4), CL&P will provide written notification to the Council of each of the steps listed below. In accordance with Section 16-50j-62(b)(1), CL&P will provide such notices **a minimum of two weeks in advance** of the work commencement steps listed in the first two bullets below.

- The commencement of vegetation clearing or access work.
- The commencement of transmission line construction.
- The completion of construction (including site restoration/rehabilitation).

Pursuant to RCSA Section 16-50j-62(a)(1), CL&P also will provide written notification to and seek approval from the Council regarding the location and size of all areas to be accessed or used for site testing or staging and not otherwise included in this D&M Plan.

7.2 NOTICE OF CHANGES TO D&M PLAN

Pursuant to RCSA Section 16-50j-61(d), notice of a filing of changes to the D&M Plan that require Council approval will be provided to the service list and the property owner of record, if applicable, at the time that the filing is made with the Council.

7.2.1 D&M Plan Changes Requiring Notice to the Council

Pursuant to RCSA Section 16-50j-62(b)(2), the Council must pre-approve any significant changes to this D&M Plan. CL&P (or its agent, BMcD) will identify, track, and approve all changes, whether significant or insignificant. *No changes to the D&M Plan will be implemented without such documented approvals.*

CL&P will provide the Council with advance written notice whenever a significant change of the approved D&M Plan is necessary. If advance written notice is impractical, CL&P will provide immediate verbal notice to the Council, followed by written notice no later than 48 hours after the verbal notice.

RCSA Section 16-50j-62(b)(2) defines a "significant" change to the approved D&M Plan as including, but not limited to, Project modifications that entail a change in:

- The location of a wetland or watercourse crossing.
- The location of an accessway or structure in a regulated wetland or watercourse area.
- The construction or placement of any temporary structures or equipment.
- Transmission line structure type or location including, but not limited to, towers, guy wires, associated equipment, or other structures.
- Use of additional mitigation measures or elimination of mitigation measures.

In addition to the above criteria, CL&P proposes to define a "significant" Project change as one that would substantially reduce the amount of protection to the environment, substantially increase potential public concern, or would otherwise potentially result in a meaningful effect on the environment, the public, or other Project permits and approvals.

7.2.2 D&M Plan Change Approval Process

A request for a change to the D&M Plan may originate from the Project team, the construction contractor, or others, or be driven by regulatory agency approvals issued after the Council's approval of the D&M Plan, with which the D&M Plan must be consistent. The following procedures will be used to identify, track, and obtain the approval of the Council, if required, for changes to this D&M Plan.

1. **Identify Proposed Project Change**. A proposed change is identified and described by the change originator and provided to CL&P and BMcD. Data to be provided to CL&P and BMcD by the change originator may include, for example, the specifics of the change (location, type), the reason/need for the change, when the change is required (timing), Project schedule and cost implications (if applicable), and effects (if any) on the environment and on the public. The Project change request will be supported by maps and drawings, as appropriate.

2. **Assess Significance of Proposed Change**. CL&P will evaluate each proposed change to determine whether it either:

   - Qualifies as a significant change to the approved D&M Plan and thus requires advance notification to and approval by the Council; or
   - Constitutes a minor change requiring only CL&P approval.

3. **Significant Changes Requiring Notice to and Prior Approval by the Council.** After CL&P determines that a proposed change represents a significant change to the D&M Plan requiring notification to the Council and the Council's pre-approval, CL&P will categorize each proposed change as either "urgent" or "non-urgent", based on the following:

- ***Urgent.*** A Project change will be considered "urgent" if waiting until the next regularly-scheduled Council meeting to obtain approval of the change would have a negative impact on Project construction costs or scheduling, or if the provision of written notice is impractical for other reasons. For "urgent" changes, CL&P will provide verbal notification of the change to Council staff and will request that the Council approve the change expeditiously. CL&P will promptly implement the D&M Plan change in accordance with the Council's expedited approval (verbal or written). Not later than 48 hours after the provision of verbal notice of the D&M Plan change request to the Council, CL&P will submit written notice to the Council. If the Council elects not to act on the proposed D&M Plan change request pursuant to the urgent (verbal) notice, CL&P will provide the Council with written notice of the proposed Project Change within 48 hours and will defer any construction activities related to the change request pending the Council's determination.

- ***Non-Urgent.*** If CL&P determines that a D&M Plan change request is "non-urgent", CL&P will provide written notice to the Council, seeking the Council's consideration of the proposed D&M Plan change at the next regularly-scheduled Council meeting.

4. **Non-Significant D&M Plan Change: No Council Pre-Approval Required.** Minor changes to the approved D&M Plan will require CL&P approval prior to implementation, as well as Project documentation.

Figure 7-1 provides a flow chart illustrating this change approval process.

7.2.3 D&M Plan Change Documentation and Reporting

Although only significant D&M Plan changes will require the Council's pre-approval, CL&P will document all D&M Plan changes and provide such documentation to the Council in its monthly construction progress reports.

7.3 REPORTS

Table 7-1 identifies the written reports that will be provided to the Council regarding the Project. Except for the bi-weekly Independent Environmental Inspector's report, all reports will be provided by CL&P.

Figure 7-1
D&M Plan Change Process

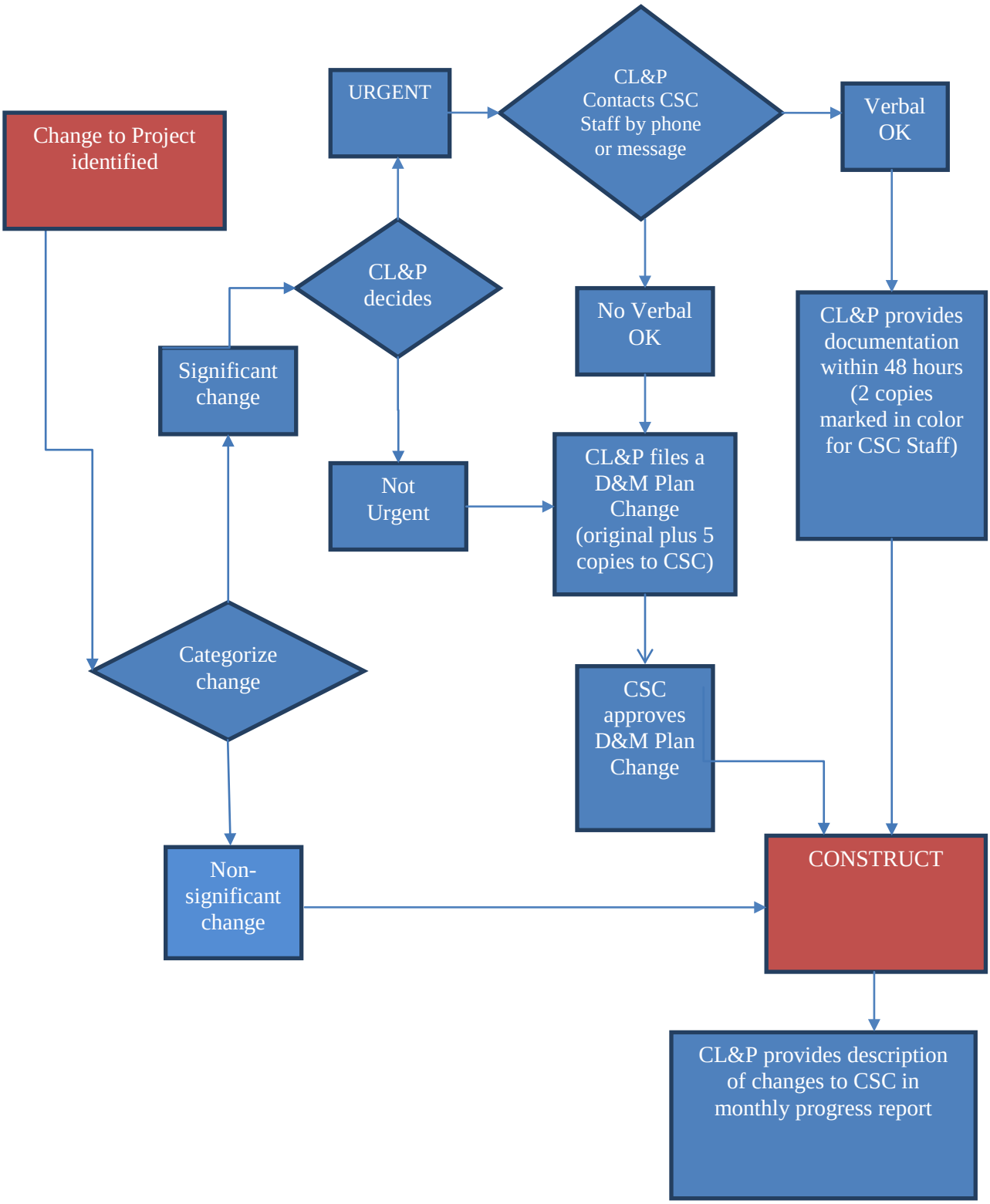

Table 7-1
Reports to be Provided to the Council

Report Type (Regulatory Requirement)	Content
Monthly Construction Progress Report (RCSA Section 16-50j-62(b)(3))	Report will also identify changes and deviations to the approved D&M Plan, including both significant changes involving Council pre-approval and minor changes that did not require Council action.
Bi-Weekly Independent Environmental Inspector Report (Docket No. 424, Decision and Order, Condition 8)	The Independent Environmental Inspector will submit to the Council and the Chief Elected Officials of each involved town (or their designated representatives) a written report regarding the status of construction activities and environmental protection pursuant to the Council's Decision and Order, Certificate, and the D&M Plan.
Final Report (RCSA Section 16-50j-62(c))	CL&P will provide to the Council a final report no later than 180 days after the completion of all site construction and rehabilitation. The report will identify the following: 1 All agreements with abutters or other property owners regarding special maintenance precautions 2 Significant changes to the D&M Plan that were required because of property rights or underlying and adjoining owners or for other reasons 3 The location of construction materials that have been left in place, including but not limited to, culverts, erosion control structures along watercourses and steep slopes, and corduroy roads in regulated wetlands 4 The location of areas where special plantings and reseeding have been performed 5 The actual construction cost of the facility, including but not limited to the following costs: a. Clearing and access; b. Construction of the facility and associated equipment; c. Rehabilitation; and d. Property acquisition for the site or access to the site.
Operating Report (Docket No. 424, Decision and Order, Condition 9)	Within three months after the conclusion of the first year of the operation of all Project facilities, and annually thereafter for three years, CL&P will provide to the Council a report that describes the overall condition, safety, reliability, and operation of the transmission systems.

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8. PUBLIC REVIEW AND OUTREACH

8.1 PUBLIC REVIEW AND INPUT TO THE D&M PLAN

The new 345-kV transmission lines will extend across portions of 11 towns (Lebanon, Columbia, Coventry, Mansfield, Chaplin, Hampton, Brooklyn, Pomfret, Killingly, Putnam, and Thompson). As part of the D&M Plan preparation process, CL&P consulted with officials of these 11 towns, issued draft D&M Plans[14] for public review, and provided opportunities for town representatives, other agencies, and the public to comment on the Plans.

On June 3 - 4, 2013, CL&P provided a draft of the D&M Plans to the Chief Elected Officials (CEOs) of all of the towns along the Project transmission line route and to all parties and intervenors in the Project (Council Docket 424). Along with the draft D&M Plans, CL&P extended an invitation for the CEOs and/or other town officials to send written comments regarding the Plans.

In addition, CL&P encouraged public participation in the D&M Plan review process, as follows:

- Two public review sessions were held on June 12 and June 13, 2013, in the towns of Mansfield and Brooklyn, respectively. These public review sessions were designed to solicit public input regarding the draft D&M Plans.

- In mid-May 2013, a postcard (refer to Volume 2, Attachment I) was mailed to the residents and businesses along and near the Project route and the substations and switching stations to be modified, inviting them to participate in the D&M Plan review process, and providing information regarding the dates and locations of two public review sessions. In addition, notifications about the public review sessions were posted on the Project website, placed in local newspapers, and issued to the media via a press release. Further, signs were placed at the local meeting facilities the day of each event.

- Hard copies of the draft D&M Plans were hand-delivered to the public libraries in all 11 towns traversed by the Project facilities and electronic versions were posted on the Project website at www.NEEWSprojects.com. A postage-paid comment card (refer to Volume 2, Attachment I) was made available at the local public libraries for members of the public to submit comments on the draft D&M Plans. Comment cards also were provided at the two public review sessions.

[14] The draft D&M Plan for the new 345-kV transmission lines and related line modifications and the draft D&M plan for substation and switching station modifications were provided for public review and comment at the same time. Public outreach (i.e., consultations with town CEOs, public open houses) was conducted jointly for both the station and the 345-kV transmission line D&M Plans.

- In May and June 2013, CL&P met with officials of the 11 Project towns, as well as with targeted stakeholders to review the draft D&M Plans.

- The public review comment period on the draft D&M Plans extended for four weeks (to July 1, 2013). The public was encouraged to submit written comments or to otherwise contact Project representatives regarding the draft D&M Plans at any time during this period.

A total of approximately 50 people attended the public review sessions in Mansfield and Brooklyn. In addition, CL&P received written comments from the public, either at the public review sessions or during the associated comment period. Two towns (Mansfield and Coventry) also provided comments on the Project. Volume 2, Attachment I includes copies of the public outreach materials provided by CL&P as part of the D&M Plan review process, as well as copies of the written comments received from the public and from the towns of Mansfield and Coventry during the draft D&M Plan review period.[15]

Most of the comments received pertained to property-specific concerns, such as the disposition of wood removed during clearing for the Project, long-term ROW vegetation management, farmland soil preservation, and construction access roads. The Town of Mansfield's comments pertained to general public issues, such as the minimization of impacts to business activities and to stone walls, protection of active farmland, ROW restoration schedule, and coordination regarding construction activities across town open space, public trails, and Mansfield Hollow State Park and WMA. The Town of Coventry's comments centered solely on the transmission line design and location over property east of Flanders River Road (refer to correspondence in Attachment I).

8.2 PUBLIC OUTREACH DURING CONSTRUCTION

Throughout the Project planning and the Council's siting processes, CL&P conducted extensive community outreach, including a series of pubic open houses during both the Municipal Consultation and D&M Plan phases of the siting process. CL&P will continue its outreach efforts through the Project's construction phases and will notify affected stakeholders of upcoming construction activities.

A Project hotline (1-866-99-NEEWS) and dedicated email address (NEEWS@nu.com) are currently in operation and will continue as the primary means for residents, businesses, and other stakeholders to contact Project representatives throughout construction of the Project. The public can also access the Project website (www.NEEWSprojects.com), which provides an overview of the Project, a map of the Project facilities, Project Fact Sheet, and CL&P Project contact information.

Once construction begins, the website will include regular town-by-town construction updates that will be easily accessible by town residents, businesses, and other stakeholders.

[15] All of the comments received pertained to the draft D&M Plan for the new 345-kV transmission lines and related line modifications. No comments were received regarding the draft D&M Plan for the stations.

In addition, CL&P will offer to brief nearby residents and businesses most affected by Project construction activities and other interested stakeholders regarding the construction process, key construction stages, and expected construction timelines. Project representatives will also contact adjacent and nearby residents and businesses to notify them of upcoming construction activities and will be available throughout the construction process to address any specific questions or concerns.

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9. GLOSSARY OF TERMS

Access Road: A road that provides access into and out of the stations, staging areas, or ROW.

Ampere: (Amp): A unit of measure for the flow (current) of electricity. A typical home service capability (i.e., size) is 100 amps; 200 amps is required for homes with electric heat.

Arrester (surge arrester): Protects lines, transformers and equipment from lightning and other voltage surges by carrying the charge to ground. Arresters serve the same purpose as a safety valve on a steam boiler.

BMP: Best Management Practice

Bus: Electrical conductor that serves as a common connection between the source of electric power and the load circuits.

CCVT: Coupling capacitor voltage transformers

CDOT: Connecticut Department of Transportation (also, ConnDOT)

Certificate: Certificate of Environmental Compatibility and Public Need (from the Connecticut Siting Council)

Circuit: A system of conductors (three conductors or three bundles of conductors) through which an electrical current is intended to flow and which may be supported above ground by transmission structures or placed underground.

Circuit Breaker: A switch, located in stations, that automatically disconnects power to the circuit in the event of a fault condition. It performs the same function as a circuit breaker in a home.

CL&P: The Connecticut Light and Power Company

Conductor: A metallic wire, busbar, rod, tube or cable which serves as a path for electric current flow.

Conduit: Pipes, usually PVC plastic, typically encased in concrete, or rigid galvanized steel (RGS) for housing underground power and control cables.

Contingency: The unexpected failure or outage of a system component, such as a generator, transmission line, circuit breaker, switch or other electrical element.

CONVEX: Connecticut Valley Electric Exchange

Council or CSC: Connecticut Siting Council

CWA: Clean Water Act

CT DEEP: Connecticut Department of Energy and Environmental Protection

Counterpoise: Part of grounding system.

D&M Plan: Development and Management Plan (required by the Connecticut Siting Council)

dBA: Decibel, on the A-weighted scale.

Deadend Structure: A line structure that is designed to have the capacity to hold the lateral strain of the conductor in one direction

DECD: Connecticut Department of Economic and Community Development

D&O, Decision and Order: Council approval of the Project

Direct Embed: Structure installation type in which the bottom section of each pole is placed in an excavated hole. Does not require the use of foundations or concrete. H-frame and guyed pole structures are typically direct embedded.

Disconnect Switch: Equipment installed to isolate circuit breakers, transmission lines or other equipment for maintenance or sectionalizing purposes.

Distribution Line or System: Facilities that transport electrical energy from the transmission system to the customer.

Docket 424: Council Docket number for the Project

DPUC: Connecticut Department of Public Utility Control (former agency); now part of the Public Utility Regulatory Authority (PURA), which is part of CT DEEP

Drilled Shaft Foundation: Structure foundation type involving the use of drilling rigs and pneumatic hammers to excavate an area for the structure foundation. Concrete is used for the foundation.

During Construction: Construction refers to Project activities commencing with work site / staging area preparation through final restoration and site stabilization.

Electric Field: Produced by voltage applied to conductors and equipment. The electric field is expressed in measurement units of volts per meter (V/m) or kilovolts per meter (kV/m); 1 kV/m is equal to 1,000 V/m.

Electric Transmission: The facilities (69 kV+) that transport electrical energy from generating plants to distribution substations.

EMF: Electric and magnetic fields.

Environmental Inspector, Environmental Monitor: Environmental scientist retained by CL&P to monitor the conformance of Project construction to the environmental requirements

EPA: United States Environmental Protection Agency

FAA: Federal Aviation Administration

Fault: A failure (short circuit) or interruption in an electrical circuit.

FEMA: Federal Emergency Management Agency

Frac Tank: Fractionization tank, used to temporarily hold water pumped from Project excavations or otherwise used during Project construction activities

Grounding System: Consists of ground rings, placed around transmission line poles and counterpoise as required

Ground Wire: Cable/wire used to connect wires and metallic structure parts to the earth. Sometimes used to describe the lightning shield wire.

H-Frame Structure: A wood or steel structure constructed of two upright poles with a horizontal cross-arm and bracings.

HRMP: Historic Resources Management Plan

Idling: The period when mobile construction equipment is not in motion or is not otherwise actively performing its designated function.

Independent Environmental Inspector(s): Environmental scientist with formal training in civil or environmental engineering, retained by CL&P but reporting to the Council to verify compliance with the Council's Decision and Order

kV: Kilovolt, equals 1,000 volts

kW: Kilowatt, equals 1,000 watts

Lightning Mast: A column or narrow-base structure containing a vertical conductor from its tip to earth, or that is itself a suitable conductor to earth. Its purpose is to intercept lightning strokes so that they do not terminate on objects located within its zone of protection. (Definition taken from IEEE 998)

Lightning Shield Wire: Electric cable located to prevent lightning from striking transmission circuit conductors.

Line: A series of overhead transmission structures which support one or more circuits; or in the case of underground construction, a duct bank housing one or more cable circuits.

Magnetic Field: Produced by the flow of electric currents; however, unlike electric fields, most materials do not readily block magnetic fields. The level of a magnetic field is commonly expressed as magnetic flux density in units called gauss (G), or in milligauss (mG), where 1 G = 1,000 mG.

MF: Magnetic Field

MHG: Material Handling Guidelines

MUTCD: Manual of Uniform Traffic Control Devices

MW: (Megawatts(s)) Megawatt equals 1 million watts, measure of the work electricity can do

MWh: Per megawatt hour

NAAQS: National Ambient Air Quality Standards

National Grid: National Grid, USA, parent company of Narragansett Electric Company and the New England Power Company

NDDB: Connecticut Natural Diversity Data Base (CT DEEP)

NEEWS: New England East – West Solution

NGVD: National Geodetic Survey Datum

NPH: Notice of Presumed Hazard (FAA)

NRCS: National Resources Conservation Service (U.S. Department of Agriculture)

NRHP: National Register of Historic Places

NU: Northeast Utilities (NUSCO and CL&P are wholly owned subsidiaries of NU)

NUSCO: Northeast Utilities Service Company

NWI: National Wetlands Inventory

OH (Overhead): Electrical facilities installed above the surface of the earth.

OPGW: Optical groundwire (a shield wire containing optical glass fibers for communication purposes)

OSA: Office of State Archaeology (representing the SHPO for the review of this Project)

PEM: Palustrine emergent marsh (wetlands)

PFO: Palustrine forested (wetlands)

Phases: Transmission (and some distribution) AC circuits are comprised of three phases that have a voltage differential between them

Project: Interstate Reliability Project

Protection/Control Equipment: Devices used to detect faults, transients and other disturbances in the electrical system in the shortest possible time. They are customized or controlled per an entity's operational requirements.

PSS: Palustrine scrub-shrub (wetlands)

PT: Potential transformer

PUB: Palustrine unconsolidated bottom (wetlands)

PURA: Public Utilities Regulatory Authority (part of CT DEEP, formerly DPUC)

RCSA: Regulations of Connecticut State Agencies

Reactive Power: The portion of electricity that establishes and sustains the electric and magnetic fields of alternating-current lines and equipment owing to their inductive and capacitive characteristics. Reactive power is provided by generators, synchronous condensers, and capacitors, absorbed by reactive loads, and directly influences electric system voltage. Shunt capacitor and reactor capacities are usually stated in MVAR.

Rebuild: Replacement of an existing overhead transmission line with new structures and conductors generally along the same route as the replaced line.

Reconductor: Replacement of existing conductors with new conductors, but with little if any replacement or modification of existing structures.

ROW: Right-of-Way

SCEL: Stream Channel Encroachment Line (CT DEEP designation; the CT DEEP will eliminate the SCEL program beginning October 1, 2013.

Shield Wire: See Lightning Shield Wire

SHPO: State Historic Preservation Office (Connecticut)

SPCP: Spill Prevention and Countermeasures Plan

SRHP: State Register of Historic Places

Stormwater Pollution Control Plan: Is a sediment and erosion control plan that also describes all the construction site operator's activities to prevent stormwater contamination, control sedimentation and erosion, and comply with the requirements of the Clean Water Act.

Substation: Part of the electric transmission system, a high-voltage electrical facility with a fenced-in yard containing switches, transformers, line-terminal structures, and other equipment enclosures and structures to regulate and distribute electrical energy, such as receiving power from a generating facility, changing voltage levels, limiting power surges, etc. Adjustments of voltage, monitoring of circuits and other service functions take place in this installation.

Switchgear: General term covering electrical switching and interrupting devices. Device used to close or open, or both, one or more electric circuits.

Switching Station: A station that does not contain transformers and operates only at a single voltage level.

Terminal Structure: Structure typically within a substation that ends a section of transmission line.

T&E: Threatened and endangered species

Transformer: A device used to transform voltage levels to facilitate the efficient transfer of power from the generating plant to the customer. A step-up transformer increases the voltage while a step-down transformer decreases it.

Transmission Line: Any line operating at 69,000 or more volts.

USACE: United States Army Corps of Engineers

USDA: United States Department of Agriculture

USFWS: United States Fish and Wildlife Service

USGS: United States Geological Survey (U.S. Department of the Interior).

VAR: Volt-ampere reactive power. The unit of measure for reactive power.

Vegetation Clearing: Removal of forest vegetation. May also refer to mowing or cutting of scrub-shrub vegetation.

Voltage: A measure of the push or force that transmits energy.

Watercourse: Rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs, and all other bodies of water, natural or artificial, public or private.

Wave Trap: Part of the Power Line Carrier communication scheme. Prevents loss of communication signal by providing high impedance for the carrier signal and low impedance at the power system frequency.

Wetland: Is an area of land consisting of soil that is saturated with moisture, such as a swamp, marsh, or bog. CT DEEP and the U.S. Army Corps of Engineers have formal definitions of state and federal jurisdictional wetlands, respectively.

WMA: Wildlife Management Area (CT DEEP)

APPENDICES

The following appendices apply to all construction activities for the new 345-kV transmission lines and related line modifications. Certain plans and guidelines are pertinent to site-specific resources (e.g., farmlands, wetlands, watercourse, vernal pools, invasive wetland plant species): such plans and guidelines apply along those portions of the ROWs where such resources are documented as identified on the D&M Plan maps in Volume 3.

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APPENDIX A

VEGETATION CLEARING PLAN

August 2013

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LIST OF TABLES AND FIGURES

ATTACHMENTS

1. Northeast Utilities' *Right-of-way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines* (OTRM 030.001)

2. Northeast Utilities' *Vegetation Clearing Procedures and Practices for Transmission Line Sections* (OTRM 230)

3. CL&P's brochure regarding procedures for landowners to request timber cleared from the ROW on their property ("Making Requests for Wood" www.NUrightsofway.com)

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1. INTRODUCTION

The Connecticut Light and Power Company's (CL&P's) Interstate Reliability Project (Project) includes the installation of approximately 36.8 miles of new 345-kilovolt (kV) transmission lines in 11 towns in northeastern Connecticut. The new 345-kV transmission lines will be located adjacent to existing overhead transmission lines, which are situated within CL&P ROWs that vary in width from approximately 175[1] to 400 feet. Beneath and in the vicinity of the existing transmission lines that occupy these ROWs, CL&P routinely manages vegetation pursuant to requirements for the reliable operation of the overhead transmission lines.

Since April 7, 2006, CL&P's ROW vegetation management practices have been required to comply with mandatory standards adopted by the North American Electric Reliability Corporation (NERC) following the August 14, 2003 Northeast blackout.[2] These vegetation management practices are designed to allow the reliable operation of the transmission facilities by preventing the growth of trees or invasive vegetation that will otherwise interfere with the transmission facilities or hinder access along the ROWs.

As a result, the vegetation within the managed portions of the ROWs typically consists of shrubs and small trees (typically maturing at a height less than 20 feet in height) and herbaceous species. The vegetation outside the currently managed portions of the ROWs consists predominantly of mixed deciduous forest of various ages and sizes, but also includes areas of farmlands, open fields, and similar low-growing vegetative communities.

Low growing, herbaceous, scrub/shrub and forest vegetation along the ROWs will be removed where necessary to allow for construction of the new 345-kV lines, to provide and maintain access to transmission line structures, and to provide safe distances between the conductors and woody vegetation at all times. However, the amount of and type of vegetation clearing required will vary, depending on factors such as the existing width of the managed ROW, vegetation communities present (e.g., forested, herbaceous, scrub-shrub, open field), the type of the new 345-kV transmission line structures, configuration of the transmission line conductors, transmission line span lengths, and terrain.

This *Vegetation Clearing Plan (Plan)* describes the vegetation clearing that will be performed as part of Project construction, including the limits of clearing for construction and the vegetation disturbance (primarily removal of tall-growing tree species) along each ROW segment, as required to meet the established minimum vegetation clearances when operating the new transmission lines. These vegetation removal limits are illustrated on the Volume 3 maps. It also is likely that as part of vegetation removal during construction or after the conductors have been installed, additional trees,

[1] Includes width of ROW through Mansfield Hollow area (federally-owned lands) after CL&P's acquisition of an additional 25- and 35-foot wide easement from the USACE in Mansfield and Chaplin, respectively.

[2] Transmission line outages triggered by conductors sagging into overgrown vegetation in Ohio were substantial factors in causing the blackout.

located outside of the initially cleared area, may need to be selectively removed or pruned to maintain the required clearances. Vegetation (trees and herbaceous or low growing scrub/shrub) removal outside of the vegetation clearing limits shown on the Volume 3 maps will also be required, particularly along off-ROW access roads and along on-ROW access roads that extend beyond these clearing limits.

The typical methods to be used for forested and low growing herbaceous and scrub/shrub vegetation removal are also included in the *Plan*, as are measures for salvaging merchantable timber.

Vegetation clearing methods will be in accordance with the conditions of regulatory approvals received from the USACE, CT DEEP, and the Council. In addition, Best Management Practices (BMPs) will be implemented, as appropriate to the clearing activities (refer to Volume 2, Attachment E).

2. LIMITS OF CLEARING

Along the ROWs within which the new 345-kV lines will be located, the width of the vegetation that CL&P currently manages differs, depending on the number and configuration of the existing transmission lines that occupy the ROWs (refer to the cross-sections in Volume 3). As a result, the amount of new vegetation clearing for the Project, particularly additional forest removal, will vary. Along each ROW segment, the Volume 3 maps illustrate the edge of new vegetation removal that is required to meet the established minimum vegetation clearances for operating the new transmission lines and – within the presently managed portions of the ROW - the general limits of vegetation clearing that will be required to construct the new lines.

For example, along the 2.8 miles between Card Street Substation and Babcock Hill Junction (XS-1), CL&P's 350-foot-wide ROW includes one 345-kV circuit supported on H-frame structures and two 69-kV circuits supported on common steel-pole structures. The new 345-kV line will be located between the 345-kV and 69-kV circuits. CL&P presently manages a large portion of the ROW along this segment for low-growth vegetative communities. As a result, along this ROW segment, new clearing for the new 345-kV line will predominantly involve the removal of scrub-shrub type vegetation to support the installation of access roads and work pads for structure installation and conductor pulling. Some of this clearing will occur outside of the limits of vegetation removal shown on the Volume 3 maps.

Along a majority of the other ROW segments, the new 345-kV transmission lines will be located adjacent to one existing 345-kV line, within a typical 300-foot-wide ROW. Along these ROW segments, CL&P presently manages (on average) a 140-foot-wide area beneath and adjacent to the existing 345-kV lines (where the transmission line is supported on H-frame structures). In these areas, the installation of the new 345-kV transmission lines, supported on H-frame structures, will typically require an additional 90 feet of new vegetation removal for construction and subsequent management.

In the Mansfield Hollow area where the new 345-kV line will use a vertical conductor configuration on steel monopoles (refer to XS-3 and XS-5), less additional new vegetation removal and management (40 – 50 feet) will be required. Table 1 summarizes the widths of the CL&P ROW segments along which the new 345-kV transmission lines will be located, together with the typical widths of the existing managed portions of the ROWs and the additional widths of vegetation removal required by NERC mandatory standards along each ROW segment.

Outside of the limits of vegetation removal shown on the Volume 3 maps, most of the vegetation within the remaining width of the ROWs will not be affected by construction activities. However, some additional vegetation removal will be required to establish on- or off-ROW access roads and certain work pads that must be located beyond the standard vegetation removal limits.

Also, as part of vegetation removal during construction or after the conductors have been installed, additional trees, located outside of the initially cleared areas, may need to be selectively removed or pruned to maintain the required clearances.

Figure 1 illustrates the typical 300-foot-wide ROW and identifies the vegetation removal that will be required to construct and operate the new 345-kV H-frame line adjacent to the existing 345-kV H-frame line. This typical drawing is for illustrative purposes only; refer to Volume 3 for vegetation removal limits and ROW configurations.

Table 1
Summary of Vegetation Clearing Widths for New 345-kV Transmission Lines

Town	EXISTING CL&P ROWS			
	Cross-Section Reference (refer to Vol. 3)	**Total ROW Width (feet)**	**Width of Current Vegetation Management Area along ROW (feet, typical)**	**Estimated Width of New Vegetation Clearing* Required for New 345-kV Transmission Lines (feet)**
Lebanon / Columbia / Coventry	XS-1	350	275	0
Coventry / Mansfield	XS-2	300	140	90
Mansfield	XS-HL-1	300	0	Varies (refer to Volume 3, Map 15) (Hawthorne Lane ROW Shift)
Mansfield	XS-3	175**	100	50 (includes vegetation removal in 25-foot-wide expanded ROW per new easement)
Mansfield	Within XS-3 (0.1 mile, but not depicted on XS)	300	140	90
Mansfield / Chaplin	XS-4	300	140	90
Chaplin	XS-5	185**	140	40 (includes vegetation removal in 35-foot-wide expanded ROW per new easement)
Chaplin / Hampton / Brooklyn	XS-6	300	140	90
Brooklyn / Pomfret / Killingly	XS-7	360	260	90
Killingly / Putnam	XS-8	360	345	0
Killingly	XS-9	250	250	0
Killingly	XS-10	400	385	0
Killingly / Putnam	XS-11	340	210 (140 transmission line; 70 distribution line)	90
Putnam / Thompson	XS-12	300	140	90

Notes:
*For the purposes of this table, "clearing" refers to vegetation removal required for the Project within currently un-managed portions of CL&P's ROWs. Locations with "0" new clearing pertain to portions of the existing ROWs where the new 345-kV transmission lines will be aligned **predominantly** within areas where CL&P currently manages vegetation (e.g., XS-1, where the new 345-kV transmission line will be located between existing 345-kV and 69-kV lines). To construct the new 345-kV lines within the ROW segments where "0" new vegetation removal is indicated, isolated areas of trees and shrubland vegetation will have to be removed.

**Reflects additional 25- and 35-foot-wide expansion of the ROW pursuant to 2013 easement conveyance from the USACE.

Figure 1: Typical Vegetation Removal: ROW Configuration with H-Frame Line Design

NOTES:

- Typical existing ROW width as shown is 300 feet. Existing H-frame structures (330 Line) to remain. Typical structure height refers to common heights and is not indicative of every structure height. (Refer to the Volume 3 maps.)
- The new and existing structure locations, as depicted on this figure, are typical and may not be representative of all locations along the Project ROWs.
- Approximately 90 feet of new vegetation removal and subsequent vegetation management will be required for the new 345-kV line supported on H-frame structures as shown.
- Low-maturing woody shrub species typically will not be removed for Project construction, except as needed at work sites (e.g., work pads, access roads). Portions of the ROWs where CL&P presently manages vegetation in conjunction with the operation of the existing 345-kV (and other) transmission lines may be used during Project construction.
- As part of vegetation removal during construction or after the conductors have been installed, additional trees, located outside of the initially cleared area, may need to be selectively removed or pruned to maintain required clearances.
-

3. VEGETATION CLEARING METHODS

3.1 General Approach

Vegetation clearing for the new 345-kV transmission lines will be performed in accordance with Northeast Utilities' *Right-of-way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines* (OTRM 030.001) and *Vegetation Clearing Procedures and Practices for Transmission Line Sections* (OTRM 230). (Refer to Attachments 1 and 2, respectively, to this Appendix).

Vegetation will be removed along those portions of the ROWs to be used for the construction of the new transmission lines, as well as in areas that contain undesirable, tall-growing, woody species that could grow to interfere with the operation of the proposed transmission lines should they not be removed. For example, as part of construction, all tall growing vegetation will be removed within the identified "vegetation clearing limits for construction" shown on the Volume 3 maps.

Vegetation (all types) also will be cleared, as required, at work pads, as well as along existing or new access roads. In addition, vegetation will be removed, as necessary, along existing or new access roads that may be on the ROW (but outside the designated vegetation removal limits) or off the ROW (but required to reach the ROW). In addition, danger or hazard trees outside the limits of clearing (on or off the ROW) will be removed as necessary to protect the integrity of the new transmission lines.

Clearing will be accomplished using mechanical methods. Vegetation removal activities typically require flatbed trucks, brush hogs or other types of mowing equipment, skidders, forwarders, bucket trucks for canopy trimming, feller bunchers for mechanical tree cutting, wood chippers, log trucks, and chip vans.

3.2 Access for Vegetation Clearing

Clearing crews must be able to access areas where vegetation removal is required for construction and within the clearance zones of the new 345-kV conductors, as well as to reach on-ROW or off-ROW danger and hazard trees (refer to Section 3.4). Thus, vegetation clearing crews will use both on- and off-ROW access roads, which also will be used for general Project construction, as well as on-ROW "access routes" that will be required only to reach areas where vegetation must be removed.

Access roads are illustrated on the Volume 3 maps. However, temporary clearing crew "access routes" will be identified in the field at the time of construction, based on site-specific conditions. Such "access routes" will be removed, with restoration performed as necessary, as clearing activities proceed along the ROW.[3]

[3] Clearing access routes also will be used to reach danger and hazard trees, located either on-or off the ROW that, in the opinion of CL&P foresters, must be removed to protect the integrity of the transmission lines. Such danger and hazard trees cannot be identified until the construction phase.

During vegetation removal, timber mats, timber corduroy road, or equivalent may be used to provide a stable base for clearing equipment across watercourses or within wetlands. Such temporary support will minimize rutting in wetlands and will be removed after the clearing activities are completed. Within wetlands and across streams, vegetation clearing crew "access routes" will be in accordance with all Project regulatory requirements, including permits from the CT DEEP and the USACE.

3.3 Vegetation Removal: Low-Impact Tree Clearing

CL&P will implement various measures to minimize the environmental effects of vegetation removal. For example, CL&P will:

- Incorporate into the vegetation clearing contract relevant specifications for access, wetland/stream crossings, vegetation removal methods, vernal pool protection[4], listed species protection, cultural resources protection, and maintenance of site quality.

- Retain a forestry professional to oversee the clearing operations (e.g., access route identification, selection of water resource crossing methods, protection of environmentally or culturally sensitive resource areas, disposition of wood resources).

In addition, CL&P will require the vegetation clearing contractor to use low-impact tree clearing means and methods to remove forested vegetation. Low-impact tree clearing incorporates a variety of approaches, techniques, and equipment to minimize site disturbance and to protect wetlands, watercourses, soils, threatened and endangered species and their habitats, and cultural resources. CL&P will require the clearing contractor to use some or all of the following low-impact tree clearing methods, depending on site-specific considerations:

- Consider soil and weather conditions when scheduling vegetation removal activities.

- Maximize the use of uplands for clearing access routes.

- Fell trees directionally (parallel to and within the ROW) to minimize impacts to residual vegetation, where practical.

- Adhere to BMPs, as described in the *Best Management Practices for Water Quality while Harvesting Forest Products*, 2007 Connecticut Field Guide (also referenced in the NU BMPs, Volume 2, Attachment E) (http://www.ct.gov/deep/cwp/view.asp?a=2697&q=379248&deepNav_GID=1631)

- Use a variety of tree clearing equipment, as appropriate to minimize impacts to the extent practicable.

- Cut trees close to the ground, leaving root systems and stumps, where practical, to provide additional soil stability

- Stockpile cut timber and brush only in uplands.

[4] Vegetation clearing in amphibian breeding habitat (which is shown on the Volume 3 maps) will incorporate typical wetland protection measures (refer to Section 5.3 of this D&M Plan).

For the construction of the new transmission lines, undesirable, tall-growing, trees[5] within the ROW areas proximate to the new lines will be removed. Where removal of woody vegetation is required, vegetation will be cut so that stumps are generally 6 inches or less above the ground surface.

Desirable species will be preserved to the extent practical. For example, certain desirable, low-growing trees may be kept on the ROW in specific locations, pursuant to CL&P's *Right-of-Way Vegetation Initial Clearance Standard for 115-kV and 345-kV Transmission Lines* (refer to Attachment 1 of this Appendix). Generally, all tall-growing tree species will be removed from the managed portion of the ROWs and low-growing tree species and taller shrub species will be retained in the areas outside of the conductor zones. The conductor zone is the area directly beneath the conductors extending outward a distance of 15 feet from the outermost conductors.

3.4 Vegetation Removal: Environmentally Sensitive and Other Special Areas

In environmentally sensitive and other special use areas, CL&P will conduct vegetation removal activities in accordance with applicable federal and state permit requirements, and site-specific conditions that may apply to special land uses (e.g., public recreational areas, active farmland).

Wetlands and Waterbodies. Along stream banks and within wetlands, CL&P will attempt to retain low-growing vegetation to the extent practicable. For example, vegetation removal near streams will be performed selectively, preserving desirable streamside vegetation within a 25-foot-wide riparian zone adjacent to either side of the stream bank in order to maintain habitat, shading, and bank stability and to minimize the potential for sedimentation.

In wetlands, vegetation clearing will be conducted to minimize rutting; in addition, stumps will not be removed from forested wetlands unless it is determined that intact stumps will pose a safety concern for the construction personnel during the establishment/use of access roads and work areas, or installation of transmission line structures. (For additional information regarding vegetation removal in and near water resources, refer to the *Wetlands and Waterbodies Impact Avoidance and Minimization Protocols* in Appendix B).

Vernal Pools. Vegetation removal in and around vernal pool habitats will be necessary, but will be limited to the extent practicable. Equipment access for vegetation removal through or near vernal pools will be avoided when practicable. Where limited access across vernal pools is unavoidable, lower impact clearing techniques and/or temporary swamp mats, corduroy roads, or equivalent will be used to support vehicles and equipment. To the extent that circuit outage and other construction timing constraints allow, CL&P will attempt to schedule these activities so as not to interfere with amphibian breeding and migration seasons. Work during frozen ground conditions also will be considered, if construction and/or transmission line outage schedules allow. (For additional details, refer to the *Avoidance and Minimization Protocol for Vernal Pools* in Appendix E.)

[5] A "tree" is defined as a woody plant maturing at 20 feet or more in height, usually with a single trunk, un-branched for several feet about the ground, with a definite crown. (Refer to Attachments 1 and 2)

Other. CL&P may alter vegetation removal activities in the following areas, provided that the vegetation clearing is consistent with the requirements for construction and for the operation of the facilities pursuant to national transmission line vegetation management standards:

- Steep slopes and valleys spanned by transmission lines, where the conductors will be significantly higher than normal and where the vegetation at full mature height would not violate conductor clearances and would not cause construction or access problems.

- Active farmlands (where vegetation removal is required, such as within hedgerows). ***Wilted cherry leaves are poisonous to livestock; therefore, in areas frequented by livestock, any cherry cuttings will be removed and disposed of outside of livestock use areas.***

- Near homes where owner-maintained ornamental vegetation does not interfere with the construction, maintenance, or operation of the transmission lines.

- In areas documented to provide state-listed species habitat or to contain host plant species that support state-listed invertebrate species, CL&P will minimize mowing and ground disturbance outside of the areas required to safely complete the necessary vegetation clearing for construction activities.

- In locations where cultural resources must be avoided or protected.

3.5 Timber and Brush Disposition

As part of the Project planning, CL&P commissioned a survey of the vegetation along the transmission line ROWs, including the size and quality of trees within the currently un-managed portions of the easement. This survey determined that most of the forest vegetation that will be removed for the Project (approximately 280 acres) consists of trees with an average diameter at breast height (dbh[6]) greater than 5-6 inches. Forest areas were grouped as follows:

- Sawtimber (S1): Areas containing trees mostly 12 inches and larger in dbh, that are free from decay, well-formed, and accessible.

- Sawtimber (S2): Areas containing trees mostly 12 inches and larger dbh, but have significant decay, are poorly formed, and are difficult to access.

- Poletimber (PT): Areas containing trees generally 5 – 11 inches dbh.

The clearing contractor will be responsible for using or properly disposing of any vegetative materials cut along the ROWs that are not otherwise planned for use by the landowner (e.g., as firewood) per easement agreements (refer to Section 5 and Attachment 3 of this Appendix). Other than when wood is to be left for the landowner, CL&P will not dictate to the clearing contractor the means and methods for wood disposition.

[6] Dbh is defined as outside bark diameter at breast height. Breast height is defined as 4.5 feet above the forest floor on the uphill side of the tree. For the purposes of determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

The value of timber resources removed from the ROW for such uses as lumber, firewood, mulch, or biomass chips is a function of the species, location, size, and quality, as well as the market for such products. Typically, a clearing contractor can be expected to reduce waste, minimize clean-up costs, and maximize the value of the wood resources. The following methods may be used for timber disposition:

- **Wood Requested by Landowners.** For landowners who request to retain timber wood that is cleared from an easement area on their property, tree tops will be cut, chipped and removed or spread in upland areas, but the timber/firewood will be piled on the edge of the ROW (on the landowner's property), outside of any environmentally or culturally sensitive areas and away from construction activities.

- **Drop and Lop.** This method involves cutting a tree, lopping off the branches (as appropriate), and then leaving the wood materials where felled. The "drop and lop" method is typically used in areas that are inaccessible to clearing equipment; when cutting sapling-size trees (generally less than 2 inches dbh) on the managed portions of the ROWs; or when impacts to nearby compatible vegetation need to be avoided.

- **Chipped on ROW.** Brush, tree tops, limbs, and other non-marketable timber and marginally marketable trees typically will be disposed of by chipping. Chips must not be left in piles, but may be spread on the ROW at a depth not to exceed 3 inches.

- **Used for Log Riprap.** Some timber may be requested by the construction contractor involved in access road construction for use when developing temporary access roads (corduroy) across wetlands. The use of corduroy must be in accordance with regulatory requirements.

- **Removed for Forest Product Use.** The harvested trees or other wood materials (e.g., wood chips) are transported off-site for productive use. Market demand, transportation costs, and quality of the wood materials will factor into the viability of this option.

3.6 Danger and Hazard Trees

A danger tree is a tree that, due to its location and height, could cause a flashover or damage to the structures or conductors, or violate the conductor zones, if it were to fall toward the transmission lines. A hazard tree is a tree that exhibits some type of defect or damage (e.g., weakness, broken limbs, decay, infestation) that increases the risk of it falling into the transmission lines.

During and after the 345-kV transmission line construction, on- and off-ROW danger and hazard trees that threaten the transmission lines will be identified. Such trees will be removed or pruned as necessary. To the extent that relatively wide, un-managed portions of the existing CL&P ROWs border the new 345-kV lines, there is a lower potential for the occurrence of off-ROW danger or hazard trees. However, on-ROW danger or hazard trees, located in un-managed areas outside the limits of the Project clearing, may be identified and then would be removed.

Prior to the removal of any off-ROW danger or hazard trees, CL&P will inform the affected landowner.

4. VEGETATION MANAGEMENT AND PRESERVATION GOALS AND METHODS

The objective of CL&P's well-established vegetation management program is to maintain safe access to its transmission facilities and promote the growth of vegetative communities along its ROWs that are compatible with transmission line operation and in accordance with federal and state standards. The vegetation along the new transmission lines will be managed in accordance with these standards.

CL&P's vegetation management practices are designed to allow the reliable operation of transmission lines by preventing the establishment and growth of trees or invasive vegetation that could interfere with the transmission facilities or access along the ROWs. As a result, the vegetation within the managed portions of CL&P's ROWs typically consists of shrubs, herbaceous species, and other low-growing species. Unused or un-managed portions of CL&P's ROWs not proximate to the existing lines may be characterized by forest vegetation, which is allowable as long as it does not conflict with the operation of overhead transmission lines.

Undesirable tall-growing woody species within the ROWs and proximate to the new 345-kV transmission lines will be removed during construction. These species will be cut to ensure adequate clearance from wires and structures, pursuant to NU's *Right-of-Way Vegetation Initial Clearance Standard for 115-kV and 345-kV Transmission Lines* (refer to Attachment 1 to this Appendix). Desirable species will be preserved to the extent practicable. In selected locations, certain desirable low-growing trees or tall growing shrubs, due to their growth characteristics and locations relative to the new lines, may be allowed to remain on the ROWs.

Vegetative species compatible with the use of the ROWs for transmission line purposes are also expected to regenerate naturally over time. CL&P will promote the re-growth of desirable species by implementing ROW vegetative management practices to control tall-growing trees and promote native plant colonization.

Vegetation preserved during Project construction activities may be removed in the future in accordance with NU's *Vegetation Clearing Procedures and Practices for Transmission Lines, OTRM 230* (refer to Attachment 2 to this Appendix).

5. LANDOWNER OUTREACH AND BENEFICIAL USE OF FOREST PRODUCTS

The timber and firewood resources along the 345-kV transmission line route belong to the landowners across whose properties the ROWs are aligned. CL&P's policy is to proactively coordinate with landowners regarding the disposition and use of the trees to be removed along the ROWs.[7]

If requested by the landowner, the firewood and timber portions of the trees will be left on the landowner's property, in upland areas that are not otherwise designated as environmentally or culturally sensitive, on the edge of the managed portion of the ROW. After limbs are removed, wood will be piled in tree lengths (typically 18 to 22 feet) for landowners to cut and remove at their convenience.

Timber and firewood removed along the ROWs on CL&P-owned properties or on parcels where the landowners are not interested in retaining the wood will become the property of the Project's land clearing contractor.

[7] Information for landowners regarding vegetation clearing and timber also is described in CL&P's brochure "Making Requests for Wood", which can be found at www.transmission-nu.com/residential/pdf/wood.pdf. A copy of this brochure is included in Attachment 3 of this Appendix.

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ATTACHMENT 1

Northeast Utilities' *Right-of-way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines* (OTRM 030.001)

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1. Scope

This standard describes the vegetation clearing along rights-of-way (ROW) of the NU operating companies in Connecticut and Massachusetts where overhead transmission lines are to be constructed. The practices described here apply to the construction requirements for all 115kV and 345kV [1] electric transmission lines, and are consistent with the North American Electric Reliability Council (NERC) Vegetation Management Standard FAC-003-1 dated 2/16/2006, The New England Independent System Operator's (ISO-NE) vegetation clearing standard OP-3 dated 2/1/2005, and the National Electrical Safety Code (NESC) Rule 218 as adopted by the Connecticut Department of Public Utility Control (Regulation Sec. 16-11-134).

This standard applies to new construction clearing requirements and practices and not to on-going future vegetation maintenance of the ROW's. The initial clearance requirements outlined in this standard are intended to provide adequate clearances for a period of four (4) years at which time scheduled maintenance will be performed to reestablish or preserve the initial clearances. The maintenance of the vegetation following construction is addressed under the Northeast Utilities Specification for Rights-of-Way Vegetation Management. Low-maturing trees, which are allowed to remain after completion of vegetation clearing, are still subject to future trimming and removals, depending upon their growth and health, as well as the future needs of NU to operate, maintain, and add or replace electric facilities on the ROW.

NU operating companies typically obtain permanent easement rights for the placement of overhead transmission lines, including the right to clear vegetation within the fully defined limits of a ROW. In most locations the right to remove any tree or portion of tree outside the easemented limits of the ROW ("danger tree") that by falling could endanger the transmission line facilities is also obtained. These rights are necessary to provide for the safe and reliable operation and maintenance of any overhead transmission line that is built on a ROW.

Notwithstanding these rights, the standard practice of the NU operation companies is to minimize tree and other vegetation removal that is required for new transmission line construction by:

A. Designing new lines to keep the positions of new conductors as much as possible within any existing cleared ROW corridor, thus minimizing additional clearing

B. Remove non-compatible vegetation (trees and tall growing shrub species) within the conductor clearance zone (area directly under the conductors extending 15 feet horizontally outward from the outermost line conductors)

[1] Except for possible modifications to existing 69kV lines, it is unlikely that NU will construct any new 69kV lines. Therefore, this standard covers 115 and 345kV lines only, and 115kV line clearances would apply to any new 69kV lines.

C. Allowing low-maturing tree species such as dogwoods to remain within the side zones (area outside of the conductor clearance zone extending to the edge of the ROW clearing limits) where these low-maturing species exist

D. Re-establishing pre-existing access roads for construction vehicles to minimize the clearing of low growth within the existing corridor for access

E. Locating new line structures close to old structures and overlapping the work areas of old structures to reduce to the amount of clearing for the new structure work areas

F. Where feasible, using existing conductors to pull in new conductors, thus reducing damage to low growth vegetation along the cleared corridor

G. Engaging an arborist to determine individual "danger trees" for removal considering
   1) Species
   2) Soil conditions
      a) including wetland vs. upland
      b) susceptibility to flooding
      c) depth to rock (and adaptability of the species to those conditions)
   3) Health of the tree
   4) Inclination of trunk
   5) shape of crown

Refer to figures V-1 through V-6 for diagrams of the conductor clearance zone and side zones associated with various line structure types.

2. Clearance between Conductors and Woody Vegetation

Transmission lines within the Northeast Utilities System present a variety of woody vegetation control situations. Regulatory authorities may require "buffers" or "screening" at visually sensitive highway and local road crossings or other locations, and such locations require special attention to achieve and maintain the necessary clearances. At all other locations, standard ROW vegetation clearing practices for new line construction are as follows:

A. Within the ROW limits, as depicted on Figures A, B, and C, cut all tall-maturing tree species of any height while retaining existing compatible woody shrub species (see Appendix 1).

B. Clear-cut construction areas at structure locations and access roads as depicted on Figure C.

C. At road crossings, within side zones and other sensitive areas, as specified by ROW development and management plans, retain existing low-maturing tree species such as Flowering Dogwood (see Appendix 2) to the extent that these trees will not conflict with operation of the transmission line prior to the next scheduled vegetation maintenance.

D. At ravines, river crossings, and similar locations: retain tree species on the ROW where the conductors will be significantly higher than normal and where the

vegetation at full mature height would not violate Figure A clearances and will not cause construction or access problems.

The minimum clearances established in Figures A, B, and C between conductors and woody vegetation includes allowances for re-growth over the periodic maintenance cycle of four (4) years for vegetation within the cleared limits of the ROW, and ten (10) years for vegetation beyond the cleared limits of the ROW. The defined clearances cover all vegetation including natural growth, screens or buffers, orchards, ornamental plantings, nursery stock, and danger trees.

The minimum clearances applicable to woody vegetation are shown in the included figures.

1) Figure A; Minimum Conductor Clearances
2) Figure B; Danger Tree Clearance
3) Figure C; Conductor Clearance Zone, Side Zones and Structure Clearing Areas for New Construction

Where Orchards, ornamental plantings, or nursery stock is permitted by easement or license to exist, the maximum tree heights allowed within the conductor and side zones are shown in Figure A. Agreements with individual property owners may define site-specific maximum allowable tree heights and should be checked prior to scheduled maintenance activities.

Where rights exist beyond the edge of the ROW, any tree designated as a "danger tree," i.e. a tree that can fall within the dimensions noted in Figure B that is determined to be an imminent hazard will be removed at the discretion of the arborist. In sensitive areas adjacent to or within the ROW or where rights or other permission to remove danger trees cannot be obtained, arborists will direct the removal of those portions of the tree canopy projecting into the ROW, and those portions of a tree which, if they become detached, may fall within the minimum clearance distances as shown on Figure B. On side-hill ROW's, danger trees can be found significantly further from the conductors on the uphill side of the ROW.

3. Clearing for New Construction

This clearing consists of clear cutting four distinct areas of the ROW as defined by Figure C. These clearing areas are:

A. Basic clearing of the ROW width, which consists of a conductor clearance zone and side zones. Low-maturing woody shrub species are typically not removed from the side zones, and low maturing tree species such as Flowering Dogwood will be preserved where they do not conflict with construction needs.

B. Clearing at each structure location as required for construction equipment

C. Clearing the full length of all access road and spurs to structure sites for a cleared width of fifteen (15) feet

D. Removal of danger trees that pose an imminent risk to the new line along the new or existing clearing edge

For new line construction, in addition to the cleared area around each structure, a lay-down and assembly area may be required that is considerably larger. The size of this area depends upon topography, the type of structure to be assembled, and the type of foundation required at the site. Also at selected locations spaced several miles apart, setup sites for conductor-pulling equipment are required within the conductor zone and may require some removal of shrub growth.

The process to accomplish the clearing for new construction involves:

A. Field survey and stake the edge of the clearing limits and conductor zone

B. The NU "Owner's Representative" further reviews the survey staking before clearing begins

C. Where specified in an existing agreement with individual landowners, the Owner's Representative or his designee marks acceptable low growing trees they will attempt to retain within a side zone

D. The Owner's Representative contacts landowners before the clearing begins if they wish to discuss the clearing as marked out, and to ask if the property owner wishes to take ownership of the cut wood

E. Where the landowner will take the cut wood, an agreement will specify the contractor's placement of cut wood outside the ROW, or the landowner's schedule for removal if at a location within the ROW

F. Carry out the clearing operation

G. Cut using chain saws within wetland areas, and minimize the use of mechanized equipment for removal (note: mechanized equipment may be used to remove the logs and tree tops from a wetland by positioning equipment outside wetlands to drag out logs and tops using cables)

H. During or shortly after the initial clearing operation, an arborist will evaluate trees beyond the edge of the clearing limits to identify and mark danger trees that pose an imminent risk to the new line

I. The landowner will then be given an opportunity to discuss the danger trees marked for removal with the Owner's Representative who will then give instructions to the contractor

Contracts for clearing will be structured to effectively implement the above process and this standard. Despite efforts to minimize tree and other vegetation removal, there may still be locations where the transmission facility requirements and/or the existing vegetation conditions are such that no substantial vegetation may remain within the ROW limits.

4. Clearing for Structure Maintenance or the Replacement of an Existing Line

Clearing for structure maintenance or replacement of an existing line is similar to that for new line construction with the following exceptions:

A. Clearing needs depend on the relative location of the rebuilt line with respect to the existing maintained area of the ROW and the proposed construction method for installation of conductors and shield wires. These factors may reduce the needed clearing.

B. Structure site and access road clearing will still be required but may also be significantly reduced.

C. When structures from the old line are removed, the cleared area at these sites and the access spurs to them will be allowed to naturally re-vegetate with native plant species, which may include native grasses, forbs or shrubs.

5. Decision Responsibility for Retention of Non-standard Woody Vegetation

The transmission line Construction Manager and Contractor Arborist will be responsible for obtaining approval from the Transmission Supervisor, Vegetation Management before allowing vegetation to remain which conflicts with the clearances shown in Figures A, B, and C.

6. Approving Managers and SME

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Northeast Utilities

Peter Avery
Manager Transmission Line Construction and MTCE
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7. Deviations

This standard sets forth the current NU 'best practices' for most applications of this subject matter. Therefore, deviation from this standard is generally not permitted. However, in unique instances a user may submit a written deviation request including justification to the listed Subject Matter Expert (SME). The SME must approve or deny the request in writing prior to the user commencing any non-standard activities. The SME may consult with his/her supervisor, co-SME if any and co-SME supervisor, and subsequently must copy any approval to them.

Revision History
Rev.0 – original issue
Rev. 1 – Clarified conductor zone and side zone definitions, and clearing practices to address NERC reliability requirements through strict conformance to the ISO-NE OP-3.

APPENDIX 1

SHRUB SPECIES ALLOWED TO REMAIN: (PARTIAL LIST)

COMMON NAME	GENUS/SPECIES
Arrowwood Viburnum	*Viburnum dentatum*
Bayberry	*Myrica pennsylvanica*
Blueberry - Highbush	*Vaccinium corymbosum*
Blueberry - Lowbush	*Vaccinium angustifolium & V. vacillans*
Brambles	*Rubus spp.*
Buttonbush	*Cephalanthus occidentalis*
Dogwood - Gray	*Cornus racemosa*
Dogwood - Redosier	*Cornus stolonifera*
Dogwood - Silky	*Cornus amomum*
Elderberry	*Sambucus spp.*
Hazelnut	*Corylus americana & C. cornuta*
Honeysuckle - Bush	*Diervilla lonicera*
Honeysuckle - Fly	*Lonicera canadensis*
Honeysuckle - Tartarian	*Lonicera tatarica*
Huckleberry	*Gaylussacia spp*.
Maple-leaf Viburnum	*Viburnum acerifolium*
Meadowsweet - Broad-leaved	*Spirea latifolia*
Meadowsweet - Narrow-leaved	*Spirea alba*
Mountain Laurel	*Kalmia spp*.
Oblong Fruited Juneberry	*Amelanchier bartramiana*
Oldfield Common Juniper	*Juniperus depressa*
Pasture Juniper	*Juniperis communis*
Running Shadbush	*Amelanchier stolonifera*
Sheeplaurel	*Kalamia augustifolia*
Spicebush	*Lindera benzoin*
Steeplebush	*Spirea tomentosa*
Sumac - Smooth	*Rhus glabra*
Sweetfern	*Comptonia peregrina*
Sweetpepperbush	*Clethra alnifolia*
Winterberry	*Ilex verticillata*
Witch Hobble	*Vburnum alnifolium*
Witherod	*Viburnum cassinoides*

APPENDIX 2

LOW-MATURING TREE AND SHRUB SPECIES ALLOWED TO REMAIN ALONG THE SIDE ZONES: (PARTIAL LIST)

All species listed above including:

Alder	*Almus spp*.
Dogwood - Alternate-leaved	*Cornus alternifolia*
Dogwood - Flowering	*Cornus florida*
Sumac - Shining	*Rhus copillina*
Sumac - Staghorn	*Rhus typhina*
Willows (except tree species)	*Salix spp.*
Witch-Hazel	*Hamamelis virginiana*

Figure A

Minimum Conductor Clearances

* All Other Woody Species		
Line Voltage	A (ft.)	B (ft.)
69 & 115 kV	12	11
230 & 345 kV	16	15

* Orchards		
Line Voltage	A (ft.)	B (ft.)
69 & 115 kV	14	11
230 & 345 kV	18	15

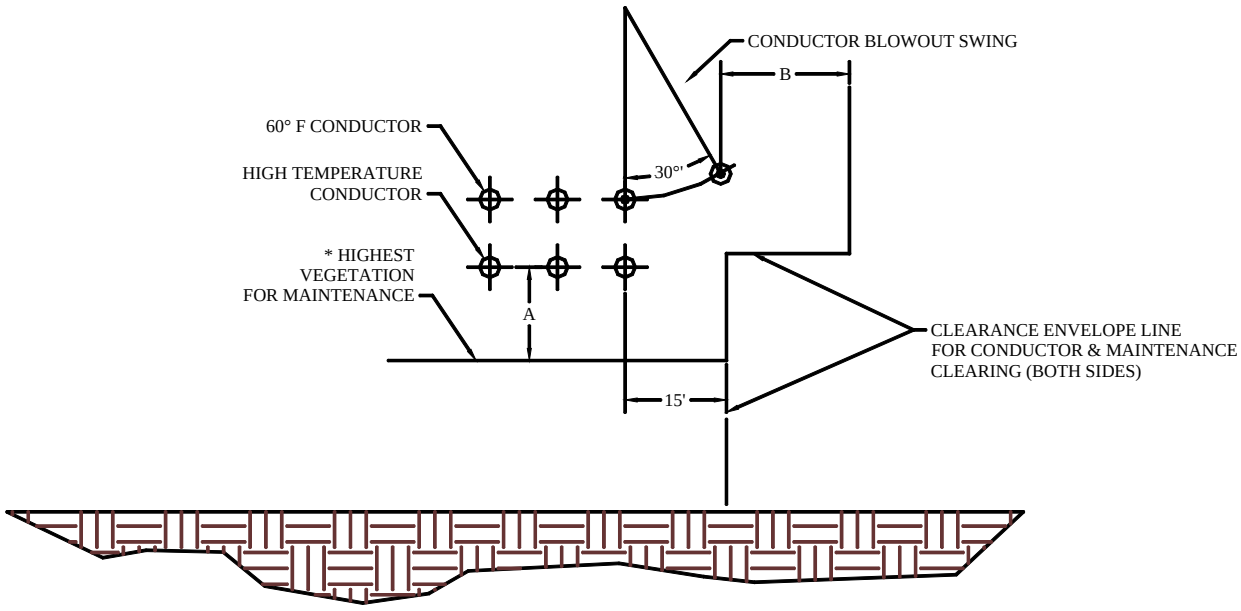


Figure A Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
Northeast Utilities **Approved by: DEH, PJA**	**Design and Application**	**OTRM** **030.008**	**Rev. 1** **05/16/2008**

Figure B

Danger Tree Clearances

Line Voltage	A (ft.)
69 & 115 kV	6
230 & 345 kV	10

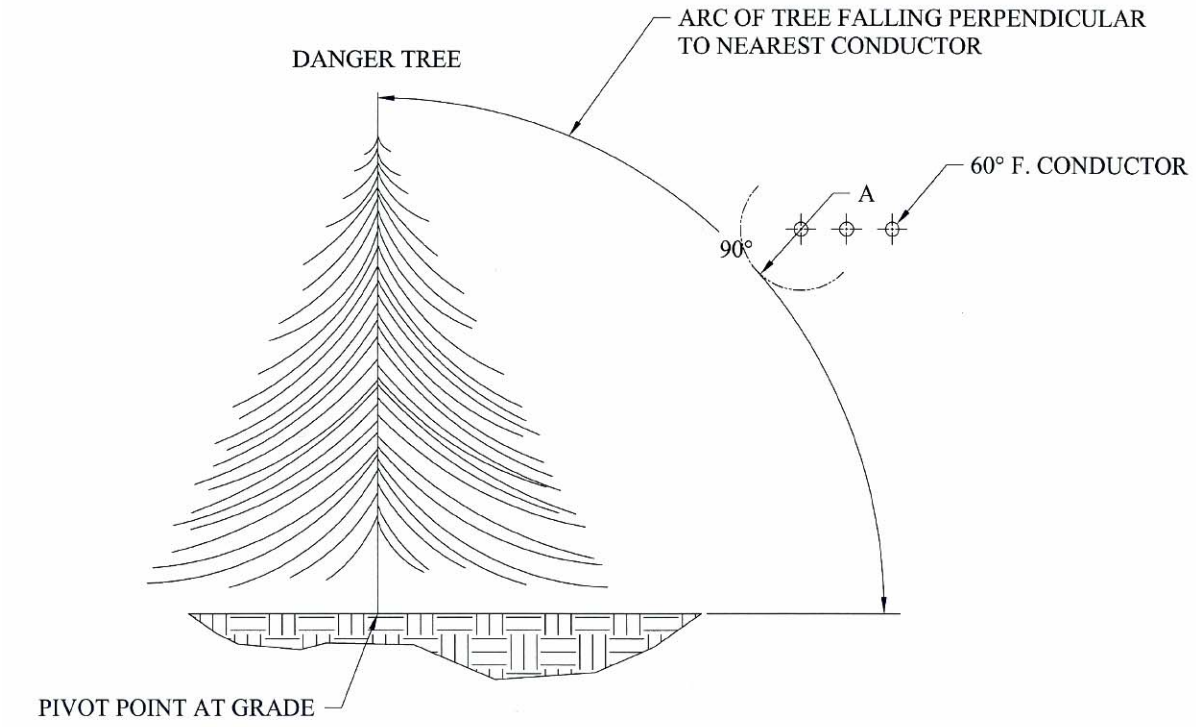


Figure B Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
Northeast Utilities **Approved by: DEH, PJA**	**Design and Application**	**OTRM** **030.009**	**Rev. 1** **05/16/2008**

Figure C

Conductor Clearance Zone, Side Zones
and Structure Clearing Areas for New Construction

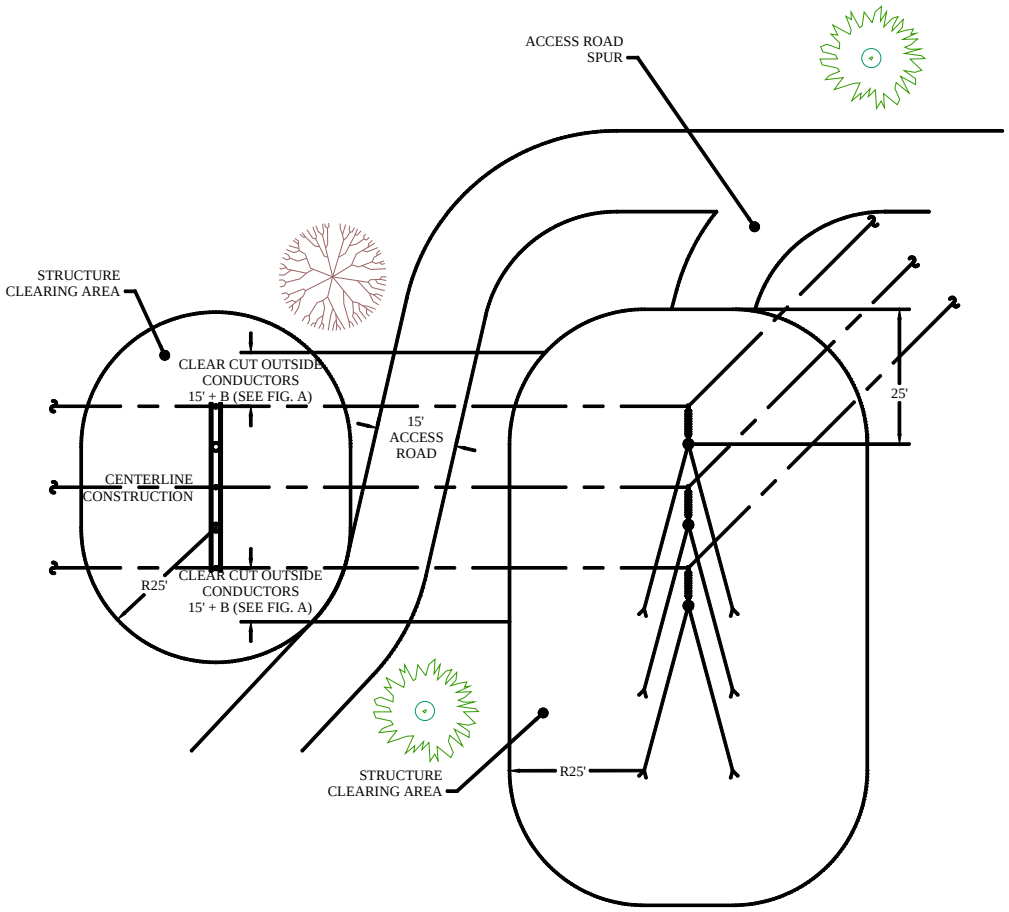
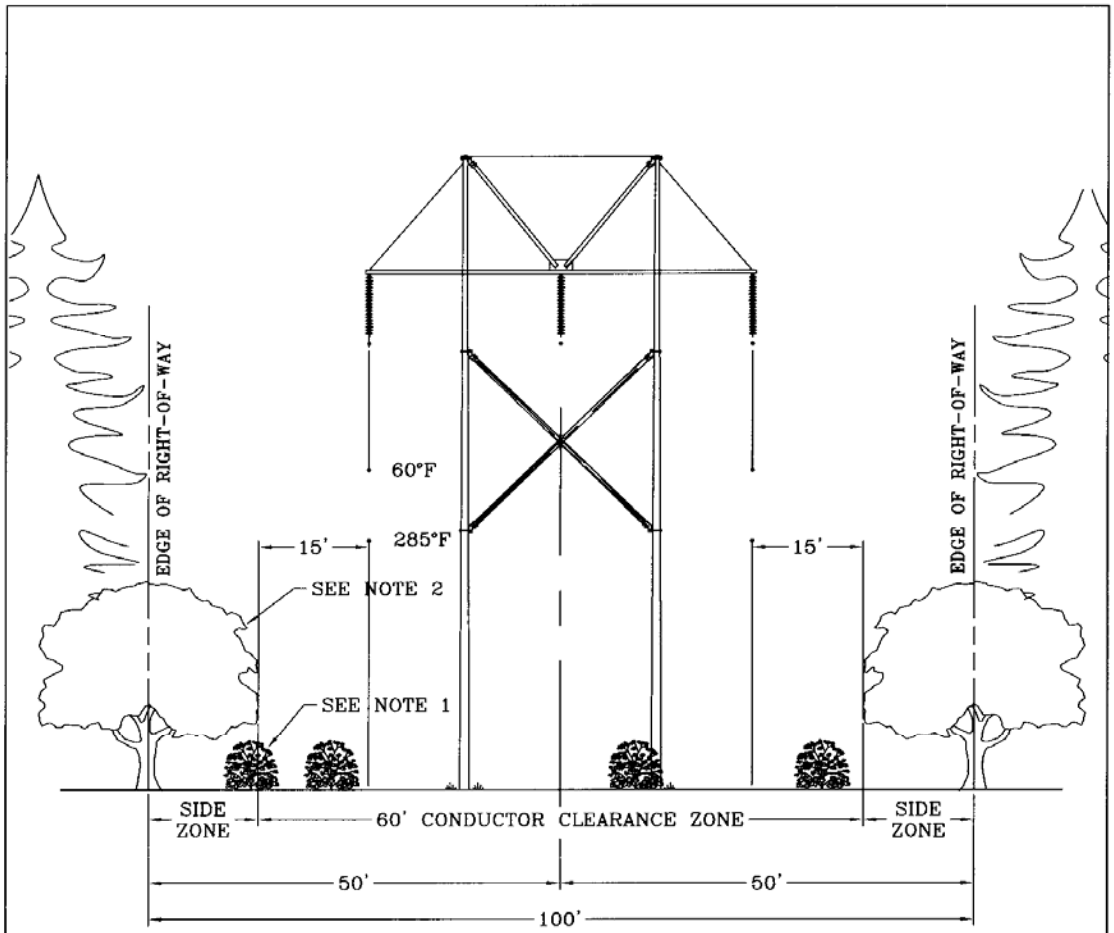


Figure C Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines			
Northeast Utilities **Approved by: DEH, PJA**	**Design and Application**	**OTRM** **030.0010**	**Rev. 1** **05/16/2008**



NOTES:
1) WOODY SHRUB SPECIES
2) LOW MATURING TREE SPECIES SUCH AS DOGWOODS ALLOWED OUTSIDE CONDUCTOR CLEARANCE ZONES.
3) ACTUAL DIMENSION TO R.O.W. EDGE VARIES. ADD UP TO 25' TO SIDE ZONE WHERE EXTRA RIGHT-OF-WAY EXISTS.

NORTHEAST UTILITIES SERVICE CO.

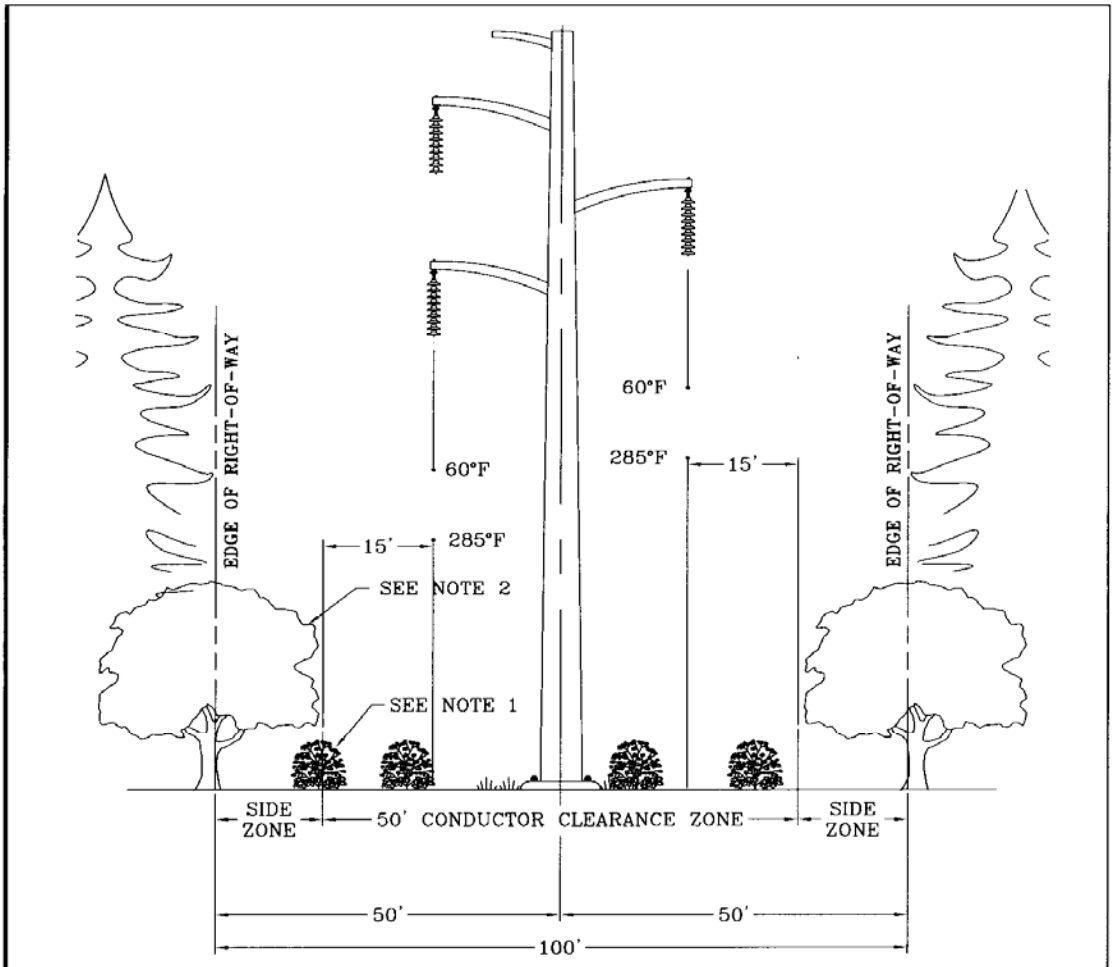
TITLE
TYPICAL VEGETATION CLEARING FOR A 115-kV H-FRAME STRUCTURE LINE

BY RDG	REV A	APP DEH	APP
DATE 04/13/04	DATE 05/13/08	DATE 12/23/04	DATE
SCALE NONE	MICROFILM DATE	DWG. NO. FIGURE V-1	
P.A. #			

K:\Engineering\Transmission Engineering\MN345\OH\ROW Management

Figure V-1
Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines

Northeast Utilities **Approved by: DEH, PJA**	**Design and Application**	**OTRM 030.0011**	**Rev. 1 05/16/2008**



NOTES:
1) WOODY SHRUB SPECIES
2) LOW MATURING TREE SPECIES SUCH AS DOGWOODS ALLOWED OUTSIDE CONDUCTOR CLEARANCE ZONES.
3) ACTUAL DIMENSION TO R.O.W. EDGE VARIES. ADD UP TO 25' TO SIDE ZONE WHERE EXTRA RIGHT-OF-WAY EXISTS.

NORTHEAST UTILITIES SERVICE CO.

TITLE
TYPICAL VEGETATION CLEARANCE
FOR A 115-kV DELTA POLE STRUCTURE LINE

BY RDG	REV RDG	APP DEH	APP
DATE 04/13/04	DATE 05/13/08	DATE 12/23/04	DATE
SCALE none	MICROFILM DATE	DWG. NO. FIGURE V-2	
P.A. #			

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Figure V-2
Right-of-Way Vegetation Initial Clearance Standard
for 115- and 345-kV Transmission Lines

Northeast Utilities **Approved by: DEH, PJA**	**Design and Application**	**OTRM** **030.0012**	**Rev. 1** **05/16/2008**

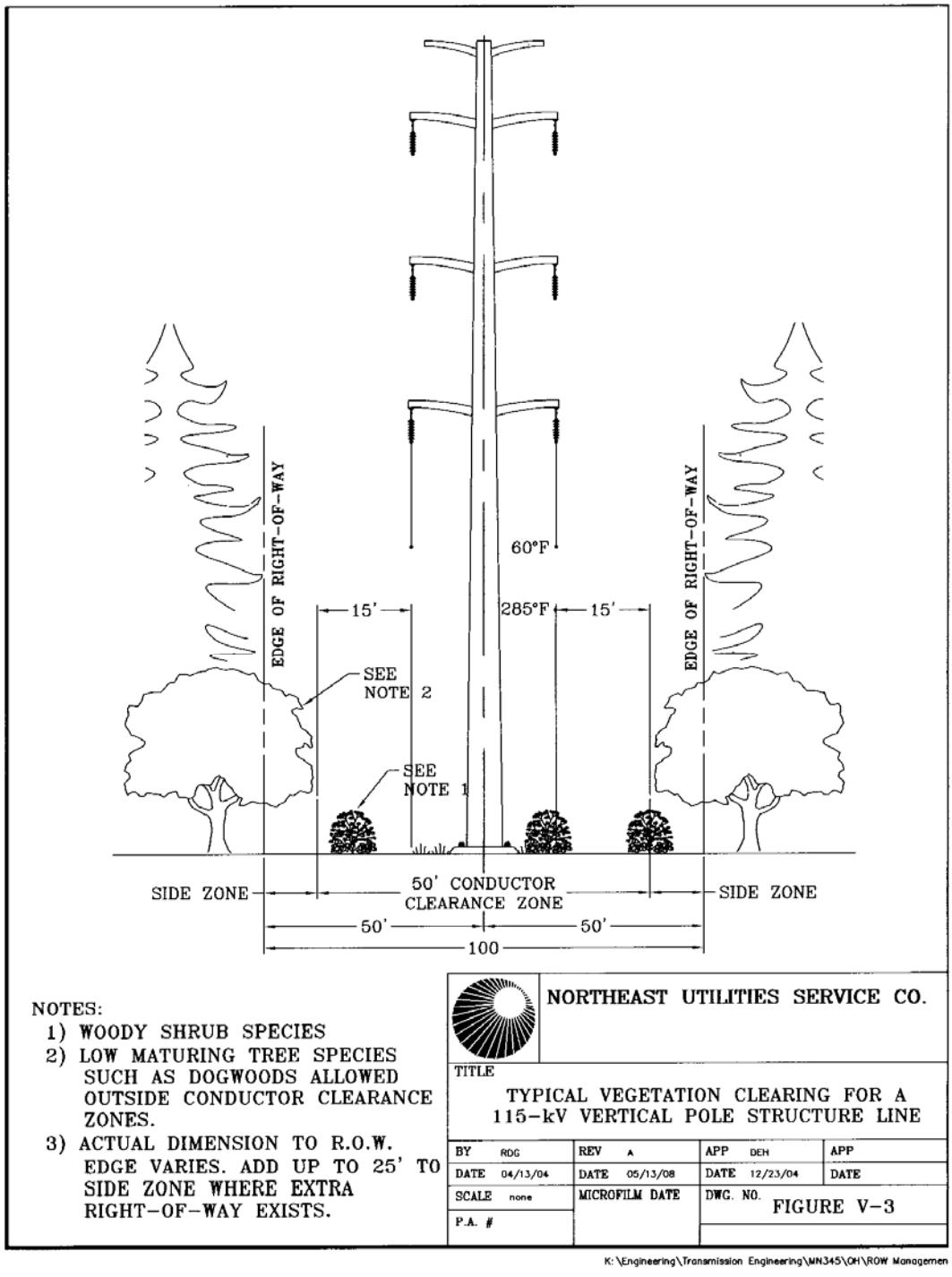


Figure V-3
Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines

Northeast Utilities **Approved by: DEH, PJA**	**Design and Application**	**OTRM 030.0013**	**Rev. 1 05/16/2008**

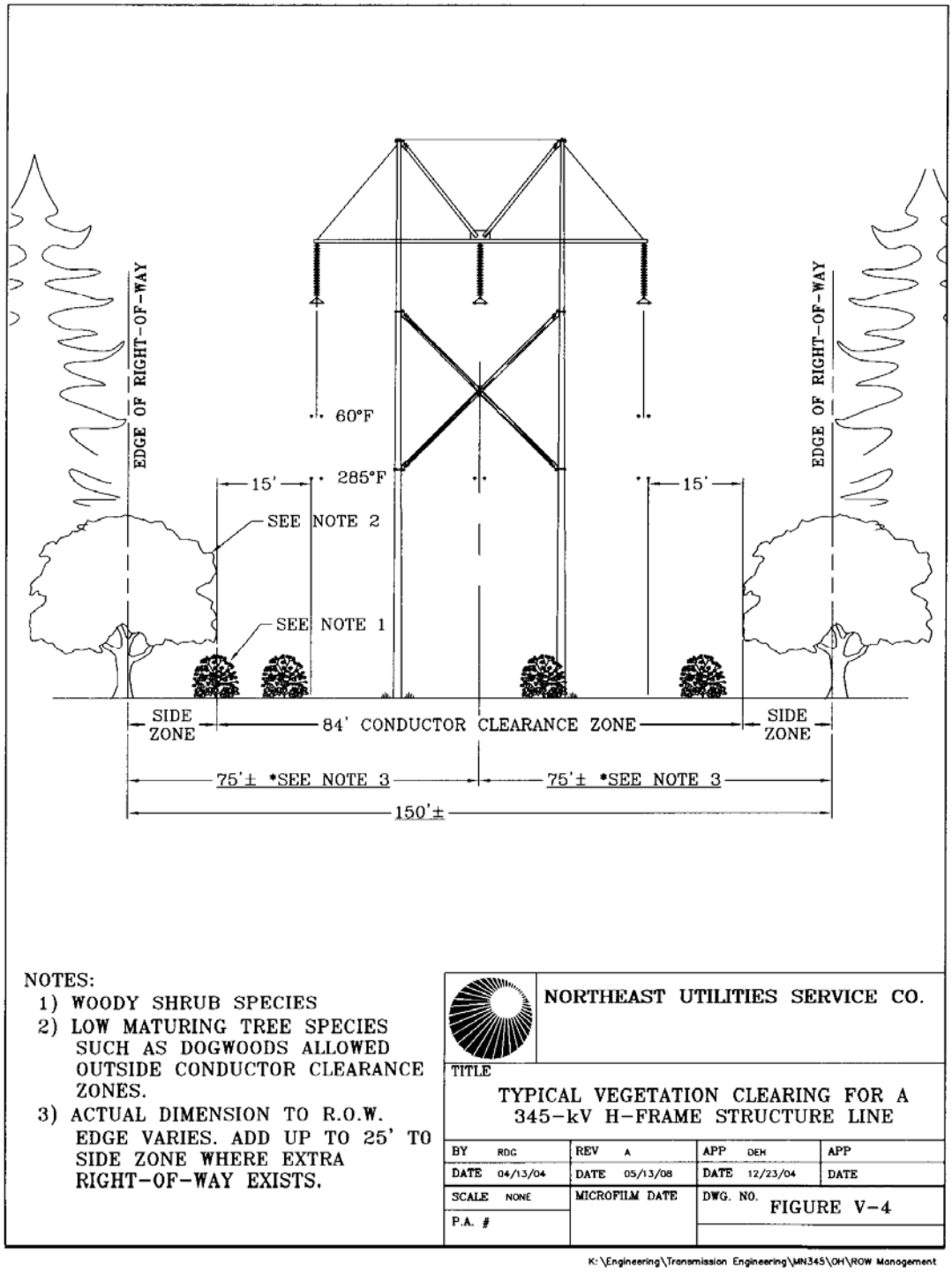
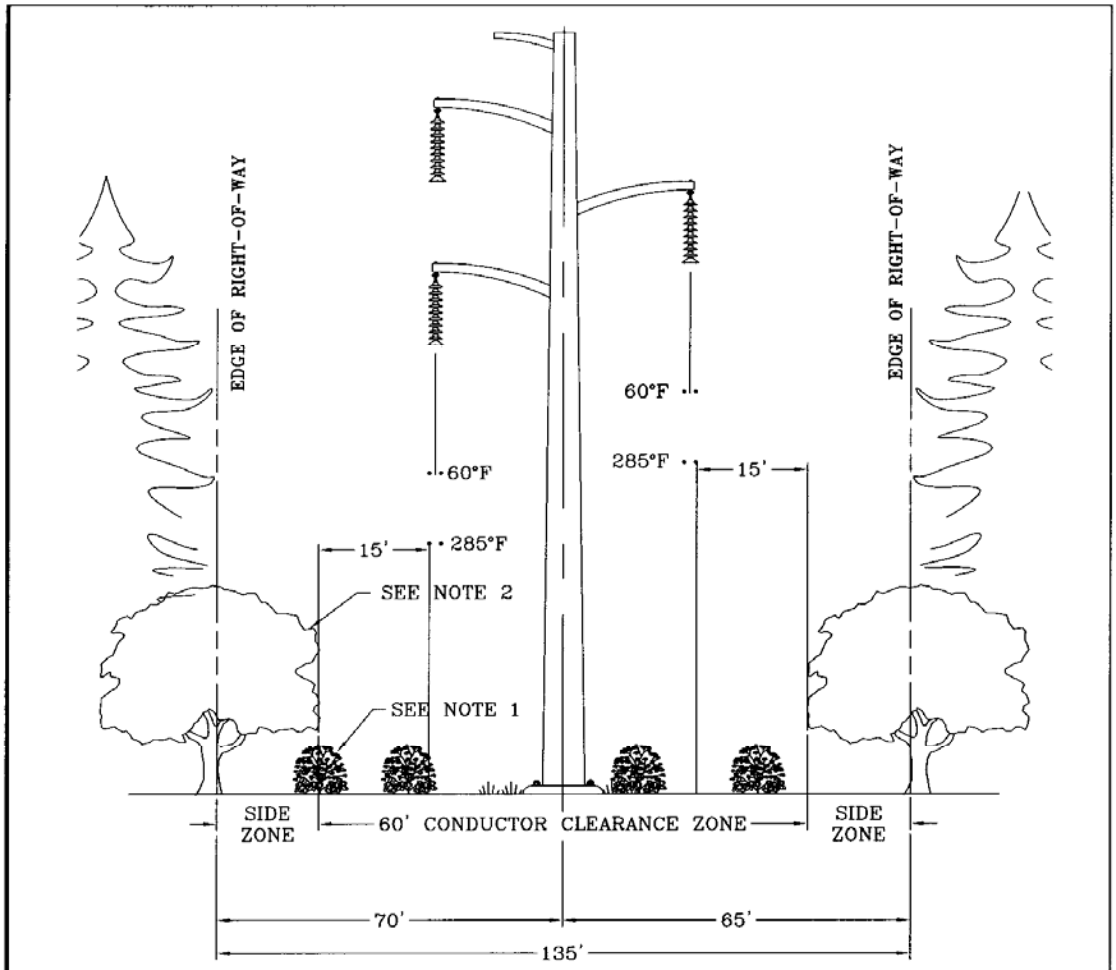


Figure V-4
Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines

Northeast Utilities **Approved by: DEH, PJA**	**Design and Application**	**OTRM 030.0014**	**Rev. 1 05/16/2008**



NOTES:
1) WOODY SHRUB SPECIES
2) LOW MATURING TREE SPECIES SUCH AS DOGWOODS ALLOWED OUTSIDE CONDUCTOR CLEARANCE ZONES.
3) ACTUAL DIMENSION TO R.O.W. EDGE VARIES. ADD UP TO 25' TO SIDE ZONE WHERE EXTRA RIGHT-OF-WAY EXISTS.

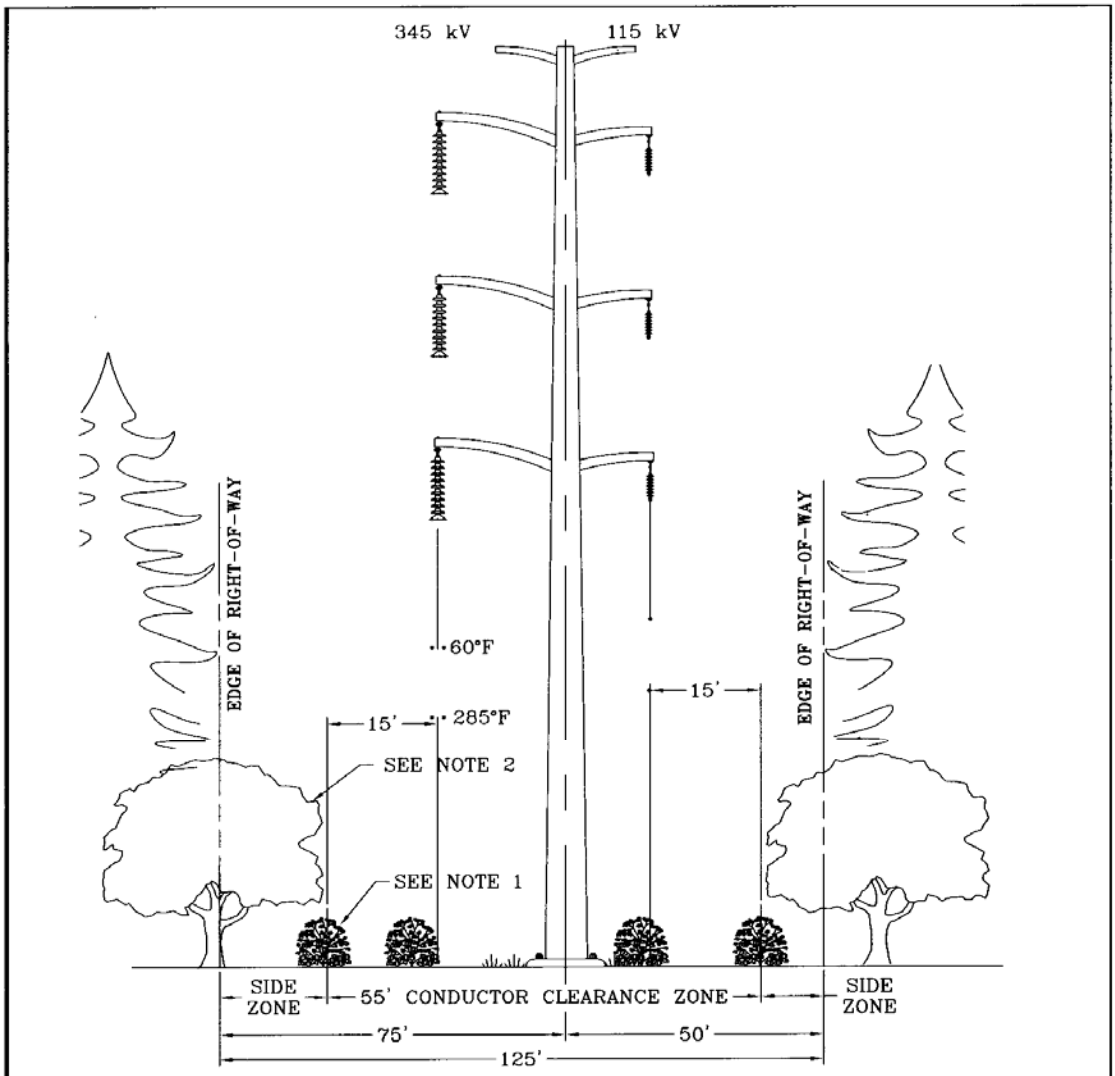
NORTHEAST UTILITIES SERVICE CO.

TITLE
TYPICAL VEGETATION CLEARING FOR A 345-kV DELTA POLE STRUCTURE LINE

BY RDG	REV RDG	APP DEH	APP
DATE 04/13/04	DATE 05/13/08	DATE 12/23/04	DATE
SCALE none	MICROFILM DATE	DWG. NO. FIGURE V-5	
P.A. #			

K:\Engineering\Transmission Engineering\MN345\OH\ROW Management

Figure V-5
Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines



NOTES:
1) WOODY SHRUB SPECIES
2) LOW MATURING TREE SPECIES SUCH AS DOGWOODS ALLOWED OUTSIDE CONDUCTOR CLEARANCE ZONES.
3) ACTUAL DIMENSION TO R.O.W. EDGE VARIES. ADD UP TO 25' TO SIDE ZONE WHERE EXTRA RIGHT-OF-WAY EXISTS.

NORTHEAST UTILITIES SERVICE CO.

TITLE
TYPICAL VEGETATION CLEARING FOR A 345/115-kV VERTICAL POLE STRUCTURE LINE

BY RDG	CHKD A	APP DEH	APP
DATE 04/13/04	DATE 05/13/08	DATE 12/23/04	DATE
SCALE none	MICROFILM DATE	DWG. NO. FIGURE V-6	
P.A. #			

K:\Engineering\Transmission Engineering\MN345\OH\ROW Management

Figure V-6
Right-of-Way Vegetation Initial Clearance Standard for 115- and 345-kV Transmission Lines

Northeast Utilities **Approved by: DEH, PJA**	**Design and Application**	**OTRM 030.0016**	**Rev. 1 05/16/2008**

ATTACHMENT 2

Northeast Utilities' *Vegetation Clearing Procedures and Practices for Transmission Line Sections* (OTRM 230)

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1. Scope

   This standard details the procedures for:

   1. Cutting, pruning, and disposal of trees, tree parts and other woody vegetation within Right-of-Way ("ROW") areas requiring clearing; the Conductor Clearance Zone and Side Zones.
   2. Structure Clearing Areas and access routes on or to the ROW.
   3. Cutting, trimming and disposal of danger trees located outside the construction clearing limits.

   Contract clearing scopes vary depending upon the classification of the area to be cleared. Contract drawings will designate two categories of Clearing Areas; the Conductor Clearance Zone and Side Zones.

2. Related NU and National Standards

   A. OTRM 030 Right-of-Way Vegetation Initial Clearance Standard for 115kV and 345-kV Transmission Lines

   B. Occupational Health and Safety Regulations (29 CFR 1910.269 and ANSI Z-133)

   C. OTRM 222 Operation of Equipment on NU Rights-of-Way

3. Definitions

   For further illustration of definitions, 2.1 through 1.12 see OTRM 030 Figures A through C and V-1 through V-6

   A. Clearing Area – The work area, which includes a central Conductor Clearance Zone flanked by two Side Zones.

   B. Conductor Clearance Zone – Areas normally located along the center portion of the width to be cleared that includes the structures and areas beneath the conductors. The width varies with the type of structure to be installed. Contract drawings provide details of the locations of t he conductor clearance zones.

   C. Side Zones – Areas adjoining the Conductor Clearance Zone to the edge of the cleared limits of the right-of-way to provide for clearances between conductors and vegetation. Contract drawings provide details of the locations of side zones.

   D. Water Supply Area – Areas owned or controlled by a public or private water supply agency for water supply purposes.

   E. Tree – A woody plant normally maturing at 20 feet or more in height, usually with a single trunk un-branched for several feet above the ground, with a definite crown.

   F. Danger Tree – Any tree located outside the limits of clearing shown on the drawing identified by the owner's representative, which could endanger the transmission line by falling closer than 6 feet to the normal 60°F sag position of a conductor.

   G. ROW Access Route – Routes within the limits of the right-of-way generally but not necessarily within the area to be cleared, to which construction traffic is to be

confined. This route shall be cleared for a width of 15 feet in the manner specified within the project documents.

H. Off-ROW Access Route – Routes outside of the limits of the ROW on private property for which rights have been or will be obtained. Such routes provide shortened access from public highways or circumvent obstacles on the ROW. This route shall be cleared for a width of 15 feet in a manner specified elsewhere.

I. Structure Clearing Area – Area that is required for the installation, equipment set up or removal work, within the conductor clearing area as shown in OTRM 030 Figure C.

J. 60° Sag Position – Conductor design elevation at any given point at 60°F – no wind.

K. Maximum Hot Sag Position – Conductor elevation at any given point under emergency high temperature operation 285°F unless otherwise noted on project profile drawings.

4. General Requirements

A. Access to and along the ROW

The owner has acquired entry and access rights to the ROW covering the project as stated elsewhere in the contract documents. The contractor shall obtain the approval of the owner's representative prior to the clearing and use of each section of access routes.

The normal access to any job site is along the owner's ROW from the intersection with the nearest public way. The ROW Development and Management (D & M) Plan for the project, which is a part of the contract drawings, establishes the location of access roads along the ROW. The contractor shall confine all travel within the ROW to the routes designated on the D & M plan. Alternative access routes shall not be used without the approval of the owner's representative who will ascertain if any additional regulatory approval is required before use. Use of alternative access will typically result in owner's re-designation of identified access routes.

Temporary rights of access over adjacent land may also be indicated on the drawings or subsequently be available via the owner's representative or construction manager. The contractor shall strictly observe established conditions attendant to the use of any temporary rights.

Continuing negotiations with property owners and regulatory authorities may result in access roads being located other than shown on the contract drawings. The owner's representative or construction manager shall instruct the contractor regarding such changes. The contractor shall make no access route changes except on the instruction of the owner's representative.

B. Site Location

The owner will flag the limits of clearing work to be done by the contractor; this shall include the limits of the clearing areas on the ROW and the location of all access routes, structures, Conductor Clearing Areas and Side Zones. The owner will identify individual trees that have been approved by the owner's representative to remain and mark them for preservation. The contractor shall confirm the location of all access

routes both on and off the ROW with the owner's representative before commencing work or making entry into a new work area.

The contractor shall preserve these field markings established by the owner for the duration of the project. The contractor is further responsible to preserve and leave undisturbed all permanent property monuments.

C. Contact with Property Owners and the Public

Property owners along the ROW will be advised by the owner's representative or construction manager of the nature of the work to be conducted on the ROW in advance of any contractor entry. All subsequent contacts with property owners on or adjacent to the ROW and access routes will be established by or with the prior specific permission of the owner's representative. The contractor shall immediately advise the owner's representative of any inquires or complaints made by property owners during the progress of the work.

The owner reserves unto itself the responsibility for public relations. The contractor shall make no statements regarding the work in progress. The contractor shall refer to the owner's representative any interest in the work expressed by individuals or groups for the general public.

D. Regulatory Aspects

The owner has general environmental obligations as well as specific development and management (D & M) plan obligations relative to the overall construction of the transmission line. As applied to the work under this specification, these obligations bear on the elimination or reduction of adverse environmental effects on desirable vegetation, fish, wildlife, forests, water purity, and water resources.

Stream crossings with equipment shall only be performed in a manner consistent with the D & M plan to avoid disturbance of stream banks and stream bottoms, which would result in siltation.

Where a wet area must be traversed by an access road or other construction, careful provision must be made to assure that surface and subsurface drainage is not impaired. The contractor shall repair any disturbance to natural drainage caused by the contractor's operation to the equivalent of the original condition.

The contractor shall take special care when moving equipment to prevent erosion on slopes leading to wetland areas. Disturbed surfaces caused by the contractor's operation which may lead to erosion or siltation shall be quickly repaired to the equivalent original condition by the contractor.

Any storage yards for trucks, equipment, etc, shall be located as far as practical away from stream and wetland buffer zones to minimize the potential adverse effects on these resources. The recommended distance for storage of equipment is 100 feet from the edge of any stream or wetland.

The statements above shall serve to advise the contractor of the scope and character of any Environmental Protections for which he shall be responsible.

The conduct of the work may be monitored by representatives of appropriate regulatory agencies. All contacts with such agencies and their representatives will be initiated by or referred to the owner's representative.

E. Contractor's Field Headquarters

The owner has made no provision for a contractor's field headquarters near the right-or-way. The contractor shall make their own provisions for a field reporting headquarters off the ROW and the cost thereof shall be included as part of their operating overhead. The cost of the contractor's field reporting headquarters shall not be separately billed to the owner. The contractor shall obtain the approval of the owner's representative as to the location of any field reporting headquarters.

F. Fences

No fence on the ROW or crossing access routes may be cut without permission of the owner's representative. Fences cut for any temporary purpose shall be repaired immediately upon completion of that purpose.

Gates may exist or be required along the ROW. The contractor shall furnish and install such gates as the owner's representative may direct as an extra cost to the owner.

The contractor shall keep closed except when moving personnel and equipment, all fence openings or gates. Particular care shall be taken to see that livestock are not allowed out of their intended bounds. The contractor is responsible for all consequential damages arising out of livestock being allowed out of their intended bounds or unauthorized access and damage from the general public as a result of their activities.

G. Overhead Electric Lines

Overhead lines energized at various voltages may be located within the ROW, cross the ROW and/or be parallel to the ROW at various locations. Such lines shall be considered energized <u>at all times.</u>

When in proximity to any overhead line:

1) The contractor is responsible to alert their people to the energized potential electrical hazard
2) The contractor is independently responsible to train maintain working clearance required b Occupational Health and Safety Regulations (29 CFR 1910.269 and ANSI Z-133)
3) The contractor shall further respond to applicable requirements of the owner's safety manual as the owner's representative may direct.

Should conditions develop where the performance of the work and overhead lines on the ROW are in conflict, the contractor shall not proceed with the work until after the situation has been reviewed with the owner's representative and all appropriate arrangements to address safety concerns or corrective actions made by the contractor.

During ROW clearing operations, including travel to and from worksites, the contractor shall set up equipment and arrange procedures to maintain safe vertical and horizontal clearances in accordance with OTRM 222.001. Elevating equipment shall be positioned in a manner and location so that the operation of this equipment would not violate owner requirements or safety regulations.

In any case, where equipment must be positioned so that it is capable of contacting any conductors, the owner's representative may require that the work proceed under the owner's protective tagging system. In such cases, the owner's representative shall define to the contractor whether the application of the protective tagging system provides an energized or de-energized line, and if energized, the limits of the protection provided.

H. Water Supply Areas

The owner will show on the project drawings where any portion of the work falls within a public water supply watershed or well field. It is the contractor's responsibility in a water supply area to:

1) Immediately remove any litter originating with his operations
2) Provide commercial toilet service for the control and removal of wastes
3) Ensure proper storage and containment of all chemicals and petroleum products. Prevent the spillage of any chemical or petroleum products. In the event of a spill, the contractor shall immediately report the spill to the owner's representative to initiate the necessary regulatory notifications and corrective action. Payment under the contract documents shall not be made for the work and materials expended to accomplish the required spill cleanup and rehabilitation.

I. Wetlands

Wetland areas designated on the plans or drawings shall be avoided to the extent practical and all activities within or adjacent to wetland areas shall follow the prescribed procedures or practices to be followed when working within or in close proximity to these areas.

1) Heavy machinery or equipment shall not be used in wetland areas
2) All vegetative debris must be removed immediately from wetland areas.
3) Storing of equipment and refueling shall not be allowed within 100 feet of any designated wetland boundary.
4) Prevent the spillage of any chemical or petroleum products. In the event of a spill, the contractor shall immediately report the spill to the owner's representative to initiate the necessary regulatory notifications and corrective action. Payment under the contract documents shall not be made for the work and materials expended to accomplish the required spill cleanup and rehabilitation.

J. Herbicide Treatments

Herbicides are not usually applied within the scope or during the schedule of work under a ROW clearing specifications. Any unusual case, which is an exception to this generality, shall be specified elsewhere in the contract documents.

5. Cutting

A. General Requirements

1) Stump Height - All stumps except those within access route areas shall be cut to a height above ground of not more than one-half the stump diameter. However, in no case shall stumps be left higher than 10" on the uphill side unless used as a support for a fence or for removal in areas where stumps will be removed. Within the Conductor Clearance Zone, all access routes and at all Structure Clearing Areas stumps shall be cut to within 3" of the ground. Stumps in developed lawn areas shall be ground to 6" below the surface, covered with 6" of soil, seeded, and mulched.

2) Cordwood – Where specifically designated on the drawings or in the Special Conditions, cordwood shall be cut in four (4) foot lengths and piled in accordance with the Disposal section.

3) Tree-length Logs – All logs not designated for use as cordwood shall be limbed-out into tree-length logs and disposed of as indicated in the Disposal section. The contractor may elect to cut the logs into shorter lengths.

4) Brush – The remaining limbed-out branches and small stems measuring less than 3" in diameter on the large end are designated "brush" and shall be disposed of as indicated in the Disposal section.

5) Danger Trees – The owner's representative shall designate removal of certain danger trees situated outside the limits of clearing shown on the drawings for which rights of removal have been obtained. These trees shall be removed and disposed of under the same provisions of the contract documents applying to these activities on the adjacent cleared ROW. Re-inspection of the ROW after the initial removal of marked danger trees may result in the owner's representative marking additional danger trees for removal.

6) Prohibitive Cutting – The contractor shall not remove trees outside the limits of clearing shown on the drawings unless marked by the owner's representative as a danger tree to be removed or in an Off-ROW Access Route marked by the owner's representative.

B. Cutting Areas

1) Conductor Clearance Zone – Within these areas all tall-maturing tree species as well as low growing shrub species shall be cut in order to provide a clear and accessible area for the construction of the new facilities.

2) Side Zones – Within these areas all tall-maturing tree species shall be removed. Where the density of trees to be removed in a given area will allow practical preservation of specimens in good condition, the owner's representative will preserve low-growing desirable species listed under OTRM 030 Appendix 1 and Appendix 2 to the extent practical. This will be allowed where vegetation to be preserved will not impinge upon the clearance envelope nor with construction, maintenance or operation of the proposed transmission line.

C. Pruning Practices – Trimming shall be accomplished in accordance with proper arboricultural practices and follow the guidelines established under ANSI Z-133;

1) When cutting back or topping trees, drop crotch trimming shall be used as much as possible and avoid cutting back to small suckers.
2) In general reduction of size (cut back or topping) not more than 1/3 of the total area should be reduced at a single operation.
3) All cuts shall be made sufficiently close to the parent stem so that healing can readily start under normal conditions.
4) All limbs 1 inch in diameter (size of a quarter) or over must be pre-cut to prevent splitting.
5) Trees showing visible signs of disease or damage shall be reported to the owner who will decide whether they will be trimmed or removed.

6. Disposal

A. General

1) Techniques – Disposal techniques will be as hereinafter specified or as may be more explicitly called for on the drawings or plans at a specific location.
2) Fallen Trees and Limbs – All trees and limbs in the proposed clearing area, which have fallen or were cut prior to the clearing of the ROW shall be considered part of the contract and disposed of accordingly. This does not apply to cuttings that were stacked to decay and provide wildlife habitat.
3) Danger Trees – Danger trees shall be disposed of under the same provisions of the contract documents that apply to disposal on the adjacent cleared ROW.
4) Cherry Tree Disposal Precaution – Wilted cherry leaves are poisonous to livestock, therefore, in areas frequented by livestock any cherry cuttings shall be disposed of immediately out of reach of livestock.

B. Logs

1) Tree-Length Logs – Removal of tree length logs in all areas shall be the primary method of disposal. Tree length logs including shorter lengths and limbs measuring at least three (3) inches in diameter on the small end shall be temporarily piled neatly within the cleared portions of the ROW outside the conductor clearance zone and as near the ROW boundaries as possible. However, none shall be piled within roads, paths, cleared areas for access roads, within 100 feet of a wetland boundary or within 100 feet longitudinally on either side of an angle point.

   Each pile shall be no higher than then (10) feet and no wider on the ground than sixteen (16) feet. Each pile shall be spaced at least six (6) feet from adjacent log piles or brush piles.
2) Cordwood – Where specified on the drawings cordwood in four (4) foot lengths shall be piled in four (4) foot high piles parallel to the sides of the ROW along the edges of the cleared areas. Single piles of cordwood shall not exceed sixteen (16) feet in length.
3) Salvageable Wood Products – For those forest products owned by the NU Operating Subsidiary and for which there is marketable value, NU will estimate the value of the timber and it shall be the contractor's responsibility to validate the value of the timber, to perform the cutting, salvage, and marketing operation

at his sole discretion, and shall be conducted subject to the constraints expressed below.

a) All forest products cut by the contractor for market become the property of the contractor and shall be removed from the ROW. Cutting remnants shall be disposed by either the manner specified for brush disposal at the cutting location, or when larger than brush size, shall be combined with the disposal of unmarketable logs in the manner specified for logs at the cutting location.

b) The contractor shall state the scope of their marketing intentions in their proposal, and shall quote a unit price or prices, which apply to material actually removed for market. The contractor shall report, subject to confirmation by the owner's representative, the materials actually removed from the ROW.

c) The contractor shall complete his removals for market within 90 days after cutting. With the expiry of the stated time, all materials then remaining on the ROW reverts to being the property of the owner.

d) The contractor may not conduct sales to the general public at or on the ROW locations

e) Sawlog measurement shall be based on the international (1/4" kerf) log scale. Trees cut for sawlogs shall be to a minimum of:

   i) 10" tip DIB for hardwoods (deciduous)

   ii) 6" tip DIB for softwoods (coniferous, including cedar)

Other measurements shall be as follows:

   i) Posts – linear foot, 10"DIB maximum

   ii) Cordwood – Standard Cord, 4X4X8

   iii) Wood Chips – cubic yard

C. Brush

1) Chipping – shall be the primary method of disposal. The chips shall not be left in piles but shall be spread on the ROW. The maximum depth of fresh chips shall be no greater than three (3) inches. Avoid burying desirable low-growing shrubs such as lowbush blueberries as practicable. Chips shall not be placed within access roads, structure-clearing areas, or within defined wetlands.

2) Piling – to the extent, may be allowed as method of disposal in some areas if noted on the Development and Management Plan. Brush shall be piled within the same cleared areas as the log piles. Each brush pile shall be no higher than four (4) feet and no longer than sixteen (16) feet on its maximum horizontal dimension. Each brush pile shall be separated from any other brush or log pile by at least six (6) feet. Care shall be taken not to pile within the Conductor Clearance zone or within 100 feet longitudinally in both directions from an angle point.

D. Burying

Burying of vegetative debris is not permitted as a means of disposal

E. Burning

Burning is not permitted as a method of disposal.

7. Deviations

   This standard sets forth the current NU 'best practices' for most applications of this subject matter. Therefore, deviation from this standard is generally not permitted. However, in unique instances a user may submit a written deviation request including justification to the listed Subject Matter Expert (SME). The SME must approve or deny the request in writing prior to the user commencing any non-standard activities. The SME may consult with his/her supervisor, co-SME if any and co-SME supervisor, and subsequently must copy any approval to them.

8. Approving Managers and SME's

   Manager-Transmission Line Construction & Maintenance; NU

   Manager of Transmission Engineering; PSNH

   SME

   Supervisor Transmission Vegetation Management NU

Revision History
Rev.0 – original issue 8/22/2006
Rev 1- Complete rewrite to comply with new national standards 7/29/2008

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ATTACHMENT 3

"Making Requests for Wood"
(www.transmission-nu.com/residential/pdf/wood.pdf)

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Making Requests for Wood

Northeast Utilities

Connecticut Light & Power
Public Service of New Hampshire
Western Massachusetts Electric

As part of any new transmission line construction project, Northeast Utilities (NU), through its operating companies, Connecticut Light & Power, Public Service of New Hampshire, and Western Massachusetts Electric, must remove vegetation from the transmission line rights-of-way. This vegetation removal facilitates the use of line construction equipment and better ensures the safety of construction crews. NU is also required to comply with mandatory federal standards which dictate specific distances that vegetation must be kept from conductors for transmission system reliability.

The vegetation clearing process is typically a very noticeable activity associated with the construction of new transmission lines. Clearing in some areas may seem especially significant to public observers either because electric facilities presently may not be using the full width of a right-of-way, or because additional right-of-way widths may have been acquired.

During the vegetation removal process, property owners whose land includes the rights-of-way being cleared are offered the opportunity to retain the cut wood for their personal use. Unless otherwise specified in the easement granting the transmission rights-of-way, this document outlines the process by which property owners can request the wood.

HOW TO RETAIN WOOD

Property owners whose land is crossed by a transmission line right-of-way being cleared are eligible to retain all or a portion of the wood from the trees cleared from their property. Wood is provided only for the property owner. It will not be provided for renters, neighbors, friends, family or others who are not the property owner of record.

NU compiles a list of property owners whose trees will need to be removed. Prior to the start of clearing, project representatives will inform each property owner of the amount of clearing necessary and the potential for keeping wood. A Wood Information Form must be signed by the property owner at this point.

Before the actual clearing begins, NU will review the requests of property owners interested in keeping wood. Agreement will be reached with each owner on the quantity of wood to be left, and the location for that wood. Wood will be left in a mutually agreeable location on the parcel of land from which the trees were removed, within an agreed-upon time period. Please be aware that the wood will be in log lengths, typically 18-22 feet long, and can be placed only in areas not considered wetlands or near rare, threatened, and/or endangered species habitats. The quantity and location of wood cannot be guaranteed and is subject to change based on accessibility, permit requirements, project constructability and maintenance requirements.

PROPERTY OWNERS WHOSE LAND INCLUDES THE RIGHTS-OF-WAY MAY RETAIN ALL OR A PORTION OF THE WOOD CLEARED FROM THEIR PROPERTY.

If you are a property owner and interested in keeping the wood of the trees cleared from your property, please advise the NU project representatives during the initial briefing.

You may also contact Anthony (Tony) Johnson at 860-665-3858 or anthony.johnson@nu.com.

Transmission Vegetation Management
Northeast Utilities, P.O. Box 270, Hartford, CT 06141
www.NUrightsofway.com or www.transmission-nu.com

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APPENDIX B

WETLANDS AND WATERBODIES IMPACT AVOIDANCE AND MINIMIZATION PROTOCOLS

August 2013

The Interstate Reliability Project will extend across various water resources, including wetlands and water bodies (i.e., watercourses, lakes, and ponds). This appendix presents the procedures that CL&P will use to avoid or minimize impacts to wetlands and waterbodies during construction and to restore such water resources after the completion of the 345-kV transmission line installation and the related minor modifications to adjacent lines.

All work involving water resources will be conducted in accordance with:

The requirements of Project-specific regulatory approvals from the U.S. Army Corps of Engineers (Clean Water Act Section 404 Individual Permit) and the Connecticut Department of Energy and Environmental Protection (Stream Channel Encroachment Line Permit and Clean Water Act Section 401 Water Quality Certificate; included in Volume 2, Attachment G of this D&M Plan);

and

CL&P's *Best Management Practices Manual: Connecticut Construction and Maintenance Environmental Requirements* (included in Volume 2, Attachment E of this D&M Plan).

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1. WETLANDS

1.1 INTRODUCTION

To minimize or avoid adverse effects to wetlands, CL&P has located new transmission line structures in upland areas wherever practical and has avoided the alignment of construction access roads across wetlands if there are practical upland alternative access routes available to reach the new transmission line structure locations. All work in wetlands will be in accordance with Project-specific conditions of permits issued by the USACE and CT DEEP (refer to Volume 2, Attachment G), and in accordance with the *Best Management Practices Manual: Construction and Maintenance Environmental Requirements for Connecticut* (*[BMP Manual]*; refer to Volume 2, Attachment E).

Wetland boundaries are illustrated on the Volume 3 maps. Volume 3 also includes a table (refer to Detail Sheets 1 and 2) that lists each wetland; identifies whether the wetland is a vernal pool; and summarizes the anticipated temporary or permanent impacts (e.g., due to vegetation clearing routes, access roads, work pads, fill) and secondary impacts (forest vegetation removal) within each wetland as a result of Project construction activities.

Wetland boundaries will be clearly flagged in the field prior to the commencement of work.

1.2 AVOIDANCE AND MINIMIZATION MEASURES

CL&P proposes the following measures to avoid or minimize impacts to wetlands during construction.

a. Comply with the conditions of the Council's Certificate and federal and state permits related to wetlands, including the implementation of invasive species control measures during construction (refer to the *Wetland Invasive Species Control Plan*).

b. Use low-impact equipment and install temporary timber mats (or equivalent) to minimize rutting during vegetation removal activities in wetlands.

c. Pile cut vegetation in upland areas so as not to block surface water flows within wetlands or otherwise adversely affect the integrity and function of the wetland.

d. Minimize the removal of stumps in wetlands. Stumps will only be removed if it is determined that intact stumps pose a safety concern for the installation of structures, movement of equipment, or the safety of personnel.

e. Install erosion and sedimentation controls around work sites in or near wetlands to define the limits of construction activity and to minimize the potential for erosion and sedimentation. No construction activities will be allowed in wetlands outside of the work limits defined by the erosion and sedimentation controls.

f. Inspect and maintain erosion and sedimentation controls throughout construction. Sediment that accumulates behind these controls will periodically be removed and placed in upland areas, in a manner that will preclude the potential for subsequent deposition into watercourses or other waters of the U.S., or will otherwise be disposed of off-site.

g. Limit grading for access roads and work areas in wetlands to the amount necessary to provide a safe workspace.

h. Install temporary construction matting or geotextile and stone for access roads across wetlands or to establish safe and stable construction work pads within wetlands, where necessary. The type of stabilization measures to be used in wetlands will depend on soil saturation and similar site-specific factors.

i. Avoid or minimize access through wetlands, where feasible. Where access roads must be improved or developed, the roads will be designed, where practical, so as not to interfere with surface water flow or the wetland functions.

j. Implement procedures to avoid or minimize the potential for spills into wetlands (refer to the *Spill Prevention and Countermeasures Plan*). No fuel will be stored or equipment refueled within 25 feet of any wetland, except under the following circumstance:

    - Equipment that is not readily mobile or must remain on-site for prolonged periods to safely complete a construction task (e.g., drilling rigs, cranes for structure installation) may be refueled in wetlands, providing proper temporary spill prevention, control, and containment procedures are followed.

k. Prohibit vehicles or equipment from being parked overnight on access roads or work pads in wetlands, except for equipment that cannot be practically moved, such as cranes.

l. Prohibit mixing, testing, storage, or disposal of concrete (which must be used for some structure foundations and guy anchors) within or adjacent to a wetland.

m. Prohibit stockpiling of excess soil generated as a result of structure/foundation installation work within wetlands, except that soils or other excavated material may be temporarily stockpiled and contained on the work pad located within a wetland prior to off-site transport. Excess soil will be removed from wetland work areas and spread in upland areas or disposed of at an approved disposal facility in compliance with applicable regulations (refer to the *Guidance for Soils and Groundwater Management*).

n. Remove, following the completion of transmission line installation, temporary fill materials from work sites in wetlands, including all geotextile fabric, gravel / stone, and timber mats used for work pads, and temporary access roads.

o. Restore wetlands, after transmission facility construction, to pre-construction configurations and contours to the extent practicable. Replace topsoil/organic soils disturbed by construction (as appropriate) and re-vegetate with annual ryegrass, appropriate wetland seed mix, or equivalent.

p. Inspect and maintain temporary erosion and sedimentation controls until restoration has been determined to be effective (typically 70% vegetative cover) per Project permit criteria.

1.3 POST-CONSTRUCTION MONITORING

After the completion of Project construction, CL&P will implement a post-construction monitoring program, which will be designed and executed pursuant to the conditions of permits and certificates from the USACE, CT DEEP, and the Council. In general, the post-construction monitoring will be performed to verify the success of Project restoration and, as necessary, to identify additional restoration measures that may be required. Monitoring may include inspections of percent vegetative cover, wetlands functions, and permanent erosion controls on the restored ROWs.

On a long-term basis, CL&P will conduct wetland invasive species monitoring and, as appropriate, will implement invasive species control as part of its overall ROW vegetation management program. This wetland invasive species monitoring and control effort will be implemented pursuant to CL&P's agreement with CT DEEP (refer to the *Wetland Invasive Species Control Plan*).

2. WATERBODIES

2.1 INTRODUCTION

The construction, operation, and maintenance of the Project will have a minimal effect on waterbodies (i.e., watercourses, lakes, ponds) and water quality. The design of the new 345-kV overhead transmission lines inherently avoids most direct adverse impacts to such water resources. Moreover, CL&P has taken a number of steps to further avoid and minimize impacts to waterbodies. For example:

- No new 345-kV transmission line structures will be placed in watercourses, lakes, or ponds;
- The new transmission line conductors will span over all watercourses, lakes, and ponds;
- Construction equipment access across major waterbodies (e.g., the Willimantic, Natchaug, Quinebaug rivers and Mansfield Hollow Lake) will not be required (the installation of the new 345-kV lines across these major waterbodies and some of the larger perennial streams will be accomplished by working from either side of the water body);
- Access roads across smaller watercourses along the ROWs will be improved (where roads exist) or established (new access roads) only as necessary for the safe construction, operation, and maintenance of the Project. Where access roads are required across streams, temporary spans (using mats or equivalent), temporary culverts, or permanent culverts will be installed, consistent with Project-specific federal and state regulatory requirements.

Where spans and/or culverts must be installed across watercourses, temporary and localized turbidity will likely occur, causing an unavoidable but short-term and minor change in background water quality. Best management measures will be implemented to minimize such impacts (refer to NU's *BMP Manual*, Volume 2, Attachment E). Any background change in water quality will be highly localized in the immediate vicinity of the crossing site and will typically be associated only with equipment crossings, the installation and removal of temporary spans (including temporary culverts), or the installation of permanent bridges/culverts.

Potential impacts to watercourses as a result of most transmission line construction activities will be limited to the crossing locations identified on the maps in Volume 3. With the exception of the temporary watercourse crossings that may be required by vegetation clearing crews (refer to the *Vegetation Clearing Plan*) to access areas of required tree removal, no other construction access across watercourses will be used without the prior approval of the state and federal regulatory agencies. Detail Sheets 1 and 2 in Volume 3 list the anticipated temporary or permanent impacts to water bodies (e.g., vegetation removal, fill) as a result of Project construction activities.

2.2 AVOIDANCE AND MINIMIZATION MEASURES

CL&P proposes the following mitigation measures during Project activities involving watercourse crossings. All work in or near waterbodies will be in accordance with Project-specific conditions of permits issued by the USACE and CT DEEP (refer to Volume 2, Attachment G), and in accordance with the *BMP Manual*. These measures are intended to avoid or minimize adverse impacts to watercourses by avoiding or limiting impacts on water quality and by maintaining flows.

a. Perform unconfined in-water activities (e.g., the installation of temporary and permanent watercourse crossings) during low-flow periods (June 1 through September 30), unless prior written approval from CT DEEP is received. Some crossings may have to be installed outside of typical low-flow periods in order to adhere to Project construction schedules and to conform to any transmission line outage windows that must be coordinated to maintain the reliability of the transmission grid. No access road crossings will be installed across watercourses during conditions of peak flows or bank-full conditions.

b. Install and maintain temporary erosion and sedimentation controls along the ROWs where construction activities disturb soils near watercourses. These controls will be installed and maintained to prevent sedimentation into water resources. Sediment that accumulates behind these controls will periodically be removed and placed in upland areas, in a manner that will preclude the potential for subsequent deposition into watercourses or other waters of the U.S., or will otherwise be disposed of off-site.

c. Where existing access roads must be improved or new access roads must be established across watercourses, clean materials will be used (e.g., clean riprap, gravel, stone or equivalent).

d. Access roads across watercourses will be installed, where practicable, so as to avoid or minimize direct adverse impacts to stream banks and stream-bottom sediments, as well as to provide unobstructed ambient flow in perennial streams (e.g., span crossings will provide adequate clearance above the watercourse to convey flows).

e. Major construction equipment will be prohibited from fording streams. However, depending on site-specific conditions, equipment used by vegetation clearing crews may have to pass across smaller watercourses to access areas to be cleared and/or to remove felled trees and other vegetation. Clearing crews may use mat spans, log corduroys or swamp mats, depending on site-specific conditions (refer also to the *Vegetation Clearing Plan*).

f. Where temporary construction work pads must be constructed over watercourses, the work pad design will incorporate culverts or other site-specific measures designed to maintain flows and minimize aquatic habitat disturbance during the construction period.

g. Existing riparian vegetation along the ROW within 25 feet of watercourse banks will be maintained, to the extent practicable and consistent with ROW vegetation management requirements.

h. Temporary and permanent culverts, where required, will be sized in general accordance with the state stream crossing standards.

i. Appropriate BMPs will be used, as determined by site-specific conditions, to prevent or minimize the potential for sedimentation into watercourses.

j. Mat spans or equivalent access across watercourses will be periodically swept, as appropriate, to minimize the potential for soil deposition into watercourses as a result of vehicle/equipment movements.

k. Concrete (used for some structure foundations and guy anchors) will not be mixed, tested, placed, or disposed of so as to enter a watercourse.

l. Except for equipment that is not readily mobile or must remain on-site for prolonged periods to safely complete a construction task (e.g., drilling rigs, cranes for structure installation), construction vehicles and equipment will not be refueled within 25 feet of a watercourse. For refueling that must be performed less than 25 feet from a watercourse, appropriate spill prevention measures, as detailed in the Project *Spill Prevention and Countermeasures Plan*, will be applied.

m. No bulk petroleum products will be stored within 25 feet of a watercourse.

n. As the final phase of construction, temporary mat spans and culverts will be removed and watercourses will be restored. Temporary erosion and sedimentation controls will be removed upon the stabilization of exposed soils near watercourses.

2.3 POST-CONSTRUCTION MONITORING

After the completion of Project construction, CL&P will implement a post-construction monitoring program, which will be designed and executed pursuant to the conditions of permits and certificates from the Council, CT DEEP, and the USACE. In general, the post-construction monitoring of watercourses will be performed to verify the success of stream bank and stream bed restoration and, as necessary, to identify additional restoration measures that may be required. Monitoring may include inspections of percent vegetative cover on stream banks and effectiveness of bank stabilization measures.

APPENDIX C

SUMMARY REPORT ON FARMLAND PROTECTION MEASURES AND CONSULTATIONS WITH FARMLAND PROPERTY OWNERS AND LESSEES

August 2013

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ATTACHMENTS

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1. INTRODUCTION AND SUMMARY

Pursuant to Condition 3(r) of the Council's Decision and Order for the Project, CL&P identified areas of active farmland along the Project ROWs and off-ROW access roads, and contacted and offered to meet with the property owners and lessees ("farmers") of active farmlands to discuss protection measures for agricultural soils. CL&P representatives subsequently met with all farmers who agreed to such meetings.

In active farmlands, Project construction will involve activities ranging from the installation and use of temporary work pads[1] and access roads, to the erection of new 345-kV transmission line structures and guy wires, relocation of existing guy wires/anchors supporting adjacent line structures, and conductor stringing. Grounding systems also will be installed.

To identify active farmlands both within the transmission line ROWs and along off-ROW access roads, CL&P:

- Analyzed aerial maps of the Project area;
- Reviewed U.S. Department of Agriculture, Natural Resources Conservation Service soils maps;
- Considered the results of field investigations of the Project ROWs;
- Examined town data regarding properties with farmland tax status; and
- Incorporated information from previous Project community outreach activities.

Using this information, CL&P compiled a list of the active farmland properties along the Project route and then consulted with the farmers of such properties.

Table 1 in Attachment 1 summarizes the results of CL&P's consultations conducted with farmers. Attachment 2 includes a copy of the typical information package that CL&P provided to and discussed with each farmer.

CL&P's consultations with the farmers revealed that the primary issues of concern regarding Project construction and farmland preservation are:

- The proposed locations of and improvements to construction access roads (e.g., which roads would be temporary and which would remain permanently);

[1] Work pads include those required for new line structures, wire pulling, and guard structures.

- The mechanisms for topsoil preservation (e.g., temporary topsoil removal from work sites, temporary topsoil stockpiling, and topsoil replacement as part of ROW restoration); and

- The construction schedule and potential effects on cropland use.

The locations of active farmlands and the construction-related protection and mitigation measures applicable to each property, as identified based on CL&P's consultations with the farmers, are depicted on the Volume 3 maps. Typical farmland mitigation measures and typical construction procedures for construction work in farmlands are included Detail Sheet 8 in Volume 3.

Based on the consultations with the farmers, CL&P will implement measures to:

- Protect active farmlands during Project construction; and

- Restore temporarily affected farmlands to productive farmland use after the completion of construction (refer to Section 2).

The procedures that CL&P will implement to minimize impacts on active farmlands reflect the commitments that CL&P made during the Council's siting process concerning construction in active farmlands and incorporate NU's existing guidelines regarding transmission line ROW activities in agricultural lands (refer to Attachment 2, *Transmission Right-of-Way Activities in Agricultural Lands and Transmission Rights-of-Way Restoration*).

2. FARMLAND PROTECTION MEASURES

During construction, the measures described in this section will be implemented in active farmlands, as applicable, to protect agricultural soils and minimize adverse effects on active farmland uses. The measures apply to the active farmlands identified on the Volume 3 maps.[2] Volume 3 also includes typical drawings for the installation of access roads and work pads in active farmlands (refer to Detail Sheet 8).

2.1 General Measures

- No new permanent access roads will be located in active farmlands unless approved by the landowner.

- Temporary access roads and work pads will be sited, to the extent practicable, to avoid or minimize disruptions to active farm uses.

- Except for equipment that cannot practically be moved once in place (e.g., cranes), no equipment or vehicle refueling will be performed in active farmlands. If equipment refueling must be conducted in active farmlands, appropriate leak and spill prevention measures will be used, as specified in the Project's *Spill Prevention and Countermeasures Plan* (refer to Volume 2, Attachment B).

- Existing agricultural drainage and erosion control features (e.g., ditches, swales) will be avoided during construction to the extent practical. If avoidance is not possible, the construction contractor will take appropriate measures to maintain the effectiveness of the existing features. Any drainage features disturbed by construction activities will be repaired.

- Hay bales (which may contain seeds inappropriate to farm use) will not be used for temporary erosion and sedimentation control in active farmlands unless specifically approved by the farmer. (Instead, straw bales, weed-free hay, or other types of erosion and sedimentation control measures will be used as appropriate.)

[2] The Volume 3 maps depict all known active farmlands along the Project ROWs and proposed off-ROW access roads. If additional active farmlands are identified after approval of the D&M Plan, CL&P will consult with the affected farmer(s) regarding property-specific issues and will implement the protection and mitigation measures identified in this section. A D&M Plan Change Notice will be provided to the Council, as described in Volume 1, Section 7.

2.2 Specific Construction Measures

Work Boundaries

- The boundaries of all work areas (e.g., on- and off-ROW access roads, work pads) will be as identified on the Volume 3 maps.

- No vehicles or equipment will be allowed outside the identified work areas, except to remove, stockpile, and process forest vegetation as may be necessary to maintain mandated clearance from the transmission line conductors, or to install counterpoise, as needed.

- If the construction work area divides an active farmland area, upon the farmer's request, appropriate access will be provided across the construction zone for farm uses and temporary fencing and gates will be installed if needed.

Access Roads and Work Pads

- Topsoil will be removed from work sites (access roads and work pads) and stockpiled along the ROW or in other areas designated by individual farmers. Topsoil storage piles will be protected with temporary erosion and sedimentation controls and may be stabilized temporarily by seeding or by other measures, in accordance with landowner agreements, NU's BMPs (refer to Volume 2, Attachment E) and CT DEEP permit requirements (refer to Volume 2, Attachment F).

- Access roads and work pads will be built in accordance with the specifications for work in farmlands (refer to Volume 3).

- Access roads will be maintained throughout construction to allow safe use and, if requested by the farmer, crossing by farm machinery.

- Silt fence or similar measures may be installed, as appropriate, along access roads and around work pads to prevent the mixing of gravel with subsoil or with adjacent topsoil.

- Construction equipment and vehicles will use only designated access roads. No vehicle or equipment parking will be allowed outside of the identified access roads and work pads.

Structure Foundations: Excavation and Backfill

- Any excess subsoil or water pumped from structure foundation excavations will be handled in accordance with CL&P's *Guidance for Soils and Groundwater Management* and *Material Handling* (refer to Volume 2, Attachment C).

- Excavated subsoil and rock will not be stockpiled or spread on active farmland or on topsoil stockpiles. Excess excavated subsoil and rock will be removed from active farmlands.

- Concrete trucks will be restricted to designated access roads and work pads. Concrete truck wash-out areas will not be located within active farmlands.

Guy Wires and Anchors

- To the extent practical, guy wires and anchors will be placed outside of active farm land.
- All guy wires will be shielded with highly visible guards.

Structure Grounding

- Ground rings, ground rods, and counterpoise will be buried to provide a minimum depth of 24 inches.
- In areas where topsoil has been removed (e.g., within the footprint of work pads and access roads), ground rings, ground rods, and counterpoise may be installed prior to the replacement of topsoil.
- In areas where topsoil has not been removed, grounding systems will be directly embedded through topsoil and subsoil layers.

2.3 Restoration

Following the installation of the new transmission line, active farmlands will be restored to pre-construction condition, unless otherwise specified in farmer agreements with CL&P.

The following activities typically will occur during restoration:

- Temporary access roads and work pads, including all geotextile fabric and gravel/crushed stone, will be removed. Improvements to existing permanent access roads may be left in place with the mutual agreement of CL&P and the landowner; however, any such permanent improvements must be in full compliance with federal and state regulations. The Volume 3 maps identify access roads as permanent or temporary, based on the results of CL&P's consultations with farmers.
- In locations where topsoil was removed from work sites, subsoil may be decompacted, if necessary, prior to topsoil replacement.
- All construction materials and debris, including temporary erosion and sedimentation controls, will be removed and properly disposed of off-site.
- Topsoil will be spread over the subsoil and re-graded to match original depth and contours to the extent practicable.
- Drainage features (if affected by construction activities) will be restored.
- Restored farmlands will be stabilized with seed and/or mulch in consultation with the farmer. If a future crop type is undetermined at the time of restoration, the site will be seeded with annual rye or similar cover crop, or as agreed to with the farmer.

- If restoration occurs outside of the growing season, restored areas will be stabilized by mulching with weed-free hay, straw, or other measures, based on farmer preference and CL&P agreement.

- Temporary fences and gates will be removed and pre-existing permanent fences and gates re-established, pursuant to farmer agreements.

ATTACHMENT 1

SUMMARY OF CONSULTATIONS WITH ACTIVE FARMLAND PROPERTY OWNERS AND LESSEES

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Table 1
Report on Consultations with Property Owners and Lessees of Active Farmland

NOTES:
Based on consultations with farmers (property owners and lessees):

1. **Topsoil will be removed from all access roads and work pads, and stockpiled in nearby areas along the ROW unless other locations are designated by the farmer.**
2. **Access road and work pad construction in active farmlands will be as identified on the typical drawings included on Detail Sheet 8, Volume 3.**
3. **After the installation of the Project facilities, all work pads in active farmlands will be removed, topsoil will be re-spread, and the affected farmland areas will be restored. Access roads will similarly be removed unless the farmer has otherwise requested that they remain (refer to this table and the Volume 3 maps).**

Town / Volume 3 Map No.	Line List No.	Access Road		Work Pad Structure No. / Other Work Pad Type	Comments
		General Location (refer to Volume 3 maps)	Farmer Requests Regarding Access Roads		
Coventry					
6	30060	Structure 29 to Babcock Hill Road	Remove access roads in active farm fields; roads located along edge of field to remain permanently	Structures 29 and 30	
Mansfield					
10	30108, 30109	Structure 51 to Structure 55 Off-ROW access roads (AR-54 and -55) from Mansfield City Road	Portions of access roads in upland, non-farm areas to remain; AR-54 &-55 to remain	Structures 51 through 55; potential wire pulling pad between Structures 52 and 53	
11	30111.02	Alternative access road from Mansfield City Road	Remove temporary access road	-	
14	30134, 30140	Structure 73 (adjacent to Storrs Road) to Structure 75	Access road between Structures 73 and 75 may potentially remain permanently per landowner request (see comments); other portions of access road to be removed	Structure 74	Access road that farmer has requested remain permanently is within a designated state-listed threatened and endangered species habitat. CL&P will not leave permanent access roads in state-listed habitats without the concurrence of the CT DEEP.
14	30141	Structure 76 to Bassetts Bridge Road	Remove temporary access road	Structures 76 and 77; guard structure pad adjacent to Bassetts	

Town / Volume 3 Map No.	Line List No.	Access Road		Work Pad Structure No. / Other Work Pad Type	Comments
		General Location (refer to Volume 3 maps)	Farmer Requests Regarding Access Roads		
				Bridge Road	
15	30146	Bassetts Bridge Road to Structure 78	Remove temporary access road	Structure 78	
15	30148	Structure 78 to Structure 79	Remove temporary access road	Potential wire pulling pad	Push topsoil to side of ROW, restore after construction.
15	30151	Vicinity of Structure 79	Remove temporary access road	Structure 79	
Chaplin					
18	30183, 30185	Structure 92 to Structure 95	Remove temporary access road	Structures 93 and 94	Push topsoil removed along access road to side of road; topsoil removed from work pad sites will be piled within ROW.
21	30213	Structure 110 to Chewink Road	Remove temporary access road	Structure 111	Topsoil removed from work pad site will be piled within ROW.
Hampton					
27-28	30259	South Bigelow Road to Structure 146	Access roads will remain permanently (refer to Comments)	Structures 145 and 146	All access roads will remain. Access roads in fields to be installed at grade.
Brooklyn					
32	30280	Stetson Road to Structure 167	Access roads within ROW will remain permanently; no roads will be within tree farm portion of property	-	Christmas tree farm; no access roads or work pad sites proposed within farmland.
34	30290	Structure 177 to Windham Road	Remove temporary access roads in active farmlands	Structure 177	Access roads to be removed within active farmland. Landowner will decide during construction if access roads outside of active farmlands are to remain.
39A	30339, 30339.01	Brown Road to ROW near Structure 204	To be determined later by farmer	-	Christmas tree farm; CL&P will continue to coordinate with landowner regarding whether access road is to remain permanently or not.

Town / Volume 3 Map No.	Line List No.	Access Road		Work Pad Structure No. / Other Work Pad Type	Comments
		General Location (refer to Volume 3 maps)	Farmer Requests Regarding Access Roads		
40	30340	Access road from Barrett Hill Road to vicinity of Structures 208 and 209	Remove access roads in active farm fields; roads located along edge of field to remain permanently	-	
42	30362	Church Street to Structure 217	Remove temporary access road	Structures 216, 217; potential wire pulling pad -	
43, 44	30368	Access roads from Day Street to Structures 220, 221, access road to Structure 222	Remove access roads in active farm fields; roads located along edge of field to remain permanently	Structures 220 and 221, potential wire pulling pad	
Pomfret					
45	30374	Structure 226 to Structure 228, vicinity of Woods Hill Road	Remove access roads in active farm fields; roads located along edge of field to remain permanently	Structures 226, 227, and 228	
45	30375	Vicinity of Woods Hill Road to Structure 230	Remove temporary access road	Structure 229	Push topsoil removed along access road to side of road; topsoil removed from work pad sites will be piled within ROW.
46-47	30380	South of Structure 234 to Structure 236	Remove access roads in active farm fields; roads located along edge of field to remain permanently	Structure 235	
Killingly					
47, 47A, 48	30390	Vicinity of Structures 240 and 241 Portions of alternative access road from Cotton Bridge Road	Access roads to remain in non-active farmlands that are not within environmentally sensitive areas	-	No active farmlands will be affected at work pad sites.
Putnam					
50, 51	30413	Structure 256 to access road from River Road	Remove access roads in active farm fields; roads located along edge of field to remain permanently	Structures 256 and 257	
51	30414	Structure 258 to 259	Remove access roads in active farm fields; roads located along edge of field to remain permanently	Structures 258 and 259	

Town / Volume 3 Map No.	Line List No.	Access Road		Work Pad Structure No. / Other Work Pad Type	Comments
		General Location (refer to Volume 3 maps)	Farmer Requests Regarding Access Roads		
52	30415	Between Structures 259 and 260	Remove access roads in active farm fields; roads located along edge of field to remain permanently	N/A	
52	30416	Structure 260 to 261	Remove access roads in active farm fields; roads located along edge of field to remain permanently	Structures 260 and 261	
56-57	31024	Killingly Avenue (Route 12) to Structure 285	Remove access roads in active farm fields; roads located along edge of field to remain permanently	Structure 283	
57-58	31032	Heritage Road to Structure 290 / 291 and distribution line work pad	Remove temporary access road	Structure 290; distribution line work pad; potential wire pulling pad	Remove topsoil such that temporary access road is at grade with the field on either side.
58	31036	Structure 291 to Tourtellotte Road	Remove temporary access road	Potential wire pulling pad; guard structure pad	
58	31040	Tourtellotte Road to Structure 293	Remove temporary access road	Structures 292 and 293	Remove topsoil such that temporary access road is at grade with the field on either side
58-59	31041	Structure 295 to Liberty Highway (State Route 21)	Remove temporary access road	Structure 295	
59	31045	Liberty Highway (State Route 21) to Structure 296; Aldrich Road to Structure 297 (no access road in active farmlands between these two structures)	Remove temporary access road	Structures 296 and 297	Maintain owner access at Structure 297.
60	31065	Vicinity of Structure 303	Remove temporary access road	Structure 303	

* No active farmlands are located along the Project ROWs in the towns of Lebanon, Columbia, or Thompson.

ATTACHMENT 2

EXAMPLE OF TYPICAL INFORMATION PROVIDED TO FARMERS

Including the Following NU Guidelines:

- TRANSMISSION RIGHT-OF-WAY ACTIVITIES IN AGRICULTURAL LANDS

- TRANSMISSION RIGHTS-OF-WAY RESTORATION

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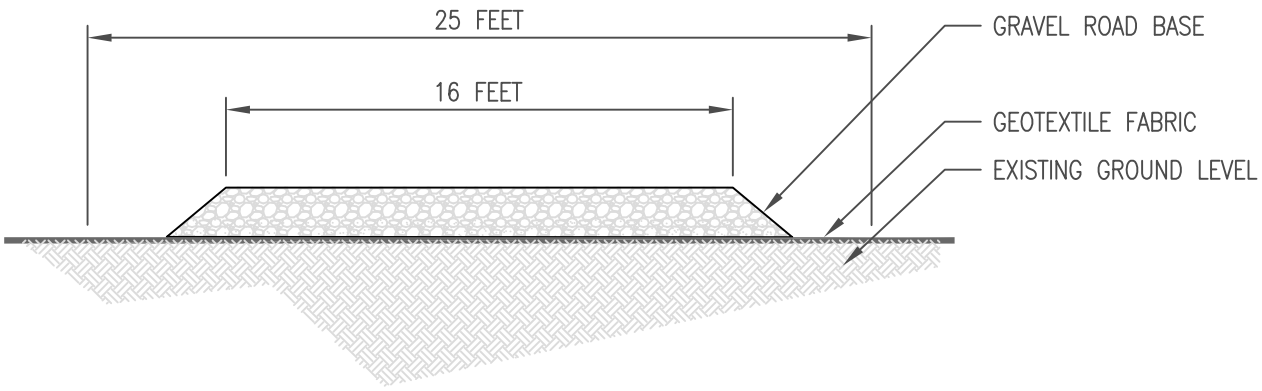
TYPICAL ACCESS ROAD CONSTRUCTION
ACTIVE FARMLAND
(NO TOPSOIL REMOVAL)



NOTES:

1. PROPOSED ACCESS ROAD IS NOT CONSIDERED A PERMANENT IMPROVEMENT AND WILL BE REMOVED AT END OF THE PROJECT, UNLESS OTHERWISE REQUESTED BY PROPERTY OWNER.

2. TYPICAL ACCESS ROAD WIDTH INCLUDING SHOULDERS IS 25 FEET. MINIMUM ACCESS ROAD WIDTH FOR CONSTRUCTION IS 20 FEET, WITH A TRAVELWAY WIDTH OF 16 FEET. WIDTH MAY VARY DEPENDING ON SITE CHARACTERISTICS.

3. DRAWING IS NOT TO SCALE.

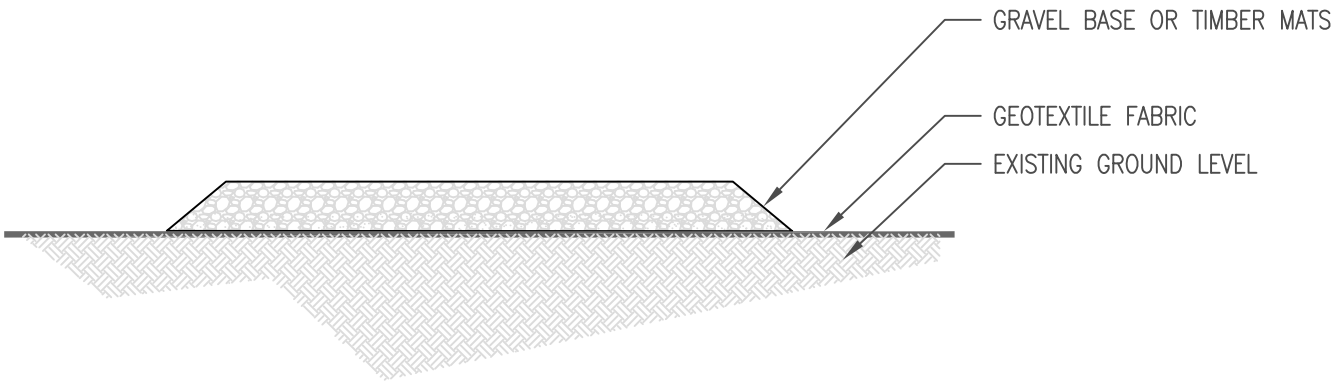
PRELIMINARY - NOT FOR CONSTRUCTION

DRAFT

Northeast Utilities Service Co.			
FOR INTERSTATE RELIABILITY PROJECT			
TITLE TYPICAL ACCESS ROAD – SECTION (ACTIVE FARMLAND)			
BY MJM	CHKD. .	APP. .	APP. .
DATE 2/20/13	DATE .	DATE .	DATE .
SCALE NONE	SIZE A	DWG. NO. FARMLAND FIGURE 1	
PROJ.	V.S.		

N:\NUSCO\46197 – Interstate\Cadd\Access Road Drawings\Access_Road_Typ_Sec_1.dwg (Figure1) 03-07-2013 08:18 MJM B&McD

TYPICAL WORK PAD CONSTRUCTION
ACTIVE FARMLAND
(NO TOPSOIL REMOVAL)



NOTES:

1. PROPOSED WORK PAD IS NOT CONSIDERED A PERMANENT IMPROVEMENT AND WILL BE REMOVED AT THE END OF THE PROJECT, UNLESS OTHERWISE REQUESTED BY THE PROPERTY OWNER.
2. ACTUAL DIMENSIONS OF INDIVIDUAL WORK PAD WILL VARY, DEPENDING ON SITE CHARACTERISTICS AND ON THE TYPES OF STRUCTURES TO BE INSTALLED.
3. TYPICAL WORK PAD DIMENSIONS ARE 100 FEET WIDE BY 120 FEET LONG FOR IN-LINE (TANGENT) STRUCTURES, AND 100 FEET WIDE BY 200 FEET LONG FOR ANGLE STRUCTURES.
4. DRAWING IS NOT TO SCALE.

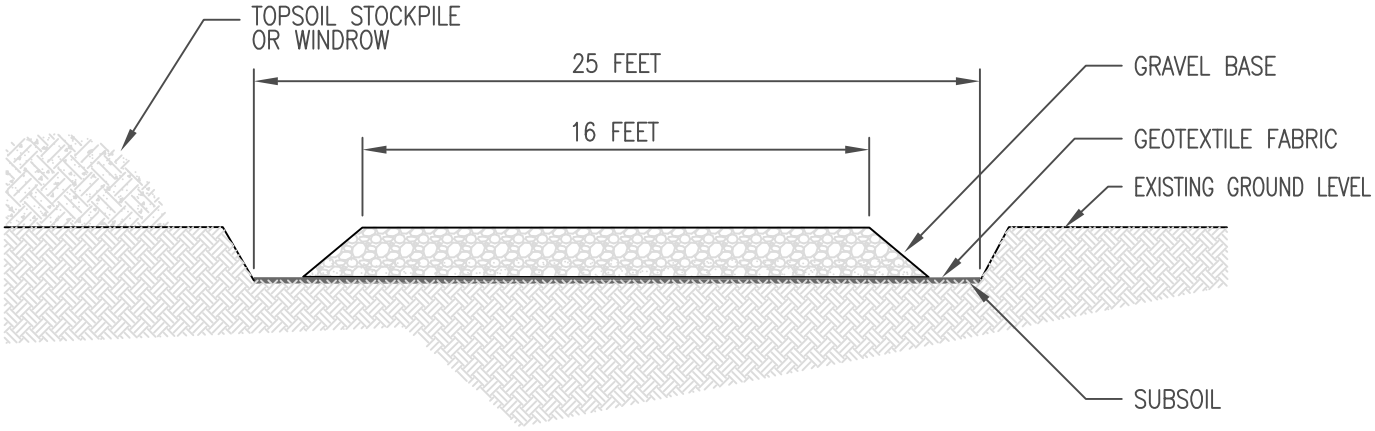
PRELIMINARY - NOT FOR CONSTRUCTION

DRAFT

Northeast Utilities Service Co.			
FOR INTERSTATE RELIABILITY PROJECT			
TITLE: TYPICAL WORK PAD – SECTION (ACTIVE FARMLAND)			
BY MJM	CHKD. .	APP. .	APP. .
DATE 2/20/13	DATE .	DATE .	DATE .
SCALE NONE	SIZE A	DWG. NO. FARMLAND FIGURE 2	
PROJ.	V.S.		

N:\NUSCO\46197 – Interstate\Cadd\Access Road Drawings\Work_Pad_Typ_Sec2.dwg (Figure2) 03-07-2013 08:18 MJM B&McD

TYPICAL ACCESS ROAD CONSTRUCTION
ACTIVE FARMLAND
(TOPSOIL REMOVAL)



NOTES:

1. TOPSOIL WILL BE REMOVED FROM WORK AREAS BUT REMAIN ON PROPERTY. TOPSOIL WILL BE STOCKPILED OR WINDROWED IN UPLAND AREAS.

2. PROPOSED WORK PAD IS NOT CONSIDERED A PERMANENT IMPROVEMENT AND WILL BE REMOVED AT END OF THE PROJECT, UNLESS OTHERWISE REQUESTED BY THE PROPERTY OWNER.

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4. AFTER REMOVAL OF ROAD, TOPSOIL WILL BE SPREAD OVER WORK AREAS TO PRE-CONSTRUCTION CONTOURS TO THE EXTENT PRACTICABLE.

5. DRAWING IS NOT TO SCALE.

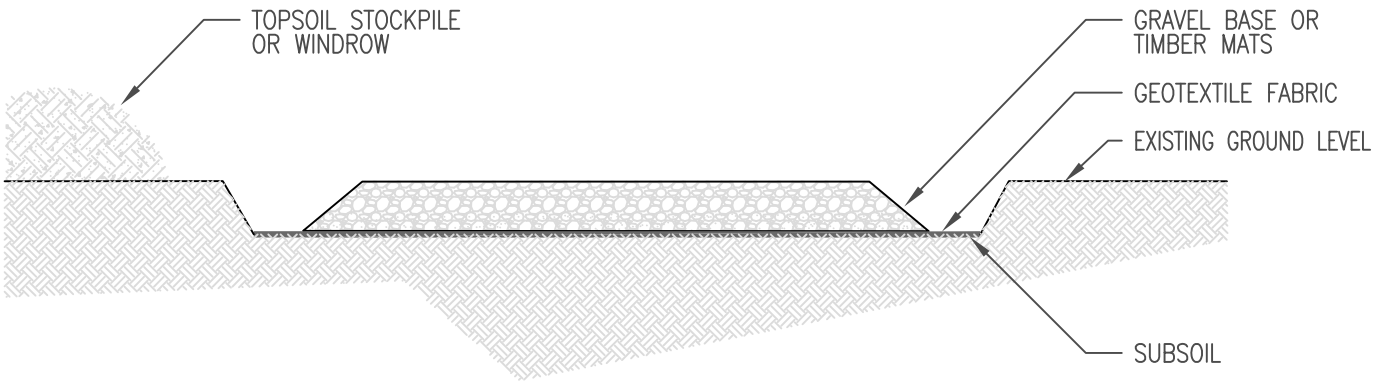
PRELIMINARY - NOT FOR CONSTRUCTION

DRAFT

Northeast Utilities Service Co.			
FOR INTERSTATE RELIABILITY PROJECT			
TITLE TYPICAL ACCESS ROAD – SECTION (ACTIVE FARMLAND–TOPSOIL REMOVAL)			
BY MJM	CHKD. .	APP. .	APP. .
DATE 2/20/13	DATE .	DATE .	DATE .
SCALE NONE	SIZE A	DWG. NO. FARMLAND FIGURE 3	
PROJ.	V.S.		

N:\NUSCO\46197 - Interstate\Cadd\Access Road Drawings\Access_Road_Typ_Sec_2.dwg (Figure3) 03-07-2013 08:18 MJM B&McD

TYPICAL WORK PAD CONSTRUCTION
ACTIVE FARMLAND
(TOPSOIL REMOVAL)



NOTES:

1. TOPSOIL WILL BE REMOVED FROM WORK AREAS BUT REMAIN ON PROPERTY, AND WILL BE STOCKPILED OR WINDROWED IN UPLAND AREAS.
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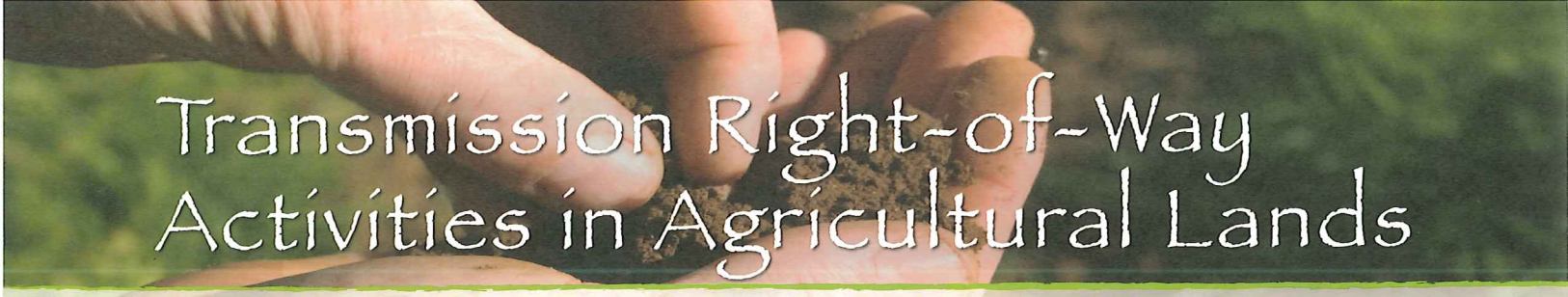
PRELIMINARY - NOT FOR CONSTRUCTION

DRAFT

Northeast Utilities Service Co.			
FOR INTERSTATE RELIABILITY PROJECT			
TITLE: TYPICAL WORK PAD – SECTION (ACTIVE FARMLAND–TOPSOIL REMOVAL)			
BY MJM	CHKD. .	APP. .	APP. .
DATE 2/20/13	DATE .	DATE .	DATE .
SCALE NONE	SIZE A	DWG. NO. FARMLAND FIGURE 4	
PROJ.	V.S.		

N:\NUSCO\46197 - Interstate\Cadd\Access Road Drawings\Work_Pad_Typ_Sec3.dwg (Figure4) 03-07-2013 08:18 MJM B&McD



Transmission Right-of-Way Activities in Agricultural Lands

Northeast Utilities

Connecticut Light & Power
Public Service of New Hampshire
Western Massachusetts Electric

Northeast Utilities (NU), through its operating companies, Connecticut Light & Power, Western Massachusetts Electric and Public Service of New Hampshire, manages nearly 1,900 miles of transmission line rights-of-way in Connecticut, Massachusetts and New Hampshire. Where transmission lines span agricultural lands, NU works closely with property owners to protect their farmland while maintaining the right-of-way for utility transmission and distribution uses. On NU-owned property, we also consider licensing portions of our property to farmers for agricultural or other purposes.

As NU improves its transmission system to better serve customers, we may need to temporarily work in croplands and pasturelands located within rights-of-way. In some instances, this may affect ongoing agricultural activities in and around the rights-of-way. While easement agreements typically grant NU rights to clear vegetation that may interfere with construction, operation or maintenance of the transmission system, we are committed to being good neighbors and partners. As such, when we undertake transmission system improvements, NU will work closely with landowners, licensees and stakeholders to minimize agricultural impacts.

NORTHEAST UTILITIES MAKES REASONABLE EFFORTS TO COORDINATE THE SCHEDULE OF CONSTRUCTION-RELATED ACTIVITIES AROUND THE GROWING AND HARVEST SEASONS.

Some of our routine practices include:

Scheduling Considerations

Whenever possible, NU makes reasonable efforts to coordinate the schedule of construction-related activities around the growing and harvest seasons to minimize the impacts on agricultural operations. When this is not possible, NU pursues reasonable measures to mitigate any impacts.

Restoration of Disturbed or Compacted Soils

NU recognizes that disturbed soils, or soils compacted by heavy construction equipment, may affect the soil's ability to support certain agricultural activities. NU takes reasonable steps to avoid or minimize soil compaction, and will restore soils that are compacted by construction equipment. NU also works with affected landowners to determine the appropriate method for restoring the soils, and is open to discussing and implementing the landowners' alternative restoration suggestions.

After a transmission system improvement is complete, NU removes all construction-related equipment and debris from the right-of-way.

Soil Preservation and Erosion Controls

NU will implement all required and other reasonable efforts for soil preservation and erosion controls in compliance with all applicable permits and good utility practices. These practices are designed to minimize or eliminate potential adverse environmental effects that may result from construction activities. Examples of these mitigation measures include the use of hay bales and silt fences.

continued >

NU will implement all required and other reasonable efforts for soil preservation and erosion controls.

Excess Soil Removal

After the installation of a transmission system structure is complete, soil material that was excavated to enable the structure installation will be used as backfill. The remaining excavated sub-surface soils will be removed from the site unless otherwise requested by the landowner.

Right-of-Way Restoration

After construction is complete, NU, through its contractors, is responsible for importing clean fill to ensure that cropland or pastureland is restored. NU works with landowners to determine an appropriate method for restoring the surface soils, including the appropriate seed mix, to restore pasturelands to their pre-construction condition.

Addressing Damage to Property or Other Losses

NU works closely with landowners to develop and implement construction and maintenance methods that minimize or prevent property damage or other losses that may occur as a result of these activities. If a landowner believes that transmission system improvements have caused property damage or other losses, the owner should contact his or her NU project representative, account executive or customer service representative by calling 800.286.2000 (860.947.2000 in the Hartford/Meriden area). NU will investigate the claim and the landowner will be advised as soon as practicable as to NU's position concerning the acceptance or denial of a claim.

NU is committed to working with landowners before, during and after transmission construction on transmission rights-of-way. Our intent is to minimize or avoid any adverse impacts or inconveniences during construction and/or maintenance activities.

For More Information

For more information, please contact **Anthony (Tony) Johnson** at 860.665.3858 or johnsaw@nu.com.

Transmission Vegetation Management
Northeast Utilities
P.O. Box 270
Hartford, CT 06141-0270

www.NUrightsofway.com

Transmission Rights-of-Way Restoration

Northeast Utilities

Connecticut Light & Power
Public Service of New Hampshire
Western Massachusetts Electric

Northeast Utilities (NU), through its electric operating companies, Connecticut Light & Power, Western Massachusetts Electric, and Public Service of New Hampshire, manages nearly 1,900 miles of transmission line rights-of-way (ROW) in Connecticut, Massachusetts and New Hampshire. During line maintenance and construction activities within these ROWs, NU will make reasonable efforts to avoid or minimize disturbances to a landowner's property including damage to trees, shrubs, lawns, and gardens, as well as non-vegetation items such as walls and fences. However, despite such efforts during these activities, some damage to private property may be unavoidable. If this occurs, NU will restore property to its pre-construction condition in a manner that is compatible with NU's operations and maintenance activities. This will take place as soon as is reasonably possible following construction completion.

Restoring Vegetation Areas

When construction or maintenance is complete, disturbed ROW areas will be restored. Erosion controls will also be removed, although some may need to remain until the area is stabilized or until removal is directed by a regulating authority. In previously unlandscaped areas, native shrubs and ground cover will be allowed to grow. In areas that were previously covered with grass, NU will restore the area to its pre-construction condition with topsoil and seed. In some areas where visual impacts are greatest, NU will replant trees and shrubs with vegetation that is compatible with the future operation and maintenance of its transmission lines according to NU's guideline entitled, "Vegetation for Transmission Rights-of-Way" and as required by state law and/or regulatory directive.

Restoring Access Roads and Work Areas

Construction and maintenance vehicles must be able to safely access each structure location. In the early stages of a new line's construction, gravel roads approximately 15 to 20 feet wide may be built to support the movement of large equipment and materials. Level gravel work areas ("crane pads") are also needed to stabilize equipment.

When construction is complete, access roads may remain for future maintenance of the transmission facilities within the ROW. Most crane pad areas will be removed and the area will be rehabilitated with topsoil and reseeded. Temporary erosion controls, such as hay bales and silt fences, may need to remain in some areas to prevent soil erosion until the grass or other vegetation regenerates.

Addressing Damage to Property or Other Losses

NU will attempt to minimize property damage or other losses that may occur as a result of construction and maintenance activities. If a landowner believes that transmission system work has caused property damage or other losses, the owner should contact his or her NU project representative, account executive or customer service representative by calling 800.286.2000 (860.947.2000 in the Hartford/Meriden, CT, area). NU will investigate the claim, and the landowner will be advised as soon as practicable concerning the response to the claim.

For More Information

www.NUrightsofway.com

Anthony (Tony) Johnson
johnsaw@nu.com
860.665.3858

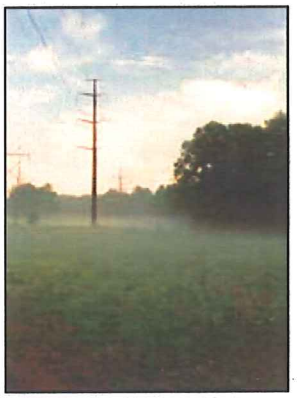
Transmission Vegetation Management
Northeast Utilities, P.O. Box 270, Hartford, CT 06141-0270

New England East-West Solution (NEEWS)

Greater Springfield Reliability Project (GSRP)

Interstate Reliability Project (Interstate)
- Project Description
- Project Need & Benefits
- Community Involvement
- Archived Documents
- Contact Information

Central Connecticut Reliability Project (Central)



Community Involvement

Development and Management (D&M) Plans - Connecticut

Click Map to Enlarge

Overview & Background on the D&M Plan Process

As the next step in the Connecticut siting process, CL&P is preparing the required construction plans, called Development and Management (D&M) Plans, for the Project. The D&M Plans include, among other things, conditions ordered by the CSC in its Decision; a detailed site plan showing work areas and structure foundations; and a description of the public review process designed to get comments on the Plans.

There will be opportunities for Town officials, the public and other interested stakeholders to review and comment on the draft D&M Plans. More information on the D&M Plans will be posted on this website when available.

Development & Management (D&M) Plans -- Open Houses

CL&P will host two open houses for the public to learn more about the construction plans, called Development & Management (D&M) Plans, for the Interstate Reliability Project. Local residents, businesses, municipal officials and other interested persons are invited to attend one of the two open houses that are being held in June 2013 (see open house session listing below).

At the open houses, Project representatives will discuss construction plans and will respond to questions and concerns residents and others may have about the construction process. The open houses are part of CL&P's ongoing commitment to keep customers informed about the company's work in the community.

Interstate Reliability Project Open House sessions:

Please click here if you would like to be added to our Project Update e-mail list.

Wednesday, June 12, 2013, 6-8 p.m.
Mansfield Community Center
10 South Eagleville Road
Mansfield, CT 06268

Thursday, June 13, 2013, 6-8 p.m.
Quinebaug Valley Senior Center
69 South Main Street
Brooklyn, CT 06234

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Your Voice Matters | Stay Informed | Environmental Stewardship | Q&As
NU Transmission Home | Media Information | Contact Us | Privacy Statement

APPENDIX D

WETLAND INVASIVE SPECIES CONTROL PLAN

August 2013

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1. INTRODUCTION

This Wetland Invasive Species Control Plan (WISCP, Plan)[1] describes the procedures that CL&P will apply to avoid or minimize the potential for the spread of invasive plant species in wetlands located within the Project ROWs during construction, and also includes the general agreement between CL&P and the CT DEEP regarding the long-term monitoring for and control of invasive species in wetlands along the ROWs. The procedures described in this WISCP will be implemented in wetlands that are affected by Project construction activities.

The overall goal of the Plan is to protect the ecological conditions of wetlands within the Project ROWs, specifically focusing on minimizing the spread of invasive species within affected wetlands and avoiding the introduction of invasive species to those wetlands in which invasive species are not currently present.

Note: Certain wetlands containing invasive plants extend well beyond the Project ROWs and outside of areas in which any Project activities will be performed. Therefore, attempting to eradicate invasive species from portions of such wetlands within the proposed work areas within the ROWs is unlikely to be successful and is not considered a practical goal of this Plan.

1.1 Predominant Invasive Species of Concern in Wetlands

The species listed in the following table were found in wetlands along the Project ROWs, based on field investigations.

Common Invasive Species Found in Project Wetlands

Common Name	*Latin Name*
Purple loosestrife*	*Lythrum salicaria L.*
Common reed*	*Phragmites australis*
Multiflora rose*	*Rosa multiflora*
Asiatic bittersweet	*Celastrus orbiculatus*
Japanese barberry*	*Berberis thunbergii*
Glossy Buckthorn	*Frangula alnus*
Tatarian honeysuckle*	*Lonicera tatarica*
Autumn olive	*Elaeagnus umbellata*
Reed canary grass*	*Phalaris arundinacea L.*
Japanese knotweed	*Polygonum cuspidatum*
Privet	*Ligustrum vulgare*
Spurge (leafy)	*Euphorbia esula L.*

*Indicates invasive species found in most abundance.

[1] This Plan focuses on construction-phase procedures for avoiding or minimizing the spread of invasive species in wetlands along the CL&P Project ROWs. These procedures are excerpted from the WISCP that encompasses the entire three-state Interstate Reliability Project (including procedures to be implemented by National Grid in Massachusetts and Rhode Island); this more extensive WISCP was provided to Council as CL&P Exhibit 23 during the Docket No. 424 proceedings.

1.2 Wetland Characteristics, including Invasive Species

During the Project wetland delineations, forms were completed for each wetland within CL&P's ROWs, including information regarding wetland type, dominant species, presence of invasive species (if any), and wetland functions and values. The function and values of each wetland were assessed based on the following factors:

- Ecological integrity
- Wildlife habitat
- Finfish habitat
- Educational potential
- Nutrient and sediment retention opportunity / removal efficiency
- Visual/aesthetic quality
- Water-based recreation
- Flood control
- Groundwater availability

Based on these quality criteria, wetland scientists assigned each wetland a rating (i.e., "high", "medium", or "low"). In addition, invasive plants (if present) were reported based on the abundance criteria identified on the wetland delineation forms, as follows:

- S = Sparse (< 5 % total cover);
- C = Common (6-25 % total cover);
- A = Abundant (26-50 % total cover); or
- D = Dominant (> 50 % total cover).

Of the approximately 218 wetlands delineated within CL&P's ROWs, 128 (59%) contain some type of invasive plant species. However, because the Project will involve construction activities only within portions of the ROW widths, not all of the 218 wetlands will be directly affected. The locations of wetlands containing invasive species are shown on the Volume 3 maps, along with the construction activities that will occur within each, as applicable.

Information compiled during the wetland delineations is summarized in Table 1 (included at the end of this Plan). Table 1 identifies each wetland along the ROWs, by town and Project-specific wetland number (keyed to the Volume 3 maps) and characterizes each wetland in terms of predominant plant species, the types of invasive plants (if any) present, and value rating.

Table 1 provides a baseline for identifying the wetlands containing invasive species along the ROWs and for planning construction activities to avoid or minimize the potential for spreading invasive species to non-infested wetlands. Table 1 also identifies the high-quality wetlands (exhibiting high functions and values), where CL&P will direct its contractors to take particular care to avoid the spread of invasive species as a result of construction activities.

As Table 1 indicates, invasive plants are most prevalent along the western portion of the ROW in the towns of Lebanon, Columbia, and Coventry (where the new 345-kV line will be aligned between CL&P's existing 69- and 345-kV transmission lines in the middle of a ROW segment that is presently managed in low-growth vegetation), and along the eastern portions of the ROW, near the Rhode Island border.

2. AVOIDANCE AND MINIMIZATION MEASURES

CL&P will require its construction contractors to implement measures to control the spread of invasive wetland plants during performance of construction activities, including during the movement of construction vehicles and equipment across wetlands along the Project ROWs. The main objectives will be to perform construction activities to minimize the spread of invasive plant species within wetlands or from wetland-to-wetland along the ROWs, and to restore wetlands affected by the Project promptly to limit the potential for invasive species to colonize disturbed soils.

To achieve these goals, both pre-construction phase planning and construction-phase measures will be implemented, including construction BMPs for work in wetlands containing invasive plants. These measures are discussed in the following subsections.

2.1 Pre-Construction Measures

Prior to the start of construction, CL&P has performed or will complete planning activities as required to identify the wetlands along the Project ROWs that contain invasive plant species, define BMPs to be used during construction to minimize the potential for spreading invasive plants to other wetlands along the ROWs, and inform construction contractors of such Project requirements. As part of the planning activities completed to date, CL&P has:

- Identified the invasive plant species of concern in wetlands along the ROWs and determined the location of wetlands containing invasive plants where BMPs will be implemented during construction to avoid or minimize the potential for spreading the invasive species to other wetlands. Table 1 identifies the wetlands along the Project ROWs that contain invasive species; all wetlands are illustrated on the Volume 3 maps.

- Developed invasive species control BMPs to be implemented during construction. These measures are listed in Section 2.2 and reflect the results of experience in implementing invasive species control measures on other recent transmission line construction projects.

Other pre-construction measures that CL&P will implement include:

- Invasive species control requirements will be incorporated into Project construction contracts.

- CL&P will provide environmental training to construction contractors and field inspectors, who will be responsible for implementing and monitoring, respectively, the invasive species control BMPs. The training will emphasize the use of the Volume 3 maps and Table 1 to determine the wetlands containing invasive species and the requirements for implementing BMPs during construction in these areas. The training also will provide an overview of the primary invasive plant species found in wetlands along the ROWs and how to identify them in general.

2.2 General Construction Measures

During construction, CL&P will reinforce to all Project construction personnel the importance of adherence to this Plan. Prior to performing work on the ROWs, all contractor personnel will be required to attend environmental training, at which the invasive species control BMPs will be identified and discussed. Contractors will be given copies of this Plan and the Volume 3 maps, which identify wetlands containing invasive species. In addition, CL&P's environmental inspectors will perform daily site inspections during construction activities and will monitor the contractors' compliance with the invasive species control BMPs.

Wetland invasive species control efforts will be important throughout Project construction. However, particular focus will be on construction activities that involve work directly in wetlands and thus will have the greatest potential for construction equipment or materials to come into contact with invasive species. These activities include:

- Clearing vegetation;
- Installing and removing timber (swamp) mats, corduroy roads, and other temporary access roads and work pads; and
- Moving equipment and vehicles through areas containing invasive species, such as for the installation, maintenance, and final removal of temporary soil erosion and sedimentation controls.

Other construction activities (e.g., foundation work, structure installation, conductor and wire stringing) typically will not require work outside of pre-established access roads and work pads. As a result, the equipment and vehicles involved in these activities is not expected to come into contact with wetland soils or plant materials.

2.3 BMPs for Wetland Invasive Species Control

To control the spread of wetland invasive plant species, CL&P will require construction contractors to implement the procedures described below, as appropriate to the construction activity being performed:

a. All construction equipment, vehicles, and materials (e.g., including swamp mats) must be clean and free of excess soil, debris, and vegetation before being mobilized to the Project ROWs.

b. Timber mats or equivalent (e.g., corduroy roads) will be used in wetlands during vegetation clearing operations to minimize the potential spread of invasive species within a wetland by the clearing equipment itself.

c. To minimize the potential for spreading invasive plant species from wetland-to-wetland along the ROWs, any equipment working in or traversing a wetland containing invasive plant species will be cleaned prior to relocating to another work site. Cleaning of vehicles and other equipment (including the equipment tracks and tires) will involve removal of visible dirt, debris and vegetation through the use of brooms, shovels, and, if needed, compressed air.

d. Timber mats or equivalent will be used for construction access across wetlands. As a result, construction vehicles and equipment will avoid direct contact with wetland vegetation.

e. Mats used in wetlands containing invasive species will be cleaned prior to relocation to other work areas or wetlands. Typically, timber mats will be cleaned by dropping mats one on top of another to shake loose sediment and debris; each mat then will be swept or brushed to remove loose soil and any plant material. Compressed air also may be used.

f. For work in wetlands, construction equipment and excavated soil material will be contained within the wetland work area boundaries (refer to the note on the Volume 3 maps).

g. Soils excavated from wetlands or riparian areas containing a predominance of target invasive plants will be stockpiled separately (to the extent that there is sufficient work space) and contained within staked bales, silt fence or other approved soil erosion and sedimentation control device to minimize the potential for spreading these soils elsewhere on the ROW.

h. Final restoration of the ROW will be performed in accordance with the procedures specified in the BMP Manual (refer to Volume 2, Attachment E).

3. POST-CONSTRUCTION MONITORING AND CONTROL

CL&P and the CT DEEP have entered into an agreement regarding long-term invasive species monitoring and control on CL&P ROWs. This agreement, which is reproduced below, pertains to the Project ROWs and is a condition of the CT DEEP Stream Channel Encroachment Line Permit / Section 401 Water Quality Certification for the Project (refer to Volume 2, Attachment G).

CT DEEP INVASIVES MONITORING CONTROL CONDITION

The Permittee shall monitor all identified wetland and watercourse units located within the bounds of the project right-of-way (ROW) greater than 0.25 acre for the occurrence of those plant species identified in the list of invasive plants published and updated by the Invasive Plant Council pursuant to section 22a-381b of the General Statutes and which are or come to be present in the project ROW. The monitoring on the project ROW shall be performed at a frequency of not less than once every four years for the duration of the operation of the permitted facilities. Upon completion of a monitoring event, the Permittee shall implement measures to control invasive species within any indentified wetland or watercourse unit where the extent of the vegetative cover of invasive species exceeds 25%, unless such measures are impracticable or imprudent due to restrictions or limitations on access or feasible control measures. Also, the implementation of invasive species control measures may be performed with cognizance of any restrictions or limitations contained within existing easements or covenants applicable to lands within the project ROW provided that the restrictions or limitations are disclosed in writing to the Commissioner. The Permittee shall submit reports to the Commissioner on a four year cycle that summarizes activities conducted during the preceding four year period with the project ROW. The first report shall be submitted no later the four years from the date of issuance herein.

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Table 1
Summary of Existing Wetland Characteristics, including Invasive Species

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
Lebanon						
1	W20-1	PFO – PSS	Low	Red maple, Gray birch, Speckled alder, Multiflora rose, Japanese barberry, Silky dogwood, Sensitive fern, Cattails, Cinnamon fern, Phragmites, Skunk cabbage	Multiflora rose, Japanese barberry, Phragmites	C, C, C
1	W20-2	PFO – PSS	Low	Red maple, Speckled alder, Multiflora rose, Silky dogwood, Maleberry, Sensitive fern, Cinnamon fern, Sedges, Skunk cabbage, Soft rush	Multiflora rose	C
1	W20-3	PSS – PFO	Low	Red maple, Multiflora rose, Silky dogwood, Sensitive fern, Cinnamon fern, Skunk cabbage, Sphagnum	Multiflora rose	C
1	W20-4	PSS	Low	Speckled alder, Silky dogwood, Honeysuckle, Cattails, Sensitive fern, Cinnamon fern, Skunk cabbage	Honeysuckle	C
Lebanon / Columbia						
2	W20-5	PSS – PFO	High	Red maple, Speckled alder, Silky dogwood, Maleberry, Japanese barberry, Sensitive fern, Cinnamon fern, Sedges, Skunk cabbage, Sphagnum, Soft rush, Reed canary grass	Japanese barberry, Reed canary grass	C, C
Columbia						
2	W20-6	PFO – PSS	Low	Red maple, Gray birch, Multiflora rose, Sedges, Cinnamon fern, Sensitive fern	Multiflora rose	C
2	W20-7	PFO – PSS	Low	Speckled alder, Silky dogwood, Maleberry, Witch-hazel, Sensitive fern, Cinnamon fern, Sedges, Skunk cabbage, Reed canary grass, Woolgrass	Reed canary grass	C
2	W20-8	PSS – PFO	Low	Red maple, Speckled alder, Silky dogwood, Honeysuckle, Multiflora rose, Sensitive fern, Cinnamon fern, Sedges, Skunk cabbage, Cattails, Soft rush, Sphagnum	Multiflora rose, Honeysuckle	C,C
2 & 3	W20-9	PSS – PFO	Low	Red maple, Speckled alder, Silky dogwood, Honeysuckle, Multiflora rose, Maleberry, Highbush blueberry, Sensitive fern, Cinnamon fern, Sedges, Skunk cabbage, Cattails, Reed canary grass, Phragmites, Tearthumb	Multiflora rose, Reed canary grass, Phragmites, Honeysuckle	C, C, C, C
3	W20-10	PFO – PSS	Low	Red maple, Yellow birch, Ironwood, Sensitive fern, Reed	Reed canary grass,	C, C

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
				canary grass, Phragmites	Phragmites	
3	W20-11	PSS – PFO	Low	Red maple, Speckled alder, Silky dogwood, Meadowsweet, Steeplebush, Sedges, Sphagnum, Woolgrass, Reed canary grass	Reed canary grass	C
3	W20-12	PSS	Low	Meadowsweet, Steeplebush, Sedges, Goldenrod, Sensitive fern	N	
3	W20-13	PSS – PFO	Low	Red maple, Speckled alder, Silky dogwood, Highbush blueberry, Maleberry, Willow, Sensitive fern, Cinnamon fern, Sedges, Cattails, Sphagnum, Tussock sedge, Phragmites	Phragmites	C
4	W20-14	PSS	Low	Speckled alder, Highbush blueberry, Maleberry, Multiflora rose, Steeplebush, Arrowwood, Sensitive fern, Cinnamon fern	Multiflora rose	C
4	W20-15	PSS	Low	Speckled alder, Multiflora rose, Elderberry, Sensitive fern, Cinnamon fern, Skunk cabbage	Multiflora rose	C
4	W20-16	PSS	Low	Speckled alder, Silky dogwood, Spicebush, Sensitive fern, Cinnamon fern, Cattails, Sphagnum, Skunk cabbage, Tussock sedge	N	
4	W20-17	PFO/PEM	Low	Red maple, Spicebush, Sensitive fern, Cinnamon fern, Cattails, Reed canary grass, Sphagnum, Skunk cabbage, Tussock sedge	Reed canary grass	C
4	W20-18	PSS	Low	Silky dogwood, Maleberry, Multiflora rose, Steeplebush, Reed canary grass, Sedges, Sensitive fern, Skunk cabbage	Multiflora rose, Reed canary grass	C, C
4	W20-19	PSS	Low	Silky dogwood, Sensitive fern, Cinnamon fern, Steeplebush	N	
4	W20-20	PSS	Low	Elm, Silky dogwood, Speckled alder, Multiflora rose, Steeplebush, Sensitive fern, Cinnamon fern	Multiflora rose	C
4	W20-21	PFO – PSS	Low	Red maple, Highbush blueberry, Japanese barberry, Sensitive fern, Cinnamon fern, Skunk cabbage	Japanese barberry	C
4	W20-22	PSS	Low	Multiflora rose, Elderberry	Multiflora rose	C
4 & 5	W20-23	PSS – PFO	Moderate	Red maple, Speckled alder, Ironwood, Highbush blueberry, Spicebush, Tussock sedge, Sensitive fern,	Reed canary grass	C

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
				Sedges, Skunk cabbage, Reed canary grass		
Columbia / Coventry						
4 & 5	W20-24	PSS/PFO	High	Red maple, Silky dogwood, Speckled alder, Maleberry, Honeysuckle, Sensitive fern, Cinnamon fern, Reed canary grass, Sphagnum, Skunk cabbage, Tussock sedge, Sedges	Reed canary grass, Honeysuckle	C, C
Coventry						
5	W20-25	PFO	Low	Greenbrier, Goldenrod, Honeysuckle spp.	Honeysuckle	C
5	W20-26	PSS – PFO	Low	Red maple, Honeysuckle, Silky dogwood, Multiflora rose, Ironwood, Sensitive fern, Sphagnum, Skunk cabbage, Tussock sedge, Christmas fern	Multiflora rose, Honeysuckle	C,C
6	W20-27	PEM/PFO	Low	Meadowsweet, Steeplebush, Reed canary grass, Woolgrass	N	
6	W20-28	PFO – PSS	Low	Red maple, Multiflora rose, Ironwood, Japanese barberry, Gray birch, Sedges, Sensitive fern, Cinnamon fern, Reed canary grass	Multiflora rose, Japanese barberry, Winged euonymus, Reed canary grass	A, C, S, C
6	W20-29	PFO	Low	Red maple, Yellow birch, Witch-hazel, Ironwood, Sedges, Christmas fern, Reed canary grass, Soft rush	Reed canary grass	C
6 & 7	W20-30	PEM – PFO	Moderate	Multiflora rose, Sedges, Cattails, Sphagnum, Cinnamon fern, Tussock sedge	Multiflora rose	C
7	W20-31	PEM – PFO	High	Red maple, Sedges, Reed canary grass	Reed canary grass	C
Mansfield						
7	W20-32	PEM	Low	Willow, Gray birch, Sedges, Steeplebush	N	
7	W20-33	PSS/PFO	Low	Red maple, Winterberry, Speckled alder, Highbush blueberry, Skunk cabbage, Cinnamon fern, Sphagnum, Tussock sedge	N	
8	W20-34	PFO	Low	Red maple, White oak, Yellow birch, Spicebush, Winterberry, Cinnamon fern, Sphagnum	N	
8	W20-35	PSS – PFO	Moderate	Spicebush, Silky dogwood, Speckled alder, Ironwood, Meadowsweet, Jewelweed, Sphagnum	N	
8	W20-36	PFO	Moderate	Red maple, Spicebush, Winterberry, Sphagnum, Skunk	N	

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
				cabbage		
8	W20-37	PFO	Low	Red maple, Highbush blueberry, Speckled alder	N	
8	W20-38	PSS – PFO	Low	Highbush blueberry, Maleberry, Meadowsweet, Dewberry, steeplebush	N	
8	W20-39	PFO – PSS	Moderate	Red maple, Green ash, Yellow birch, Spicebush, Christmas fern, Sphagnum	N	
8	W20-39A	PSS – PFO	Low	Black birch, Spicebush, Speckled alder, Ground juniper, Grasses sp.	Autumn olive	S
8	W20-40	PFO	Low	White pine, Highbush blueberry	N	
8	W20-41	PFO – PSS	Low	Red maple, Maleberry, Highbush blueberry, Witch-hazel, Reed canary grass, Sedges, Cinnamon fern, Phragmites, Steeplebush	Reed canary grass, Phragmites	C, C
8 & 9	W20-42	PFO – PSS	Low	Red maple, Witch-hazel, Sensitive fern, Cinnamon fern, Sedges	N	
9	W20-43	PFO/PSS	Moderate	Red maple, Witch-hazel, Arrowwood, Sensitive fern, Cinnamon fern, Skunk cabbage, Cattails, Phragmites, Sedges, Sphagnum	Japanese barberry, Phragmites	S, C
9	W20-44	PFO/PSS	Moderate	Red maple, Witch-hazel, Multiflora rose, Phragmites, Sensitive fern, Cinnamon fern, Cattails, Marsh marigold	Multiflora rose, Phragmites	C, A
10	W20-45	PFO	Low	Red maple, Multiflora rose, Spicebush, Japanese barberry, Sensitive fern, Cinnamon fern, Skunk cabbage, Sedges	Multiflora rose, Japanese barberry	C, C
10	W20-45A	PSS/PFO	Low	Grasses sp., Soft rush, Skunk cabbage, Jewelweed, Multiflora rose	Multiflora rose	C
10	W20-46	PFO/PSS	Moderate	Red maple, Multiflora rose, Spicebush, Japanese barberry, Speckled alder, Cinnamon fern, Cattails, Goldenrod, Skunk cabbage, Sedges	Multiflora rose, Japanese barberry	A, C
10	W20-47	PFO/PSS – PUB	Low	Red maple, Multiflora rose, Japanese barberry, Reed canary grass, Cinnamon fern, Skunk cabbage	Multiflora rose, Japanese barberry	C, C
10	W20-48	PFO – PSS	Low	Red maple, Multiflora rose, Japanese barberry, Honeysuckle, Sensitive fern, Cinnamon fern, Skunk cabbage	Multiflora rose, Japanese barberry, Honeysuckle	C, A, C

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
10 & 11	W20-49	PEM	Low	Honeysuckle, Reed canary grass, Goldenrod	Reed canary grass, Honeysuckle	D, C
11	W20-50	PFO/PSS – PEM	Low	Red maple, Silky dogwood, Sensitive fern, Cinnamon fern	N	
11	W20-51	PSS	Low	Gray birch, Steeplebush, Woolgrass, Soft rush, Sphagnum, Haircap moss	N	
11	W20-52	PFO – PSS	Low	Witch-hazel, Honeysuckle, Steeplebush, Sedges	Honeysuckle	C
11	W20-53	PFO/PSS	Low	Red maple, Yellow birch, American beech, Sedges, Cinnamon fern	N	
11	W20-54	PSS – PFO	Low	Gray birch, Sensitive fern, Sedges, Reed canary grass, Steeplebush	Reed canary grass	C
12	W20-55	PFO/PSS – PEM	Low	Red maple, Witch-hazel, Sensitive fern, Cinnamon fern, Sedges, Reed canary grass, Steeplebush	Reed canary grass	C
12	W20-56	PFO – PSS	Moderate	Red maple, Honeysuckle, Silky dogwood, Speckled alder, Spicebush, Tussock sedge, Cattails, Cinnamon fern, Marsh marigold, Phragmites, Sensitive fern, Sphagnum, Skunk cabbage, Steeplebush	Phragmites, Honeysuckle	C, C
12	W20-57	PFO	Low	Red maple, Yellow birch, American beech, Witch-hazel, Spicebush, Sphagnum, Cinnamon fern	N	
12	W20-58	PFO – PSS	Low	Red maple, Speckled alder, Highbush blueberry, Maleberry, Steeplebush, Cattails, Woolgrass, Sensitive fern, Sphagnum	N	
12	W20-59	PFO	Low	Red maple, Yellow birch, American beech, Sphagnum, Cinnamon fern	N	
13	W20-60	PSS	Low	Spicebush, Multiflora rose, Sensitive fern, Cinnamon fern, Goldenrod	Multiflora rose	C
13	W20-61	PFO – PSS	Low	Red maple, Japanese barberry, Honeysuckle, Sensitive fern, Cinnamon fern, Sphagnum	Japanese barberry, Honeysuckle	A, C
14	W20-62	PEM	Low	Sedges, Cattails, Soft rush, Steeplebush	N	
14	W20-62A	PEM	Low	Steeplebush, Sedges, Cattails, Soft rush	N	
14	W20-62B	PEM	Low	Steeplebush, Sedges, Cattails, Soft rush	N	

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
14	W20-62C	PEM	Low	Steeplebush, Sedges, Cattails, Soft rush	N	
15	W20-63	PFO/PSS	Moderate	White pine, Pepperbush, Speckled alder, Meadowsweet, Woolgrass, Sphagnum, Sensitive fern, Steeplebush, Cattails, Skunk cabbage	N	
115	W20-64	PFO/PSS	Low	Red maple, Pepperbush, Woolgrass, Sedges, Sphagnum, Steeplebush, Cattails, Skunk cabbage	N	
16	W20-65*	PUB – PFO	Moderate	White pine, Red maple, Silky dogwood, Cinnamon fern	N	
16	W20-66*	PUB – PFO (Mansfield Hollow Lake)	Moderate	Pitch pine, White pine, Shagbark Hickory, Maleberry, Highbush blueberry, Speckeled alder, White aster, Haircap moss,	N	
17	W20-67	PFO	Low	Red maple, Ironwood, Sedge	N	
Mansfield / Chaplin						
17 & 18	W20-68	PEM – PFO/PSS	Moderate	Red maple, Pepperbush, Speckled alder, Tussock sedge, Cinnamon fern, Sensitive fern, Skunk cabbage	N	
Chaplin						
18	W20-69	PFO/PSS	Low	Red maple, Honeysuckle, Ironwood, Highbush blueberry, Cinnamon fern, Skunk cabbage, Sedges, Sphagnum	Honeysuckle	C
18	W20-70*	PFO – PSS/PEM	Low	Red maple, Silky dogwood, Tussock sedge, Skunk cabbage	N	
18	W20-71*	PSS	Low	Red maple, Tussock sedge, Cinnamon fern, Woolgrass	N	
18	W20-72*/W20-73	PSS/PFO	High	Meadowsweet, Silky dogwood, Sensitive fern, Cinnamon fern, Red maple, Eastern hemlock, White pine, Speckled alder, Meadowsweet, Silky dogwood, Sedges, Sensitive fern	N	
18 & 19	W20-74*	PFO	Moderate	Red maple, Eastern hemlock, Highbush blueberry, Tussock sedge, Skunk cabbage, Sphagnum	N	
19	W20-75*	PSS	Low	Red maple, red oak, winterberry, Japanese barberry, royal fern, Tussock sedge, Cinnamon fern, Phragmites	Phragmites	C
19	W20-76*	PFO/PSS	Moderate	Red maple, red oak, winterberry, Japanese barberry, royal fern, tussock sedge, cinnamon fern	Japanese barberry	S

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19	W20-77	POW/PSS/PFO – PEM	Moderate	Red maple, White pine, Eastern hemlock, Speckled alder, Maleberry, Sensitive fern, Cinnamon fern, Tussock sedge, Sedges, Skunk cabbage, Sphagnum, Woolgrass	N	
19	W20-78	PFO	Low	Red maple, Highbush blueberry, Tussock sedge	N	
19	W20-79	PFO	Low	Red maple, Highbush blueberry, Tussock sedge	N	
19	W20-80	PFO – PSS	Low	Red maple, Highbush blueberry, Pepperbush, Tussock sedge, Sensitive fern, Sphagnum	N	
19 & 20	W20-81	PFO/PSS – PEM	Low	Red maple, White pine, Pepperbush, Meadowsweet, Speckled alder, Sensitive fern, Skunk cabbage, Sphagnum, Cattails, Steeplebush	N	
20	W20-82	PSS	Low	Speckled alder, Highbush blueberry, Witch-hazel, Sensitive fern, Cinnamon fern, Sphagnum, Sedges, Steeplebush	N	
20	W20-83	PSS – PFO	Low	Eastern hemlock, Yellow birch, Pepperbush, Highbush blueberry, Meadowsweet, Sensitive fern, Sedges, Steeplebush	N	
20	W20-84	PSS/PFO – PEM	Low	Red maple, Pepperbush, Highbush blueberry, Sensitive fern, Cinnamon fern, Sphagnum	N	
21	W20-85	POW/PFO/PSS	Moderate	Red maple, Pepperbush, Multiflora rose, Sensitive fern, Cinnamon fern, Sphagnum	Multiflora rose	C
21	W20-86	PUB/PEM/PFO	Moderate	Tussock sedge, Cattails, Sedges	N	
21 & 22	W20-87	PFO/PSS	Low	Red maple, Highbush blueberry, Sensitive fern, Cinnamon fern, Goldenrod, Sedges, Soft rush	N	
22	W20-88	PFO/PSS	Low	Red maple, White pine, Ironwood, Pepperbush, Maleberry, Sphagnum, Cinnamon fern, Skunk cabbage	N	
22	W20-89	PFO – PSS/POW	Moderate	Red maple, Yellow birch, Ironwood, Pepperbush, Spicebush, Sphagnum, Skunk cabbage, Sedges	N	
23	W20-90	PFO	Low	Red oak, Highbush blueberry, Sedges, Skunk cabbage, Tussock sedge	N	
23	W20-91	POW/PSS	Moderate	Red maple, Multiflora rose, Spicebush, Sensitive fern, Cinnamon fern, Sphagnum, Tussock sedge	Multiflora rose	A

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
Chaplin / Hampton						
23 & 24	W20-92	PFO/PSS	Low	Red maple, Honeysuckle, Pepperbush, Spicebush, Sensitive fern, Cinnamon fern, Sphagnum, Skunk cabbage	Honeysuckle	C
Hampton						
24	W20-93	PSS	Low	Sphagnum, Skunk cabbage	N	
24	W20-94	PFO/PSS	Moderate	Red maple, Meadowsweet, Speckled alder, Pepperbush, Sensitive fern, Reed canary grass, Steeplebush	Reed canary grass	C
24 & 25	W20-95	PFO/PSS	Low	Red maple, Yellow birch, White oak, Highbush blueberry, Meadowsweet, Pepperbush, Arrowwood, Sensitive fern, Cinnamon fern, Sphagnum, New York fern	N	
25	W20-95A	PFO	Low	Yellow birch, Sweet pepperbush, Swamp azalea, Cinnamon fern, White meadowsweet	N	
25	W20-96	PSS	Low	Highbush blueberry, Meadowsweet, Pepperbush, Arrowwood, Reed canary grass	Reed canary grass	A
25	W20-97	PFO/PSS	Low	Red maple, Yellow birch, Ironwood, Sensitive fern, Cinnamon fern, Sphagnum, Skunk cabbage	N	
25	W20-98	PFO – PSS	Low	Red maple, Yellow birch, Maleberry, Speckled alder, Cinnamon fern, Sphagnum, Goldenrod, Sedges	N	
25 & 26	W20-99	PFO/PEM – PSS	Low	Red maple, Highbush blueberry, Cinnamon fern, Sphagnum, Phragmites	Phragmites	D
26	W20-100	PFO/PSS – PEM	Moderate	Red maple, Yellow birch, Highbush blueberry, Pepperbush, Sensitive fern, Cinnamon fern, Sphagnum, Tussock sedge, Cattails	N	
26	W20-101	PFO	Moderate	Red maple, Yellow birch, Sphagnum, Tussock sedge	N	
26	W20-102	PFO/PSS - PUB	Low	Red maple, Yellow birch, Pepperbush, Spicebush, Cinnamon fern, Skunk cabbage	N	
26 & 27	W20-103	PFO/PSS	Moderate	Red maple, Pepperbush, Spicebush, Multiflora rose, Skunk cabbage, Sensitive fern, False hellebore	Multiflora rose	A
27	W20-104	PFO/PSS	Moderate	Red maple, Pepperbush, Spicebush, Multiflora rose, Japanese barberry, Sensitive fern, Christmas fern,	Multiflora rose, Japanese barberry	A, A

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				Sphagnum, Poison ivy		
27	W20-105	PEM	Low	Skunk cabbage, Goldenrod	N	
27	W20-106	PFO	Moderate	Red maple, White pine, Japanese barberry, Sphagnum, Sensitive fern, Skunk cabbage	Japanese barberry	A
27	W20-107	PEM – PFO	Low	Red maple, American elm, Sensitive fern, Soft rush	N	
27 & 28	W20-108	PSS/PFO	Moderate	Red maple, Speckled alder, Sensitive fern, Skunk cabbage, Sedges	N	
28	W20-109	PSS – PFO	Low	Speckled alder, Highbush blueberry, Sensitive fern, Reed canary grass, Tussock sedge	Reed canary grass	C
28	W20-110	PSS/PFO	High	Red maple, Meadowsweet, Sensitive fern, Skunk cabbage, Steeplebush, Cattails, False hellebore, Woolgrass	N	
28	W20-111	PSS	Low	Witch-hazel, Maleberry, Meadowsweet, Sensitive fern, Steeplebush	N	
28	W20-112	PSS	Low	Maleberry, Meadowsweet, Woolgrass	N	
28	W20-112A	PFO	Low	White pine, White oak, Red oak, Winterberry, Sedges, Princess pine	N	
28	W20-113	PFO	Low	White pine, White oak, Maleberry	N	
28	W20-114	PFO	Low	White pine, Red maple, Sensitive fern, Cinnamon fern, Sedges	N	
28	W20-115	PFO/PSS	Low	White pine, Red maple, Sensitive fern, Cinnamon fern, Sedges	N	
28 & 29	W20-116	PFO/PSS	Moderate	Red maple, Highbush blueberry, Pepperbush, Spicebush, Sensitive fern, Sedges, Skunk cabbage	N	
29	W20-117	PSS/PFO – PEM	Moderate	White pine, Red maple, Highbush blueberry, Maleberry, Meadowsweet, Tussock sedge, Reed canary grass	Reed canary grass	A
29 & 30	W20-118	PFO/PSS	Moderate	Red maple, Pepperbush, Willow, Tussock sedge, Steeplebush, Reed canary grass, Purple loosestrife	Reed canary grass, Purple loosestrife	A, C
30	W20-119	PSS	Low	Gray birch, Sphagnum, Soft rush	N	
31	W20-121	PSS	Low	Red maple, Yellow birch, Eastern hemlock, winterberry, witch hazel, cinnamon fern,	Phragmites	S

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Hampton / Brooklyn						
30 & 31	W20-120	PFO – PSS	Moderate	Red maple, Yellow birch, Eastern hemlock, Sphagnum, Cinnamon fern, Cattails, Phragmites	Phragmites	C
Brooklyn						
31 & 32	W20-122	PFO/PSS/PEM	Moderate	Red maple, Yellow birch, Eastern hemlock, winterberry, witch hazel, cinnamon fern, Reed canary grass	Reed canary grass	C
32	W20-123	PFO/PSS	Low	Red maple, Eastern hemlock, White pine, Cinnamon fern, Sedges, Skunk cabbage	N	
32	W20-124	PFO/PSS	Low	Sensitive fern, Sedges, Goldenrod	N	
32	W20-125	PSS/PFO – PEM	Low	Red maple, Eastern hemlock, White pine, Sensitive fern, Cinnamon fern, Sphagnum	N	
33	W20-126	PFO	Low	Red maple, Yellow birch, Highbush blueberry, Ironwood, Sphagnum, Skunk cabbage, Tussock sedge	N	
33	W20-127	PSS/PFO	Low	Red maple, Yellow birch, Maleberry, Sphagnum, Cinnamon fern, Skunk cabbage,	N	
33	W20-128	PFO	Low	Red maple, Yellow birch, Maleberry, Sphagnum, Cinnamon fern, Skunk cabbage,	N	
33	W20-129	PSS – PFO	Low	Red maple, Maleberry, Mountain laurel, Sphagnum, Sedges	N	
34	W20-130	PFO/PSS	Low	Red maple, Spicebush, Cattails, Sphagnum	N	
34	W20-131	PFO – PEM	Low	Red maple, Honeysuckle, Japanese barberry, Cinnamon fern	Japanese barberry, Honeysuckle	C, C
34	W20-132	PFO	Moderate	Red maple, Spicebush, Highbush blueberry, Cinnamon fern, Skunk cabbage, Marsh marigold	N	
34	W20-133	PEM – PFO	Low	Red maple, Skunk cabbage, Soft rush, Cattails, Jewelweed, Sedges	N	
34 & 35	W20-134	PSS	Low	Sphagnum, Cinnamon fern, Sensitive fern, Skunk cabbage, Soft rush	N	
35	W20-135	PFO	Low	Red maple, Spicebush, Japanese barberry, Honeysuckle	Japanese barberry, Honeysuckle	C,C
35	W20-136	PFO	Low	Red maple, Spicebush, Japanese barberry, Sensitive fern,	Japanese barberry	C

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				Skunk cabbage, Marsh marigold		
35	W20-137	PFO/PSS	Moderate	Red maple, Spicebush, Japanese barberry, Honeysuckle, Multiflora rose, Meadowsweet, Speckled alder	Japanese barberry, Multiflora rose, Honeysuckle	C, A, C
35	W20-138	PFO – PSS	Low	Red maple, Honeysuckle, Multiflora rose, Cattails, Sphagnum, Skunk cabbage, Woolgrass, Steeplebush	Multiflora rose, Honeysuckle	A,C
35	W20-139	PFO/PSS	Low	Red maple, Eastern hemlock, Spicebush, Japanese barberry, Cinnamon fern, Skunk cabbage	Japanese barberry	A
35 & 36	W20-140	PFO/PSS	Low	Red maple, Spicebush, Japanese barberry, Skunk cabbage, Jewelweed, Marsh marigold	Japanese barberry	A
36	W20-141	PFO	Low	Red maple, Honeysuckle, Spicebush, Canada mayflower	Honeysuckle	C
36	W20-142	PFO	Low	Red maple, Eastern hemlock, White pine, Honeysuckle, Multiflora rose, Skunk cabbage, Jewelweed, Sensitive fern	Multiflora rose, Honeysuckle	C, C
36	W20-143	PSS – PFO	Low	Honeysuckle, Willow, Cattails, Tussock sedge, Steeplebush, Phragmites, Skunk cabbage	Phragmites, Honeysuckle	C, C
36	W20-144	PFO – POW	Low	Red maple, Honeysuckle, Sensitive fern	Honeysuckle	C
36	W20-145	PFO	Low	Red maple, Yellow birch, Shagbark hickory, Japanese barberry, Skunk cabbage, False hellebore	Japanese barberry	A
36	W20-146	PFO	Low	Red maple, Yellow birch, Japanese barberry, Ironwood, Skunk cabbage, Jewelweed	Japanese barberry	A
36	W20-147	PFO – POW	Moderate	Red maple, Spicebush, Japanese barberry, Skunk cabbage, Tussock sedge	Japanese barberry	A
36	W20-148	PUB/PEM/PFO/ PSS	Moderate	Speckled alder, Silky dogwood, Reed canary grass, Cattails	Reed canary grass	A
36 & 37	W20-149	PFO/PSS	Low	Red maple, Spicebush, Japanese barberry, Honeysuckle, Skunk cabbage	Japanese barberry, Honeysuckle	A, C
37	W20-150	PFO/PSS	Moderate	Red maple, Yellow birch, Shagbark hickory, honeysuckle, Skunk cabbage, False helebore	Honeysuckle	C
38 & 39	W20-151	PSS – POW/PEM/PFO	Moderate	Red maple, American hornbeam, Highbush blueberry, Maleberry, Spicebush, Speckled alder, Multiflora rose,	Multiflora rose	C

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
				Tussock sedge, Skunk cabbage, Cattails		
39	W20-152	PSS – PFO/POW	Low	Meadowsweet, Arrowwood, Sensitive fern, Soft rush, Deer tongue	N	
39, 39A, & 40	W20-153	PEM – PSS/PFO/POW	Moderate	Red maple, American hornbeam, Speckled alder, Highbush blueberry, Meadowsweet, Tussock sedge, Skunk cabbage, Cattails, Phragmites	Phragmites	A
40	W20-154	PSS/PFO	Moderate	Red maple, Yellow birch, Speckled alder, Highbush blueberry, Swamp azalea, Maleberry, Spicebush, Tussock sedge, Skunk cabbage, Cattails, Phragmites, Cinnamon fern	Phragmites	S
40	W20-154A	PFO/PSS	Moderate	Red maple, Hickory, American hornbeam, Silky dogwood, Highbush blueberry, Autumn olive, Steeplebush, Cinnamon fern, Sensitive fern, Jewelweed, Tussock sedge	Autumn olive Multiflora rose	A S
40	W20-155	PEM	Low	Multiflora rose, Tussock sedge, Sensitive fern, Soft rush	Multiflora rose	C
40	W20-156	PSS	Moderate	Red elm, Multiflora rose, Skunk cabbage	Multiflora rose	C
40 & 41	W20-157	PEM – PFO	Moderate	Red maple, Highbush blueberry, Tussock sedge, Skunk cabbage, Cattails	Purple loosestrife	S
42	W20-158	PSS – POW/PFO	Moderate	Red maple, Silky dogwood, Buttonbush, Speckled alder, Meadowsweet, Arrowwood, Soft rush, Purple loosestrife, Woolgrass, Boneset, Sensitive fern	Purple loosestrife	Not Assessed
42	W20-159	PFO – PSS	Low	Red maple, Red elm, White pine, Highbush blueberry, Maleberry, Tussock sedge, Skunk cabbage	Japanese barberry	S
42, 43, & 44	W20-159A	PSS/PFO	Low	Red maple, Silky dogwood, Jewelweed, Multiflora rose, Glossy buckthorn, Reed canary grass	Multiflora rose Glossy buckthorn Reed canary grass	C A D
43	W20-160B	PFO	Moderate	Red maple, Spicebush, Poison ivy	Japanese barberry	S
43 & 44	W20-160	PSS/PFO	Moderate	Red maple, Red oak, American hornbeam, Arrowwood, Tussock sedge, Swamp cabbage	N	
43 & 44	W20-160A	PSS – PFO	Moderate	Red maple, American hornbeam, Silky dogwood, Speckled alder, Meadowsweet, Multiflora rose, Skunk	Multiflora rose	C

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
				cabbage, False nettle		
Pomfret						
46	W20-161	PFO	Low	Red maple, Pin oak, Silky dogwood	N	
46	W20-161A	PFO	Low	Red maple, Hickory, American hornbeam, Spicebush, American winterberry, Highbush blueberry, Cinnamon fern, Poison Ivy	Japanese barberry	S
46 & 47	W20-162	PSS – PEM/PFO	High	Red maple, Pin oak, Silky dogwood, Buttonbush, Arrowwood, Highbush blueberry, Tussock sedge, Skunk cabbage	Glossy buckthorn, Purple loosestrife	S, S
47	W20-163	PSS – PEM/PFO	Moderate	Red maple, Pussy willow, Speckled alder, Pepperbush, Silky dogwood, Arrowwood, Highbush blueberry, Tussock sedge, Skunk cabbage	Purple loosestrife	S
Killingly						
47 & 47A	W20-164	PSS – PEM/PFO	Moderate	Red maple, Pussy willow, Speckled alder, Pepperbush, Silky dogwood, Arrowwood, Highbush blueberry, Tussock sedge, Skunk cabbage	Purple loosestrife	S
48	W20-165	PSS – PFO	Low	Red maple, Silky dogwood, Honeysuckle, Tussock sedge, Skunk cabbage	Honeysuckle	C
48	W20-166	PSS	Low	Silky dogwood, Reed canary grass	Reed canary grass, Honeysuckle	A, C
48	W20-167	PFO	Low	Red maple, Red oak, White oak, White pine, Highbush blueberry, Tussock sedge, Canada mayflower	N	
49	W20-168	PSS – PFO	Low	Red maple, Red oak, Green ash, Pepperbush, Highbush blueberry, Swamp azalea, Tussock sedge, Sensitive fern	N	
49	W20-169	PSS	Low	Red maple, Silky dogwood, Highbush blueberry, Maleberry, Meadowsweet, Agrostis sp, Sensitive fern, Tussock sedge	Glossy buckthorn	S
49	W20-170A	PSS	Low	White pine, Silky dogwood, Arrowwood, Elderbery, Sensitive fern, goldenrod, Tussock sedge, Meadowsweet, Glossy buckthorn	Glossy buckthorn	A

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
49 & 50	W20-170	PEM – PSS	Low	Red maple, Gray birch, Willow, Maleberry, Multiflora rose, Highbush blueberry, Cattails, Tussock sedge, Skunk cabbage	Multiflora rose	C
50	W20-171	PSS – PFO	Low	Red maple, American hornbeam, Silky dogwood, Speckled alder, Highbush blueberry, Glossy buckthorn, Tussock sedge	Glossy buckthorn	C
50	W20-171A	PSS	Low	Maleberry, Silky dogwood, Glossy buckthorn, Steeplebush, Tussock sedge, Wool grass	Glossy buckthorn	C
Putnam						
51	W20-172	PSS – PEM/PFO	Moderate	Red maple, Yellow birch, Silky dogwood, Tussock sedge, Cattails, Reed canary grass	Reed canary grass	A
51	W20-173	PSS	Moderate	Multiflora rose, Honeysuckle, Silky dogwood, Rough-stemmed goldenrod	Multiflora rose, Honeysuckle	C, C
51	W20-174	PSS – PFO	Low	Silky dogwood, Glossy buckthorn, Arrowwood, Tussock sedge	Glossy buckthorn	C
51	W20-175	POW – PSS	Low	Highbush blueberry, Glossy buckthorn, Tussock sedge	Glossy buckthorn	A
51 & 52	W20-176	PSS – POW	Low	Highbush blueberry, Glossy buckthorn, Meadowsweet	Glossy buckthorn	A
Killingly						
52	W20-177	PSS	Moderate	Pin oak, Arrowwood, Willow, Gray birch, Speckled alder, Silky dogwood, Tussock sedge	N	
52 & 53	W20-178	PSS – PFO	Moderate	Red maple, Pin oak, Willow, Silky dogwood, Highbush blueberry, Arrowwood, Woolgrass, Reed canary grass	Reed canary grass	C
Putnam						
54	W20-179	PSS	Low	Meadowsweet, Glossy buckthorn, Soft rush, Sedges	Glossy buckthorn	A
54	W20-180	PFO – PSS	Low	Red maple, Arrowwood, Silky dogwood, Highbush blueberry, Meadowsweet, Glossy buckthorn, Tussock sedge, Sensitive fern	Glossy buckthorn	C
54 & 55	W20-181	PSS	Low	Honeysuckle, Willow, Arrowwood, Haircap moss	Honeysuckle	C
55	W20-181B	PFO/PSS	Low	Pin oak, Swamp white oak, White pine, highbush blueberry, Winterberry	N	

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
55	W20-181A	PSS/PFO	Low	Glossy buckthorn, Multiflora rose, Honeysuckle, arrowleaf tearthumb, Soft rush, Tussock sedge	Glossy Buckthorn Multiflora rose, Honeysuckle	A, C, C
55	W20-182	PSS – PFO	Low	Red maple, White pine, Speckled alder, Highbush blueberry, Arrowwood, Agrostis sp, Tussock sedge	N	
55	W20-182A	PSS	Low	Maleberry, Highbush blueberry, Steeplebush, Soft rush, Sensitive fern, Skunk cabbage	N	
55 & 56	W20-183	PSS/PFO	Low	Red maple, White pine, Red oak, Speckled alder, Highbush blueberry, Multiflora rose, Skunk cabbage	Multiflora rose	C
56	W20-184	PSS – PEM/PFO	Moderate	Red maple, Speckled alder, Highbush blueberry, Glossy buckthorn, Tussock sedge, Sensitive fern, Skunk cabbage	Glossy buckthorn	C
57	W20-185	PSS	Low	Red maple, Speckled alder, Highbush blueberry, Glossy buckthorn, Arrowwood, Agrostis sp, Hayscented fern, Haircap moss	Glossy buckthorn	C
57	W20-186	PFO – PSS	Low	Red maple, White pine, Speckled alder, Highbush blueberry, Arrowwood, Silky dogwood, Honeysuckle	Honeysuckle	C
57 & 58	W20-187	PFO	Low	Red maple, Red oak, Honeysuckle, Arrowwood, Speckled alder, Glossy buckthorn, Soft rush, Rough-stemmed goldenrod, Sensitive fern, Tussock sedge	Glossy buckthorn, Honeysuckle	C, C
58	W20-188	PFO – PSS	Low	Red maple, American hornbeam, Black cherry, Glossy buckthorn, Arrowwood, Speckled alder, Highbush blueberry, Maleberry, Tussock sedge, Cattails, Rough-stemmed goldenrod, Skunk cabbage	Glossy buckthorn	C
58	W20-189	PEM – PFO	Low	Red maple, Arrowwood, Sensitive fern, Reed canary grass	Reed canary grass	D
59	W20-190	PSS – PEM/PFO	Moderate	Red maple, Highbush blueberry, Maleberry, Silky dogwood, Swamp azalea, Tussock sedge, Cattails, Sensitive fern, Skunk cabbage	**N**	
59	W20-191	PFO – PSS/PEM	Moderate	Red maple, Highbush blueberry, Maleberry, Speckled alder, Glossy buckthorn, Tussock sedge, Cattails	Glossy buckthorn	A
59	W20-192	PFO – POW	Low	Red maple, Red oak, Highbush blueberry, Speckled alder, Glossy buckthorn	Glossy buckthorn	C

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
60	W20-193	PFO – PSS	Moderate	Red maple, White pine, Gray birch, Highbush blueberry, Speckled alder, Glossy buckthorn, Swamp azalea, Tussock sedge	Glossy buckthorn	C
60	W20-194	PFO – PEM/PSS	Low	Red maple, Maleberry, Pepperbush, Speckled alder, Swamp azalea, Highbush blueberry, Cattails, Tussock sedge	N	
60 & 61	W20-195	PFO/PSS	Moderate	Red maple, White pine, Swamp azalea, Winterberry, Highbush blueberry, Cinnamon fern	Phragmites	C
61	W20-196	PSS	Low	Highbush blueberry, Arrowwood, Raspberry, Tussock sedge, Cinnamon fern	N	
61 & 62	W20-197	PFO/PSS/PEM	Moderate	Red maple, northern arrowwood, highbush blueberry, winterberry, cinnamon fern, Phragmites (in ROW)	Phragmites	D in ROW
62	W20-198	PFO – PEM/PSS	Moderate	Red maple, White pine, Fetterbush, Glossy buckthorn, Maleberry, Silky dogwood, Tussock sedge, Sensitive fern, Cinnamon fern	Glossy buckthorn	C
62	W20-199	PFO – PSS	Moderate	Red maple, Highbush blueberry, Arrowwood, Speckled alder, Silky dogwood, Tussock sedge	N	
63	W20-200	PFO – PEM/PSS	High	Speckled alder, Silky dogwood, Highbush blueberry, Arrowwood, Meadowsweet, Tussock sedge	N	
63	W20-201	PFO – PEM/PSS	High	Speckled alder, Silky dogwood, Highbush blueberry, Arrowwood, Meadowsweet, Tussock sedge	N	
Thompson						
63	W20-202	PSS	Low	Speckled alder, Glossy buckthorn, Arrowwood	Glossy buckthorn	C
63 & 64	W20-203	PEM – PFO	High	Atlantic white cedar, Cattails, Sphagnum, Tussock sedge, Skunk cabbage, Woolgrass, Phragmites	Phragmites, Purple loosestrife	C, S
64	W20-204	PSS – PFO	Moderate	Red maple, Highbush blueberry, Winterberry, Silky dogwood, Woolgrass, Sensitive fern, Soft rush	N	
64	W20-205	PFO	Low	Highbush blueberry, Winterberry, Cinnamon fern	N	
64	W20-206	PSS/PFO	Low	Highbush blueberry, Winterberry, Sensitive fern, Reed canary grass	Reed canary grass	C
64 & 65	W20-207	PFO – PSS	Moderate	Highbush blueberry, Winterberry, Cinnamon fern,	N	

Map Sheet No. (refer to Volume 3)	Wetland No.	Wetland Classification Type	Wetland Functions / Values Rating	Principal Vegetative Species	Invasive Species Currently Present	Relative Abundance of Invasive Species within ROW (S/C/A/D)
				Sphagnum		
65	W20-208	PFO	Moderate	Red maple, Green ash, Pepperbush, Sphagnum, Cinnamon fern	N	
66	W20-209	PEM	Moderate	Highbush blueberry, Winterberry, Sedges, Sphagnum, Reed canary grass, Woolgrass	Reed canary grass	A
66	W20-210	PFO	Low	Red maple, Green ash, Black birch, White pine, Highbush blueberry, Winterberry, Witch-hazel, Sphagnum	N	
66	W20-211	PFO – PSS	Moderate	Red maple, Witch-hazel, Sphagnum, Cinnamon fern, Gold thread	N	

Notes:

1. Wetland classification is based on the Cowardin et al. (1979) system. PFO = palustrine forested, PSS = palustrine shrub/scrub, PEM = palustrine emergent, POW = palustrine open water.
2. Invasive wetland species are: *Phragmites* (common reed), purple loosestrife, tartarian honeysuckle, Japanese barberry, Japanese knotweed, buckthorn, multiflora rose, autumn olive, reed canary grass, privet (*Ligustrum*), and spurge.
3. The principal vegetation species in each wetland were identified during wetland delineations performed in 2008 – 2011. Species listed in this table are those identified on the wetland delineation data forms.
4. Relative abundance: S = Sparse (< 5 % total cover); C = Common (6 to 25 % total cover); A = Abundant (26 to 50 % total cover); D = Dominant (> 50 % total cover)
5. N = none (no invasive wetland species present)

* = Wetlands located on federally owned lands in the Mansfield Hollow area (USACE-owned lands).

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APPENDIX E

AVOIDANCE AND MINIMIZATION PROTOCOL FOR VERNAL POOLS

August 2013

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1. INTRODUCTION

Vernal pools are recognized as important habitats on both the federal level (USACE and U.S. EPA) and by the state of Connecticut. The term "vernal pool" commonly refers to a small isolated fresh water body, typically contained in a small depression, that fills with water seasonally and reaches maximum depth in the spring, does not have fish populations, and provides breeding habitat for certain species of woodland amphibians, invertebrates, and/or other animals that are adapted to seasonal water drawdowns and that require the absence of fish populations to survive. As such, some species rely on the micro-habitat provided by vernal pools for all or portions of their lifecycles.

Pool-breeding amphibians depend on both aquatic and terrestrial habitats for survival. Thus, vernal pool habitat includes three main features[1]:

1. Vernal pool depression/seasonal breeding pool;

2. Vernal pool envelope (area within 100 feet of the vernal pool depression edge); and

3. Vernal pool critical terrestrial habitat (area within approximately 100 to 750 feet of the vernal pool depression edge), consisting mainly of terrestrial (upland) non-breeding habitat.

Generally, federal and state agencies recommend protecting vernal pool habitat by:

a. Avoiding direct impacts to the vernal pool depression and vernal pool envelope.

b. Limiting site clearing, grading and construction activities to <25% of the vernal pool terrestrial habitat.

c. Implementing best management practices (BMPs) as documented in the literature (e.g., Calhoun et al.[1]).

2. PROJECT INVESTIGATIONS

To identify vernal pools in the Project area, CL&P conducted field investigations along the ROWs during amphibian breeding periods. These studies were conducted in 2007, 2008, and 2011. The locations of vernal pools along the Project ROWs are illustrated on the maps in Volume 3.

Based on the results of the field studies, three primary categories of vernal pools habitat were documented within the ROWs:

- **Traditional vernal pool:** Characterized by a confined basin depression (generally less than 2 acres) that contains water for two or more continuous months in the spring and/or summer; lacks a permanent surface water connection with other wetlands or waterbodies; does not have established (reproducing) fish populations; and supports the breeding of obligate and/or facultative vernal pool indicator species.

[1] Calhoun, A. J. K. and M. W. Klemens. 2002. Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.

- **Cryptic ("non-classic") vernal pool:** An area within a larger wetland that exhibits the hydrology (e.g., seasonal flooding) appropriate to support the breeding of obligate and/or facultative vernal pool species.

- **Depressions containing man-made amphibian habitat:** In some locations along existing on-ROW access roads, depressions have developed that hold water in the spring and opportunistically provide habitat for some amphibian species. These depressions are typically very small, and have formed over time as soils along the access roads have been compacted by the movement of equipment and vehicles used to perform ROW management activities.

The locations of the vernal pools along the ROWs are summarized in Table 1. As this table shows, a large percentage of the vernal pools found along the ROWs are within areas presently managed by CL&P in scrub-shrub vegetation.

Table 1
Summary of Vernal Pools Located along Project ROWs in Connecticut

Location	Number
Vernal Pools Identified within ROWs (full easement widths)	**88**
Vernal Pools in Relation to <u>Presently Managed</u> Portions of the ROWs	
• Vernal pools traversed by existing access roads	**10**
• Existing transmission line structures in wetlands containing vernal pools	**17**
• Existing transmission line structures located directly in vernal pools	**0**
• Vernal pools located entirely within managed (scrub-shrub) portions of existing ROWs	**45**

3. PROJECT CONSTRUCTION ACTIVITIES AND VERNAL POOLS

The principal types of Project construction activities that could directly or indirectly affect vernal pools and the obligate or facultative species that rely on such habitats include:

- The removal of vegetation in, or the tree canopy over vernal pools located along the Project ROWs;

- The development of new access roads or improvements to existing access roads through vernal pools (especially the man-made vernal pool habitats located along existing access roads);

- The movement of vehicles and equipment use on access roads or work pads in the vicinity of vernal pools and associated amphibian migratory routes;

- The placement of structures, counterpoise and guys directly in vernal pools (if such areas cannot otherwise be avoided); and

- The development and use of temporary work pads in order to install or remove structures in or near vernal pools, especially during breeding periods.

4. AVOIDANCE AND MINIMIZATION MEASURES

After the completion of the vernal pool habitat studies, CL&P performed constructability field reviews and engineering evaluations to assess the locations of the vernal pools in relation to the Project facilities. Based on the results of these analyses, new transmission line structures, access roads, and work pads were adjusted to avoid or minimize direct adverse impacts to vernal pools to the extent practicable, taking into consideration engineering design requirements for the new transmission lines and the need to maintain safety during construction.

As a result of this effort, no new transmission line structures will be located directly in vernal pools along the Project ROWs. However, given the linear nature of the Project and the number of wetlands along the ROWs, a limited number of work pads and temporary or permanent access roads must be placed in vernal pools or in wetlands that contain embedded (cryptic) vernal pools. Table 2 lists the vernal pools that will be affected by the 345-kV transmission line construction, identifying the species observed in each location and the types of construction activities that will be required in each area.

To avoid or minimize potential adverse impacts on vernal pool breeding habitats during construction, CL&P propose the following mitigation measures, which will be implemented on a site-specific basis to the extent practicable:

a. During tree clearing and vegetation removal along the ROW, access through vernal pools will be avoided when practicable. Where limited access across vernal pools is unavoidable, low impact clearing equipment/techniques and/or temporary swamp mats, corduroy roads, or equivalent will be used to support vehicles and equipment. Work during frozen ground conditions also may be considered, if construction and/or transmission line outage schedules allow.

b. Trees that must be removed from the ROW will not be intentionally felled into vernal pools. Directional felling, extended cable winching and/or booms, and other forestry practices will be used if appropriate and feasible. If trees are felled into a vernal pool, whether out of necessity or inadvertently, and removal is likely to cause adverse impacts, the trees or parts of the trees may be left in place.

c. Except in areas where access roads and work pads must be installed, existing scrub-shrub vegetation within 25 feet of vernal pools will be maintained, consistent with ROW vegetation management requirements.

d. If low growing (scrub-shrub) vegetation must be removed adjacent to vernal pools, the cut vegetation (slash) will be left in place to serve as recruitment for leaf litter and coarse woody debris.

e. Erosion and sedimentation control best management practices will be installed and maintained along construction access roads and around work pads as necessary to protect water quality and to limit the potential for soil deposition into vernal pools. Sediment built up against these devices will periodically be removed and placed in upland areas, in a manner that will preclude the potential for subsequent deposition into the pools. (Note: The specific types of controls will be determined in the field, in accordance with the BMP manual [refer to Volume 2, Attachment E] and conformance with stormwater management requirements for the Project.)

f. Where existing on-ROW access roads adjacent to or through vernal pools must be improved, swamp mats or corduroy road will be used if practicable; otherwise, clean materials will be used (e.g., clean riprap, gravel, stone or equivalent and rock fords).

> **Note**: Some man-made depressions along existing on-ROW access roads provide amphibian breeding habitat, based on the results of the field surveys. In general, such depressions provide low-quality vernal pool habitat. To accommodate Project construction vehicles, these access roads must be graded and otherwise improved. The proposed access road improvements will eliminate these depressions and the associated potential for amphibian breeding habitat. To avoid direct impacts to amphibians that may breed in these depressions, CL&P will attempt to perform the improvements to these on-ROW access roads outside of the breeding and migration seasons of vernal pool species.

g. To the extent that circuit outage and other construction timing constraints allow, CL&P will attempt to schedule vegetation clearing and the installation of access roads and work pads in and around vernal pool habitats so as not to interfere with amphibian breeding and migration seasons.

h. For Project activities that must occur adjacent to or within vernal pools during amphibian migration periods, measures will be implemented on a site-specific basis as necessary to facilitate unencumbered amphibian access to and from vernal pools. Mitigation measures will be identified after taking into consideration site-specific conditions, including the type of construction activity in proximity to a vernal pool, the amphibian species known to occur in the vernal pool, and seasonal conditions. Options to be evaluated to allow amphibian access to vernal pools may include, but not be limited to, placing wood chip ramps at intervals along erosion and sedimentation control fencing in the immediate vicinity of vernal pools; leaving gaps in or staggering the installation of erosion and sedimentation controls; and aligning erosion and sedimentation controls to avoid bifurcating vernal pool habitat. Installation of any mitigation devices will be based on field and seasonal conditions, and will depend on species-specific requirements. Further, in some cases, the objective may be to fence off construction areas near vernal pools, allowing amphibian access around such areas entirely.

i. Erosion and sedimentation control devices will be promptly removed upon final re-vegetation and stabilization of the ROW.

Table 2: Summary of Potential Direct or Secondary Effects to Vernal Pools

(Note: All vernal pools along the Project ROWs are shown on the Volume 3 maps. This table lists only the vernal pools that will be directly affected by Project vegetation clearing, access roads, and / or work pads. Other vernal pools depicted on the Volume 3 maps will not be directly affected by construction, and will be protected from indirect impacts pursuant to the Project BMPs.

Town and Volume 3 Map Number	Wetland Number	Vernal Pool (VP) Number	Species Observed	Existing Conditions		CL&P's Proposed Project Facilities and Tree Removal			
				Structures or Guy Anchors Located in Vernal Pool	Access Roads Located in Vernal Pool	Temporary Work Pad Located in Vernal Pool	Permanent Structures or Guy Anchors Located in Vernal Pool	Access Road Impacts Located in Vernal Pool	Tree Removal (Secondary Impact) Required in Vernal Pool (est. acres)
Columbia									
3	W20-9	CO-2-VP	Wood frog						<0.01
Mansfield									
9	W20-43	MA-2-VP	Wood frog, spotted salamander, green frog, fairy shrimp						<0.01
9	W20-43	MA-3-VP							0.05
9	W20-43	MA-VP-4							<0.01
9	W20-43	MA-6-VP			Yes			Yes Permanent	<0.01
9	W20-43	MA-7-VP							<0.01
11	W20-50	MA-9-VP	Wood frog						0.04
11	W20-53	MA-10-VP	Wood frog, spotted salamander, fairy shrimp						0.10
15	W20-64	MA-17-VP	Spotted salamander, spring peeper			Yes			0.01
15	W20-63	MA-18-VP	Spotted salamander, spring peeper, wood frog					Yes	0.01
15	W20-63	MA-19-VP							0.01
Chaplin									
18	W20-70	CH-1-VP	Spotted salamander, spring peeper, caddisflly larvae						0.24
18	W20-72/73	CH-2-VP	Spotted salamander, wood frog, fairy shrimp						0.03
19 / 20	W20-81	CH-6-VP	Wood frog, spotted salamander, American toad, caddisfly larvae,						0.24
19 / 20	W20-81	CH-7-VP			Yes			Yes Temporary	

Town and Volume 3 Map Number	Wetland Number	Vernal Pool (VP) Number	Species Observed	Existing Conditions		CL&P's Proposed Project Facilities and Tree Removal			
				Structures or Guy Anchors Located in Vernal Pool	Access Roads Located in Vernal Pool	Temporary Work Pad Located in Vernal Pool	Permanent Structures or Guy Anchors Located in Vernal Pool	Access Road Impacts Located in Vernal Pool	Tree Removal (Secondary Impact) Required in Vernal Pool (est. acres)
20	W20-81	CH-8-VP	green frog, red-back salamander		Yes			Yes Temporary	
20	W20-83	CH-9-VP			Yes			Yes Temporary	
21	W20-87	CH-13-VP	Spotted salamander, green frog, ribbon snake						0.01
22	W20-89	CH-14-VP	Wood frog; spotted salamander; bull frog; red-spotted newt; caddisfly larvae; leech; whirley gigs		Yes			Yes Permanent	
Hampton									
24	W20-94	HA-1-VP	Spotted salamander, caddisfly						0.17
25	W20-98	HA-2-VP	Wood frog, spotted salamander, caddisfly larvae		Yes			Yes Temporary	
26	W20-100	HA-3-VP	Spotted salamander; spotted turtle; green frog; gray tree frog; caddisfly larvae; pickerel frog						0.18
28	W20-113	HA-7-VP	Spotted salamander; wood frog; green frog						0.02
Brooklyn									
32	W20-123	BR-1-VP	Wood frog; spotted salamander; amphipods; isopods; spring peepers						0.02
32	W20-125	BR-3-VP	Spotted salamander; wood frog; American toad						0.07
33	W20-127	BR-4-VP	Marbled salamander; wood frog; green frog; caddisfly larvae					Yes Temporary	0.01
34	W20-130	BR-6-VP	Wood frog; spotted salamander; spring peeper breeding chorus						0.48

Town and Volume 3 Map Number	Wetland Number	Vernal Pool (VP) Number	Species Observed	Existing Conditions		CL&P's Proposed Project Facilities and Tree Removal			
				Structures or Guy Anchors Located in Vernal Pool	Access Roads Located in Vernal Pool	Temporary Work Pad Located in Vernal Pool	Permanent Structures or Guy Anchors Located in Vernal Pool	Access Road Impacts Located in Vernal Pool	Tree Removal (Secondary Impact) Required in Vernal Pool (est. acres)
35	W20-137	BR-8-VP	Wood frog						0.01
35	W20-138	BR-11-VP	Wood frog; spotted salamander; wood frog; spring peeper; spotted turtle; caddisfly larvae; dragonfly nymph						0.09
36	W20-140	BR-13-VP	Spotted salamander; marbled salamander; spring peeper			Yes			0.02
36	W20-140	BR-14-VP	Wood frog; spotted salamander; fairy shrimp			Yes			<0.01
36	W20-143	BR-15-VP	Spotted salamander; wood frog						0.13
40	W20-154	BR-17-VP	Spotted salamander						0.04
42	W20-158	BR-19-VP	Spotted salamander; amphibious snails; caddisfly larvae			Yes			
Putnam									
58	W20-188	PU-6-VP	Wood frog; isopods; mosquito larvae						0.04
59	W20-192	PU-8-VP	Wood frog; spotted salamander; fairy shrimp; caddisfly larvae						0.14
60	W20-195	PU-10-VP	Wood frog; spotted salamander; predacious diving beetle larvae; dragonfly nymphs; leeches			Yes		Yes Temporary	0.17
61	W20-197	PU-13-VP	Spotted salamander; spring peeper; caddisfly larvae						0.03
61	W20-197	PU-14-VP							0.70

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APPENDIX F

POST-CONSTRUCTION ELECTRIC AND MAGNETIC FIELD MONITORING PLAN

August 2013

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I. INTRODUCTION AND PURPOSE

In accordance with the December 27, 2012 Decision and Order of the Connecticut Siting Council (the Council) in Docket 424, The Connecticut Light and Power Company (the Company) proposes the following post-construction electric and magnetic field monitoring plan for the Interstate Reliability Project (Project).

A primary purpose for electric and magnetic field (E & MF) measurements near to transmission lines is to make comparisons to levels predicted by calculations. This purpose is best served by selecting post-construction measurement locations where terrain is relatively flat, conductor configurations and heights are typical and representative, and where few if any confounding field sources and objects exist.

A secondary purpose for such measurements can be to make comparisons between levels measured at points of interest before and after new line construction. However, those points of interest may not be at locations which best serve the primary purpose. Also, measurements of magnetic fields should not be so compared because grid and power-flow circumstances can be significantly different at the times of these before and after measurements.

II. MONITORING LOCATIONS

The Company's proposed monitoring locations for E & MF are listed in Table 1 at the end of this plan. The selected monitoring locations capture each newly constructed overhead line type that is part of the line design. Additional considerations in location selection are as follows:

1. Lines

At a minimum, the Company chose one readily accessible monitoring location for each overhead line type along the right-of-way (ROW) of each new 345-kV line. Other locations were chosen along sections of the route where 69- or 115-kV lines share the ROW. These monitoring locations are listed in Table 1 and shown on the Volume 3 maps.

At each of the monitoring locations listed in Table 1, measurements will be made within the Company's ROW or on public roadways or on nearby private property outside of the Company's ROW with landowner approval.

2. Substations

The Company will take measurements once on a continuous path along the perimeter fence of the Card Street Substation.

3. Measurement Location Characteristics for Lines

To the extent possible, the Company chose line measurement locations where: (1) the terrain is relatively flat and bare of vegetation; (2) conductor configurations and heights are typical and representative; and (3) few if any confounding sources, such as local distribution lines, and objects exist.

III. MEASUREMENTS FOR LINE SEGMENTS

The Company will take post-construction measurements of electric and magnetic fields twice at each of the locations listed in Table 1 (below) within 10 months of commencement of 345-kV line operation. The Company will measure electric and magnetic fields along a transect (i.e., profile) passing perpendicularly beneath the new and existing overhead transmission lines at the listed locations. The measurement path will extend to each ROW boundary where reasonable access exists, else to at least 50 feet beyond the outermost line conductors.

Table 1
E & MF Monitoring Locations for the Interstate Reliability Project

Site	Cross Section No. (refer to Volume 3)	Municipality	Monitoring Location	D&M Plan Map No. (refer to Volume 3)
1	1	Columbia	Off Baker Hill Road	2
2	2	Mansfield	East of Stafford Road	7
3	2	Mansfield	Between Storrs Road and Bassetts Bridge Road	14
4	HL-1	Mansfield	Hawthorne Lane	15
5	6	Brooklyn	West of Windham Road	34
6	6	Brooklyn	East of Church Street	42
7	7	Pomfret	Off Woods Hill Road	45
8	11	Killingly	East of Killingly Substation	54
9	12	Putnam	Behind Elvira Heights	62

IV. MEASUREMENT INSTRUMENTATION AND RECORDING

The Company will record all electric and magnetic field measurements at a height of one meter (3.28 feet) above ground in accordance with the industry standard protocol for taking measurements near power lines (IEEE Std. 644-1994 [R2008], "*IEEE Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields From AC Power Lines*"). The resultant magnetic field will be measured with a 3-axis, recording digital meter (EMDEX II). Electric fields will be measured

with an E-Probe attachment accessory to the EMDEX II meter. This accessory enables the EMDEX II to make single-axis measurements of the electric field. Both the EMDEX II magnetic field meter and the E-probe accessory meet the IEEE instrumentation standard for obtaining valid and accurate field measurements at power line frequencies (IEEE Std. 1308-1994, *"IEEE Recommended Practice for Instrumentation: Specifications for Magnetic Flux Density and Electric Field Strength —10 Hz to 3 kHz."*) With this instrumentation, magnetic fields can be recorded continuously while walking and then plotted, whereas electric fields can be measured at spots and then recorded by hand in a data table and then plotted.

V. REPORTING

Within 12 months of the in-service date of the new 345-kV lines, the Company will provide to the Council a report on these measurements with "true-up" comparisons to predicted values. "True-ups" are electric and magnetic field calculations that are based on site-specific conditions, including the actual conductor heights at a location at the time the measurement is made, current flows on the lines at the time the measurement is made, and the terrain. These calculations are then compared with the measurements taken at the location. True-up comparisons of measurements with calculations will be performed and reported for a couple of locations to demonstrate model accuracy

The report will also include aerial photographs on a scale of 1 inch equals 100 feet to mark each measurement location. For each magnetic field measurement, the coincident transmission line currents, as recorded by the CONVEX SCADA system, will be noted and reported. Additionally, for each measurement location, the size of transmission line conductor types will be reported.

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