BLOOMFIELD - WINDSOR UPGRADES PROJECT

DEVELOPMENT AND MANAGEMENT PLAN

for

MODIFICATIONS
to the
ROOD AVENUE SUBSTATION AND RELATED TRANSMISSION LINE CONNECTIONS, BLOOMFIELD SUBSTATION, AND NORTH BLOOMFIELD SUBSTATION

Towns of Bloomfield and Windsor, Hartford County, Connecticut

VOLUME 1

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Prepared by:

The Connecticut Light and Power Company doing business as Eversource Energy

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1. INTRODUCTION

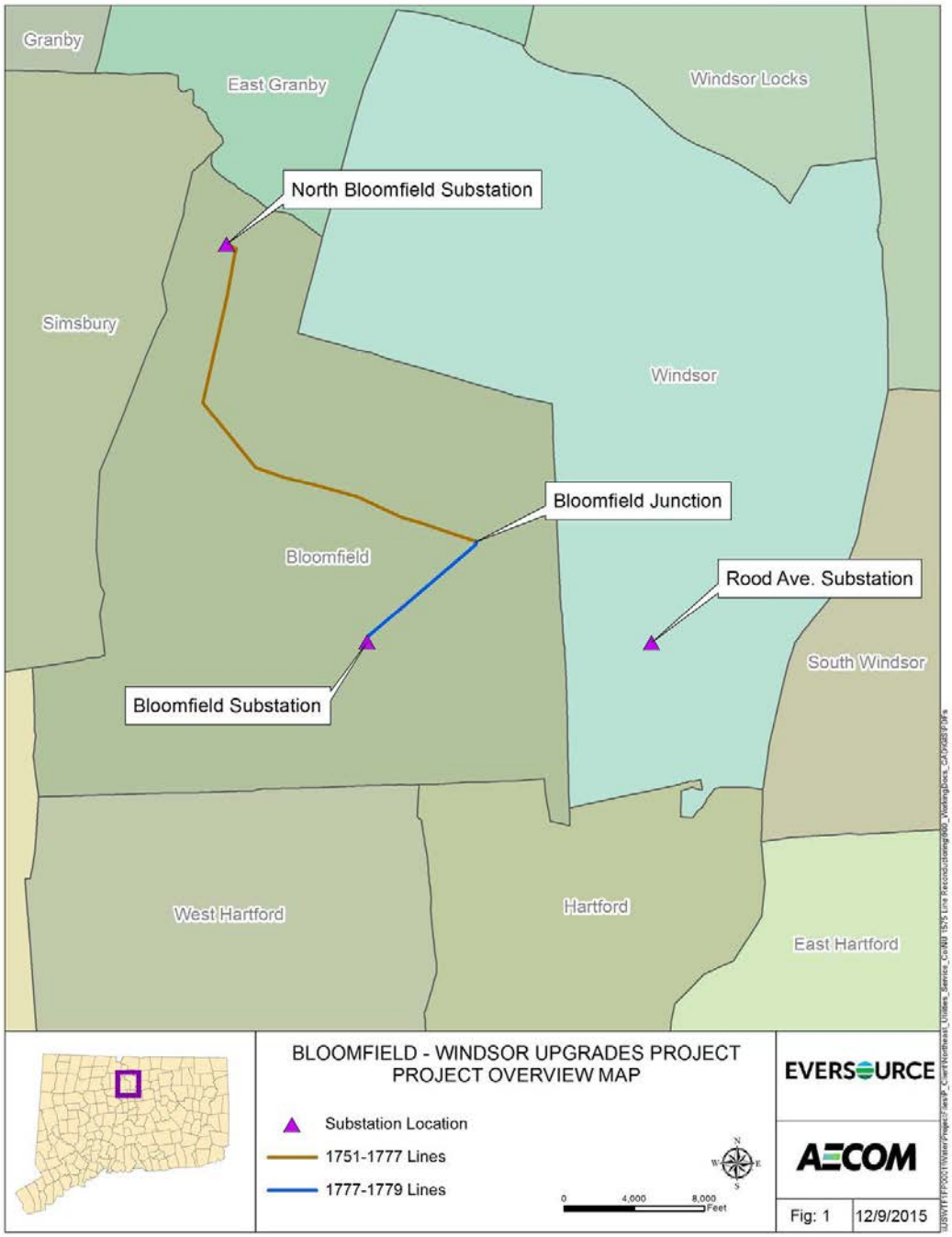
1.1 PROJECT OVERVIEW AND PURPOSE OF THE PLAN

To eliminate potential transmission system thermal and voltage criteria violations in the Greater Hartford Central Connecticut area, The Connecticut Light and Power Company doing business as Eversource Energy (Eversource or the Company) will upgrade existing 115-kilovolt (kV) transmission lines and implement associated modifications to its existing Rood Avenue, Bloomfield, and North Bloomfield substations. Referred to as the Bloomfield - Windsor Upgrades Project (Project), these modifications will be located entirely within existing Eversource rights-of-way (ROWs) or on Eversource-owned properties in the towns of Bloomfield and Windsor, Hartford County, Connecticut (refer to Figure 1-1). The Project facilities will consist of the following:

- Separation of approximately 6.9 miles of existing 115-kV lines that presently occupy the common support structures, referred to as double-circuit tower (DCT) configurations, including:
  - ✓ The existing 1777/1779 lines, which are presently located on DCT lattice structures along a 1.6-mile segment of ROW between Bloomfield Substation and Bloomfield Junction; and
  - ✓ Separation of the existing 1751/1777 lines, which are presently located on common monopoles for 5.3 miles between Bloomfield Junction and North Bloomfield Substation.
- Modification to loop the existing 115-kV overhead 1779 Line into and out of Rood Avenue Substation in an underground configuration. The existing 1779 Line, which is in a DCT configuration with Eversource's 345-kV 3642 Line, presently bypasses Rood Avenue Substation. The connections of two other 115-kV lines (the 1448 and 1751 lines) that presently tie into Rood Avenue Substation also will be reconfigured.
- Related improvements to Rood Avenue, Bloomfield, and North Bloomfield substations.

On March 8, 2016, Eversource submitted to the Connecticut Siting Council (Council, CSC) a Petition for Declaratory Ruling, requesting a Council determination that a Certificate of Environmental Compatibility and Public Need (Certificate) was not required for the Project. The Council subsequently examined the Petition (CSC Petition No. 1217) and, after consideration, on May 3, 2016 ruled that a Certificate will not be required for the Project. The Council's ruling included seven conditions; Condition No. 1 requires that Eversource prepare a Development and Management (D&M) Plan for the Project 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*), and in accordance with seven Project-specific requirements.

Figure 1-1: Project Location Map



This D&M Plan addresses all construction activities for the modifications to Rood Avenue, Bloomfield, and North Bloomfield substations, as well as the 1779 Line loop and related 115-kV line reconfigurations into Rood Avenue Substation. A separate D&M Plan addresses the Project's DCT transmission line modifications.

1.2 SUBSTATION LOCATIONS AND GENERAL DESCRIPTIONS

Rood Avenue Substation and Related 115-kV Lines[1]

Rood Avenue Substation is located at 258 Rood Avenue, in the southern portion of the Town of Windsor. The substation occupies approximately 0.7 acre of a 20-acre Eversource property. Areas developed for single-family homes border the Eversource property, including along Sunnyfield Drive, Rood Avenue, and Hope Circle. Interstate 91 and Shelley Avenue border the Eversource property to the northeast.

Rood Avenue Substation is a 115- to 23-kV substation that is presently connected to two 115-kV transmission lines (i.e., the 1751 and 1448 lines) and includes one 115-to 23-kV transformer and three 23-kV distribution circuits. The existing DCT 1779/3642 lines, which occupy the same ROW as the 1448 and 1751 lines, presently bypass the substation. These transmission lines extend through Eversource's property, generally southwest of the substation.

As part of the Project, Eversource will expand and upgrade Rood Avenue Substation, and will loop the 1779 Line, in an underground configuration, into the substation, thus adding another 115-kV source to the station. The loop will create two terminal lines: South Meadow Substation (City of Hartford) to Rood Avenue Substation (1779S Line will be renumbered as the 1873 Line) and Rood Avenue Substation to Bloomfield Substation (1779N Line will be renumbered as the 1037 Line). In addition, to maintain clearances from the new substation equipment, the 1751 and 1448 line entries to the substation will be reconfigured.

The Project modifications at Rood Avenue Substation will require the expansion of the developed portion of the substation by approximately 21,000 square feet (0.48 acre), involving an extension of the existing station fence by approximately 83 feet to the southwest and 46 feet to the southeast. Two 20-foot-wide gates also will be replaced, a new gravel access road will extend around the outside of the fenced substation expansion area, and a new catch basin will be added outside the substation fence, near the main gate.

The substation expansion will be located on Eversource property, in a partially graveled area that is characterized principally by low-growth shrubs and similar vegetation. The 1779 Line loop and related

[1] *Note*: Subsequent to the Council's approval of Petition 1217, Eversource continued to refine engineering plans for the Project. This D&M Plan reflects Eversource's more detailed engineering design for the substation modifications and 1779 Line loop at Rood Avenue Substation. Neither the location nor the scope of the Project facilities have changed as a result of this engineering work. However, compared to the information presented in the Petition, some planned structures associated with the 1779 Line loop and related 115-kV line modifications at Rood Avenue Substation have been re-numbered for clarity (for example, 1751 Line Structure 10143A and 1448 Line Structure 10142B as depicted in this D&M Plan were referred to as Structures 10142 and 10144 in the Petition). In addition, the Rood Avenue Substation fence line will be expanded on Eversource property by 83 feet rather than 81 feet (as identified in the Petition).

overhead line modifications similarly will be within Eversource's existing transmission line ROW (fee-owned property) or within the substation. The heights of the new equipment at the substation will be consistent with the heights of that in the existing substation.

Bloomfield Substation

Bloomfield Substation, which occupies approximately 1.5 acres of a 23-acre Eversource property, is located at 40 Crestview Drive, in the south-central portion of the Town of Bloomfield. The property is bordered on the north and east by residential areas and to the south and west by a railroad and commercial development along Route 178. Bloomfield High School is located to the east of the Eversource property. Access to the substation is via Crestview Drive.

The substation is a 115-kV to 23-kV substation with three 115- to 23-kV transformers, three 115-kV transmission lines, and 11 23-kV distribution circuits. All of the Project modifications will be installed within the existing substation yard (fenced area) and none of the new equipment will be taller than the existing equipment at the substation.

North Bloomfield Substation

North Bloomfield Substation, a 345-kV to 115-kV bulk power substation, is located at 2 Hoskins Road in the northwestern corner of the Town of Bloomfield, on approximately 9.2 acres of a 90-acre property owned by Eversource. Access to the substation is via Hoskins Road and Tariffville Road. Although some residences are located adjacent to both of these roads, most lands in the immediate vicinity of the substation are undeveloped.

The substation presently includes two 345- to 115-kV transformers, two 345-kV transmission lines, four 115-kV transmission lines, two 115- to 23-kV autotransformers and eight 23-kV distribution circuits. All of the Project modifications at North Bloomfield Substation will be within previously developed (graveled) areas within the existing fenced portion of the station. The new equipment installed at the substation will be no taller than the existing equipment.

1.3 ORGANIZATION OF THE D&M PLAN

This D&M Plan consists of two volumes:

- **Volume 1** includes specific information relevant to the substation modifications, including the 1779 Line loop into Rood Avenue Substation and related 115-kV transmission line reconfigurations at Rood Avenue Substation. The main text of Volume 1 (Sections 1 through 8) includes information and procedures that are pertinent to the construction at all three substations, including regulatory requirements, general Project construction procedures and special plans, overall construction schedule, environmental inspection, public outreach, and processes for reporting to the Council concerning the Project and for notifying and requesting approval from the Council for changes to the D&M Plan. Volume 1 also identifies the Project modifications, construction activities, and site-specific construction procedures and plans that are unique to each substation. Information regarding the 1779 Line loop and related modifications to the transmission lines connected to Rood Avenue Substation is also included.

Table 1-1 summarizes each of the Council's D&M Plan requirements, pursuant to RCSA Sections 16-50j-60 through 16-50j-62; Table 1-2 identifies the requirements pertaining to the substation facilities as contained in the Council's May 3, 2016 ruling regarding 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 substation modifications.

Appendices to Volume 1 contain Project-specific information regarding each of the three substations to be modified:

- ✓ **Appendix A** includes plans and drawings regarding the modifications to the Rood Avenue Substation, including the 1779 Line loop and related line modifications.
- ✓ **Appendix B** provides plans and drawings regarding the modifications to the Bloomfield Substation.
- ✓ **Appendix C** contains plans and drawings regarding the modifications to the North Bloomfield Substation.

- **Volume 2** includes copies of the approvals, plans, permits, and best management practices (BMPs) pertinent to all Project construction activities, including not only the substation modifications, but also the 115-kV transmission line modifications. Volume 2 also includes information regarding public outreach and agency correspondence.

Attachment A: The Council's Ruling and Staff Report Regarding Petition No. 1217

Attachment B: Spill Prevention and Control Plan

Attachment C: Snow Removal and De-Icing Procedures

Attachment D: Eversource'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

Table 1-1
D&M Plan Directory
Bloomfield - Windsor Upgrades Project: Substation Modifications and Related 115-kV Line Modifications
(Compliance with RCSA Sections 16-50j-60, -61 and -62, as amended through September 7, 2012)

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 will 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 modifications at Rood Avenue, Bloomfield, and North Bloomfield substations.
(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 substation modifications.
(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 Eversource.
(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 substation modifications 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 substation 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**	
(a)	**Key Map**, 1"=2,000' USGS topographic map	Appendices A-C , Exhibit 1
(b)	**Plan Drawings**, 1"=100' or larger, and supporting documents, which shall contain the following information:	Appendices A–C

R.C.S.A Section	Description	D&M Plan (Section Reference, as Applicable)
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	Appendices A–C
2.	Public roads and public land crossing or adjoining the site	Appendices A-C
3.	Location of 50' contours along the site	Appendices A-C
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	Appendices A-C
5.	Probable points of access to the site, and the route and likely nature of accessways, including alternatives	Appendices A-C
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 will remain for aesthetic and wildlife value	Refer to Appendices A-C maps
7.	Identification of sensitive areas and conditions within and adjoining the site, including but not limited to:	
	A. Wetland and watercourse areas regulated under CGS Chapter 440 and any locations where construction may create drainage problems	Appendices A-C
	B. Areas of high erosion potential	N/A
	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	No habitat in areas of proposed work
	D. Location of known underground utilities or resources to be crossed (electric line, fuel line, drainage systems and natural or artificial public or private water resources)	Appendices A-C
	E. Residences or businesses within or adjoining the site that may be disrupted during construction	Appendices A-C
	F. Significant environmental, historic and ecological features (significantly large or old trees, buildings, monuments, stone walls or features of local interest)	N/A
(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

R.C.S.A Section	Description	D&M Plan (Section Reference, as Applicable)
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:	Volume 1, Sections 3 and 5
	A. Construction techniques at wetland and watercourse crossings	Appendix A (Rood Avenue Substation)
	B. S & E control and rehabilitation procedures, consistent with the CT Guideline 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 D, BMPs
	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 to 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 guideline, as amended	N/A
	D. Plans for modification and rehabilitation of surface, drainage, and other hydrologic features	Section 3.1; Appendices A-C
	E. Plans for watercourse bank restoration in accordance with Chapter 440 of the C.G.S.	N/A
	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 5.6
3.	Plans for the method and type of vegetation clearing and maintenance to be used within or adjacent to the site	Sections 3 and 5 (Rood Avenue Substation work only)
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	N/A
5.	Plans for ultimate disposal of excess excavated material, stump removal, and periodic maintenance of the site	Volume 1, Section 5.3
6.	Locations of areas where blasting is anticipated	None Anticipated
7.	Rehabilitation plans, including but not limited to reseeding and topsoil restoration	Volume 1, Sections 3.4.7, 3.8 and 3.9, Appendices A-C; Volume 2, Attachment D BMPs
8.	Contact information for the personnel of the contractor assigned to the project	To be provided after substation contract award(s),

R.C.S.A Section	Description	D&M Plan (Section Reference, as Applicable)
		prior to commencement of construction.
9.	Such site-specific information as the CSC may require	Refer to Table 1-2: List of requirements per Council Ruling in Petition No. 1217
(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 Eversource'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, Section 3.3; Appendices A-C
(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 of the beginning of:	Volume 1, Section 7.1 summarizes notification 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 Eversource's D&M Plan change 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	

R.C.S.A Section	Description	D&M Plan (Section Reference, as Applicable)
	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 no later than 180 days after completion of all site construction and site rehabilitation. The report shall identify:	Volume 1, Section 7.3 (as applicable)
1.	All agreements with abutters or other property owners regarding special maintenance precautions	
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 CSC Ruling in Petition No. 1217
Bloomfield – Windsor Upgrades Project: Substation and Related 115-kV Line Modifications

Condition or Page Number	Description	D&M Plan (Section Reference, as Applicable)
Condition Number	**Decision and Order**	
(1)	The Petitioner shall prepare a Development and Management Plan (D&M Plan) for this Project in compliance with Sections 16-50j-60 through 16-50j-62 of the Regulations of Connecticut State Agencies (RCSA). The D&M Plan shall be served on the Towns of Bloomfield and Windsor for comment and submitted to and approved by the Council prior to the commencement of construction and shall include:	This plan is application to the substation modification portion of the Project (including the Rood Avenue Substation line loop)
	a. Statement that transmission structures located within the 100-year flood zone are designed to withstand inundation;	N/A for substation work
	b. Statement that Petitioner shall implement protective measures for Natural Diversity Database wildlife in consultation with the Connecticut Department of Energy and Environmental Protection (CT DEEP);	N/A for substation work
	c. Any additional staging area locations not identified in the Petition;	Volume 1, Appendices A-C
	d. Timing of work in the vicinity of Wintonbury Hills Golf Course;	N/A for substation work
	e. Consideration of limited landscaping along the north side of the expanded area of the Rood Avenue Substation to improve aesthetics as viewed from Sunnyfield Drive;	Volume 1, Section 3; Appendix A
	f. Vernal pool study consistent with Calhoun and Klemens 2002 Best Development Practices; and	N/A for substation work
	g. Wildlife analysis for the blue spotted salamander and marbled salamander with protective measures as applicable.	N/A for substation work
(2)	Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed within three years from the date of the mailing of the Council's decision, this decision shall be void, and the facility owner/operator shall dismantle the facility and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's decision shall not be counted in calculating this deadline. Authority to monitor and modify this schedule, as necessary, is delegated to the Executive Director. The facility owner/operator shall provide written notice to the Executive Director of any schedule changes as soon as practical.	N/A (see Section 4, Schedule, an Section 7, Reporting)
(3)	Any request for extension of the time period to fully construct the facility shall be filed with the Council not later than 60 days prior to the expiration date of this decision and shall be served on all parties	N/A

Condition or Page Number	Description	D&M Plan (Section Reference, as Applicable)
	and intervenors, if applicable, and the towns of Bloomfield and Windsor.	
(4)	Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed.	See Section 7
(5)	The facility owner/operator shall remit timely payments associated with annual assessments and invoices submitted by the Council for expenses attributable to the facility under CGS §16-50v.	N/A
(6)	This Declaratory Ruling may be transferred, provided facility owner / operator / transferor is current with payments to the Council for annual assessments and invoices under CGS §16-50v, and the transferee provides written confirmation that the transferee agrees to comply with the terms, limitations, and conditions contained in the Declaratory Ruling, including timely payments to the Council for annual assessments and invoices under CGS §16-50v; and	N/A
(7)	If the facility owner/operator is a wholly owned subsidiary of a corporation or other entity and is sold/transferred to another corporation or other entity, the Council shall be notified of such sale and/or transfer and of any change in contact information for the individual or representative responsible for management and operations of the facility within 30 days of the sale and/or transfer.	N/A

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 Eversource's commitments as contained in Petition No. 1217; and reflects adherence to the conditions of the Council's ruling regarding the Project and other relevant regulatory requirements.

All of the construction activities for the modifications at Bloomfield and North Bloomfield substations, as well as most of the modifications at Rood Avenue Substation (i.e., the substation expansion, the 1779 Line underground cable system, and the 1751 Line loop into the substation), will be within upland areas. Consequently, the controlling regulatory approvals for these substation construction activities are:

- This D&M Plan, as required by the Council pursuant to its ruling regarding Petition No. 1217 for the Project (see Volume 2, Attachment A); and
- 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 E).

At Rood Avenue Substation, some work activities for the 1779 Line transition from overhead to underground and for the reconfiguration of the substation entry for the 1448 Line will require temporary work in wetlands. Thus, for these construction activities, approvals for work in water resources will be required from the U.S. Army Corps of Engineers (USACE) and the CT DEEP.

2.2 CONSULTATIONS

During Project planning, Eversource consulted with representatives of the towns within which the substations are located (Bloomfield and Windsor), as well as with representatives of various state and federal agencies, including the USACE, New England District; U.S. Fish and Wildlife Service (USFWS), CT DEEP, State Historic Preservation Office (SHPO), and Connecticut Department of Transportation (ConnDOT).

During consultations with town representatives and the interested public, Eversource provided information regarding the D&M Plan process, the planned substation modifications (including the Rood Avenue Substation line loop), and Eversource's outreach procedures and points-of-contact prior to and during construction. In accordance with Condition 1 of the Council's ruling, Eversource also issued this D&M Plan to Bloomfield and Windsor. Additional information regarding Eversource's public outreach process is included in Section 8.

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3. GENERAL CONSTRUCTION PROCEDURES

The Project modifications to Rood Avenue, Bloomfield, and North Bloomfield substations will involve a sequential, phased, construction approach. Section 3.1 summarizes the modifications that will be performed at each substation, including the 1779 Line loop and related transmission line modifications at Rood Avenue Substation. Sections 3.2, 3.3, and 3.4 describe construction activities common to the modifications at all three substations and, as appropriate, discuss the work specific to individual substations. Section 3.5 discusses information and construction procedures regarding the underground 1779 Line loop and overhead transmission line reconfigurations at Rood Avenue Substation.

Detailed site-specific construction drawings and plans for the modifications at each substation are included in Volume 1, Appendices A through C. Actual sequences and methods of construction may vary based on the characteristics of each substation and the final engineering designs for each location.

3.1 SUMMARY OF SUBSTATION MODIFICATIONS

3.1.1 Rood Avenue Substation and Related Transmission Line Modifications

The Project modifications to Rood Avenue Substation will include an expansion of the substation, as well as the interconnection of the 1779 Line to the substation via two new transition structures and an underground cable. To achieve appropriate clearance from the new substation equipment and the existing 115-kV line entries to the substation, one new structure will be added on the 1448 Line entry to the substation and one existing structure will be removed and relocated on the 1751 Line. The following describes both the substation expansion and this related 115-kV line work. Appendix A includes detailed information regarding the Project activities at Rood Avenue Substation.

Substation Expansion

The Rood Avenue Substation modifications, which will require an approximately 0.48 acre expansion of the existing substation yard and fence line (all located on Eversource property), will include the following:

a. Remove two existing 115-kV circuit switchers.

b. Install four 115-kV circuit breakers on new foundations.

c. Install two additional terminal structures to accommodate the 1779 Line on new foundations.

d. Install nine 115-kV disconnect switches. Eight of the disconnect switches (two line disconnect switches one each located in the new line terminal positions and six breaker disconnect switches located within the new portion of the 115-kV ring bus) will be installed on new foundations and one will be installed on an existing foundation.

e. Install six 115-kV coupling capacitor voltage transformers on new foundations.

f. Replace two existing 115-kV manual-operated-disconnect switches with two motor-operated switches installed on existing structures.

g. Install underground conduits, wave traps, bushings, lightning arrestors, mounting and support beams, relay/controls and cables to accommodate the new equipment.

h. Expand the fence line by approximately 83 feet to the southwest and approximately 46 feet to the southeast and the replacement of two 20-foot wide gates. The fence and gates will be the same height as the existing fence and gates.

i. Establish a new gravel access road on Eversource property around the expanded substation fence area and add a new catch basin northeast of the main substation gate.

All new Project equipment will be no taller than the tallest existing equipment within the Rood Avenue Substation. The existing mesh size for the Rood Avenue Substation fence is 1¼". The fence for the expansion area will match this mesh size.

The new permanent gravel access road, which also will provide access to the mobile transformer position within the substation, will be developed around the western perimeter of the substation, outside of the substation expansion fence. As part of the substation drainage system, a pre-cast concrete type catch basin will be added adjacent to and outside the existing substation fence, northeast of the existing substation gate (refer to Appendix A for additional details regarding these facilities).

1779 Line Loop[2] and Related Transmission Line Modifications

As part of the Project, the existing 1779 line (which is supported, in an overhead configuration, on common towers with the 3642 Line and bypasses Rood Avenue Substation) will be connected to Rood Avenue Substation, looping into and out of the substation from the northwest and southeast. To accommodate these new interconnections within the footprint of the expanded substation, the line loop will be configured underground, extending from the overhead line via transition structures. No modifications will be performed to the existing overhead 3642 Line.

In addition to the 1779 Line loop, the existing 1448 and 1751 line entries to the substation will be reconfigured to provide proper clearance between these overhead lines and the new substation equipment. Specifically, on the 1751 Line, one existing 115-kV structure (Structure 10143A) will be removed and relocated and, on the 1448 Line, a new structure will be added (Structure 10142B). Overhead shield wires also will be added. Figure 3-1 illustrates the existing configuration of the Rood Avenue Substation and 115-kV line interconnections. Figure 3-2 depicts the 115-kV line modifications that will be performed as part of the Project, including the underground cable route and transition structures for the 1779 Line and structure reconfigurations on the 1448 and 1751 lines.

[2] After the 1779 Line loop is completed, as is its common practice, Eversource will re-number the 1779 Line, providing separate numbers for the 115-kV line segments that loop into the substation from the northwest and southeast (1037 Line and 1873 Line, respectively).

Figure 3-1: Existing Rood Avenue Substation and 115-kV Line Interconnections

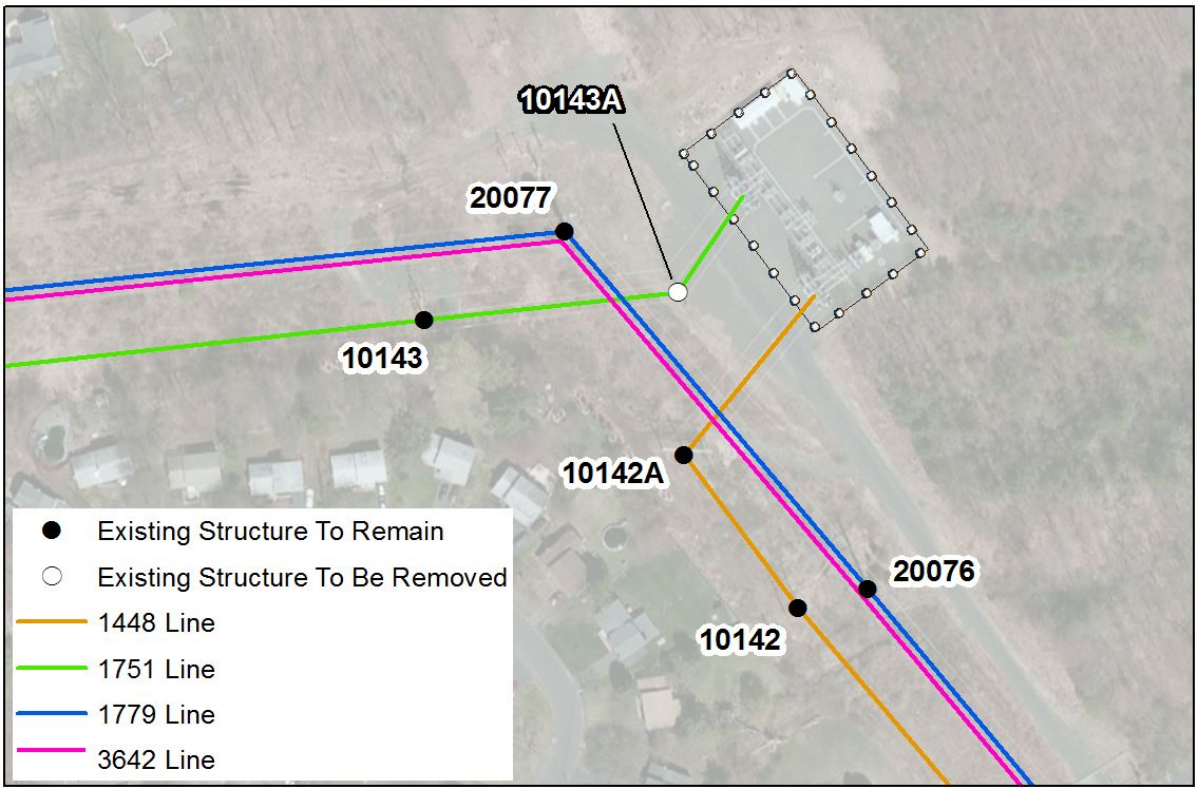
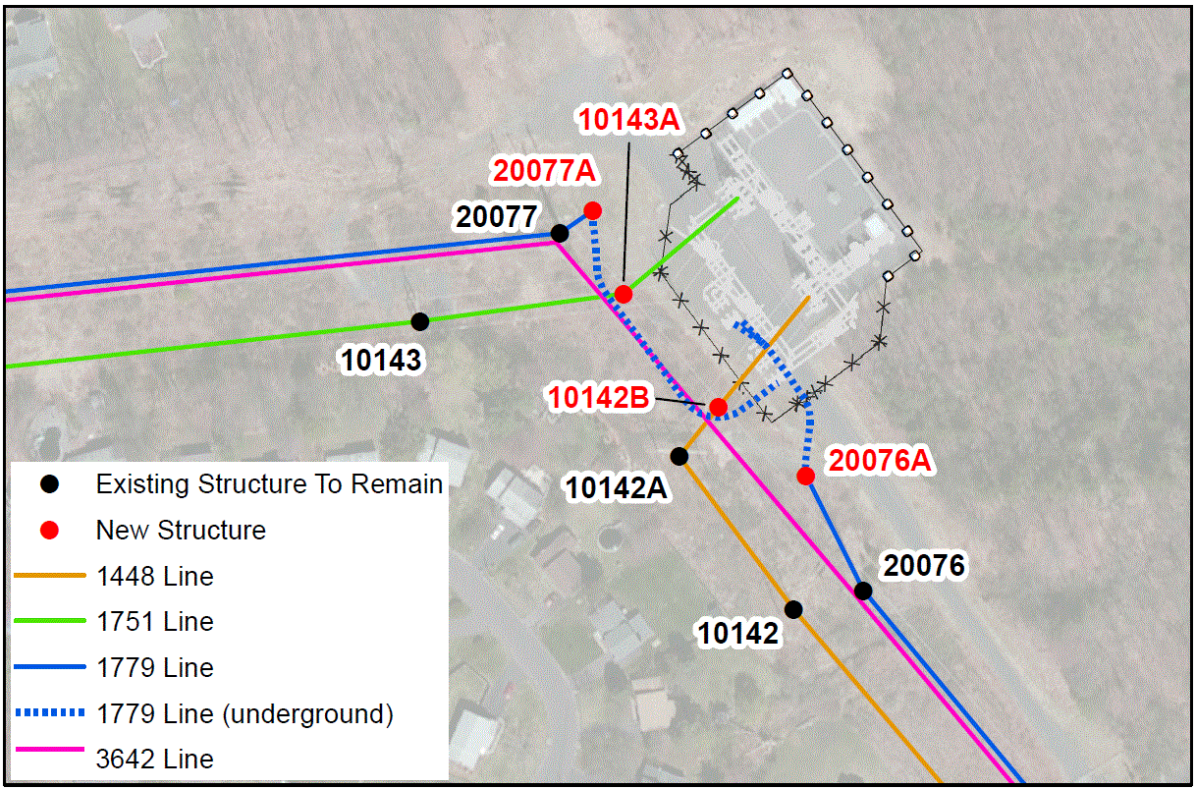


Figure 3-2: Planned Rood Avenue Substation Expansion and 115-kV line Interconnection Modifications



The transmission line work at Rood Avenue Substation will include the following:

a. Install two weathering steel transition structures to configure the 1779 Line from overhead to underground for the loop into and out of Rood Avenue Substation. The height of the new transition structures (20076A and 20077A; refer to Figure 3-2) will be approximately 95 feet and 100 feet above ground level. These structures will be installed on new drilled shaft foundations.

b. Install approximately 800 feet of 5000-kcmil cross-linked polyethylene (XLPE) 115-kV underground cable in a concrete duct bank. The cable will extend from the two proposed transition structures to termination structures inside Rood Avenue Substation.

c. Remove one existing span of 1272-kcmil 45/7 Aluminum Conductor Steel Reinforced (ACSR) conductor on the 1779 Line between existing Structures 20076 and 20077. (The 3642 Line conductor will remain.)

d. Remove one existing overhead 115-kV three-pole wood guyed structure (Structure 10143A on the 1751 Line) and replace it, in a slightly different location, with a new 115-kV three-pole weathering self-supported steel structure. The height of the new structure will be approximately 65 feet above ground.

e. Install a new 115-kV weathering steel three-pole structure (Structure 10142B on the 1448 Line) on new drilled shaft foundations. The height of the structure will be approximately 65 feet above ground level.

f. Install new overhead conductor 1272-kcmil 54/19 Aluminum Conductor Steel Supported (ACSS) from the new 115-kV structures (Structure 10143A on the 1751 Line and Structure 10142B on the 1448 Line) to the existing 1751 and 1448 terminal structures inside Rood Avenue Substation.

g. Install underground conduits, mounting and support beams, relay/controls and cables to accommodate the new equipment.

All of the 1779 Line loop and related work will be performed on Eversource-owned property within the substation expansion area or on the adjacent Eversource ROW. (Refer also to Appendix A.)

3.1.2 Bloomfield Substation

The Project modifications to the Bloomfield Substation will be accommodated within the existing substation fence. These modifications will include:

a. Remove two single-phase bus supports and foundations.

b. Install one new 115-kV circuit breaker on a new foundation.

c. Relocate one existing 115-kV disconnect switch and install it on a new foundation.

d. Install underground conduits, mounting and support beams, relay/controls and cables to accommodate the new equipment.

All new equipment will be no taller than the tallest existing equipment within the Bloomfield Substation. Appendix B includes maps and drawings of the substation modifications.

3.1.3 North Bloomfield Substation

The Project modifications to the North Bloomfield Substation will include the following:

a. Relocate one 115-kV circuit breaker to a new position next to its existing location, to create space for the installation of one additional 115-kV circuit breaker. Both circuit breakers will be installed on new foundations. After relocation of the existing circuit breaker, the original foundation for that circuit breaker will be removed.

b. Relocate two existing 115-kV disconnect switches, moving them from their current positions and placing them on new foundations and switch stands. These relocations are required to accommodate the new circuit breaker. The existing foundations for the relocated 115-kV disconnect switches will be removed and the new foundations and equipment will be installed nearby.

c. Install underground conduits, mounting and support beams, relay/controls and cables to accommodate the new equipment.

The proposed new equipment will be no taller than the tallest existing equipment within the North Bloomfield Substation. The North Bloomfield Substation modifications will be accommodated entirely within the substation's existing fenced area. Appendix C includes maps and drawings of the planned substation modifications.

3.2 CONSTRUCTION MANAGEMENT AND CONTACT INFORMATION

In the third and fourth quarter of 2016, Eversource expects to award multiple construction contracts for the modifications to the three substations and the related 1779 Line loop and 1448/1751 line reconfiguration work at Rood Avenue Substation. After contract award but prior to the commencement of the prime contractors' on-site work at the substations, Eversource will provide the Council with contact information for the prime construction contractor(s), consisting of the name of the firm, name of primary contact, corporate address, telephone number, and e-mail.

The construction of the substation and related line modifications will be overseen by Eversource personnel or Eversource representatives. Such personnel will monitor construction activities, including adherence to safety, engineering, and environmental requirements.

3.3 CONSTRUCTION FIELD OFFICES, CONTRACTOR YARDS, AND STAGING AREAS

To support the construction of the substation modifications and the related line work at Rood Avenue Substation, temporary contractor yards, construction field offices (consisting of trailers or other facilities

for contractor and Eversource personnel), and staging areas (including equipment and material staging sites, temporary storage areas, and laydown areas) will be required. All of these areas will be located on Eversource's property at Rood Avenue, North Bloomfield, and Bloomfield substations, either within the existing (developed) substation fence line and/or on adjacent uplands on Eversource property (refer to Appendices A - C). After completion of the Project modifications, these sites will be restored or otherwise stabilized in accordance with Eversource requirements.

The construction contractor(s) for the substation work will be responsible for establishing the field offices, yards, and staging areas on Eversource properties. If a contractor identifies a need for any additional support sites, Eversource will submit the proposed locations of such construction support areas to the Council staff for review and approval prior to use, in accordance with the Change Notice Approval Process described in Section 7.2.

3.4 CONSTRUCTION PROCEDURES: SUBSTATION MODIFICATIONS

3.4.1 General Construction Sequence

Eversource will construct substation modifications in several stages, some overlapping in time. The following summarizes the general sequence of substation construction activities[3]:

a. Establish construction field office area(s), typically including space for office trailers, equipment storage and maintenance, sanitary facilities, and parking. The office trailers also will be connected to a temporary power source. These areas will be within the substation sites or on adjacent Eversource property.

b. Prepare material staging sites (e.g., storage, staging and laydown areas) to support the construction effort. These areas also are expected to be on Eversource property at the substations.

c. Flag or otherwise mark, if necessary, limits of disturbance for all substation modification activities.

d. Mark the boundaries of previously delineated wetland areas near substation fence lines, as appropriate.

e. Perform vegetation removal and site preparation (e.g., grading) as needed. Note: grading expected to be required at Rood Avenue Substation only.

f. Install erosion and sedimentation controls, as appropriate, depending on locations of soil disturbance.

g. Construct foundations and erect/assemble new equipment.

h. Install grounding systems.

i. Install wire and cable for all new equipment

[3] Note: Some activities only pertain to the modifications to Rood Avenue Substation. In addition, some activities may be conducted concurrently, or in a slightly different order than listed herein.

j. Remove construction debris and restore disturbed sites; develop new permanent access road (Rood Avenue Substation only).

k. Install vegetative plantings (Rood Avenue Substation only).

l. Maintain temporary erosion and sediment controls until sites are re-stabilized (e.g., paved, graveled, or revegetated).

3.4.2 Clearing and Vegetation Removal

No significant forested vegetation removal will be required for the modifications to any of the three substations. At Bloomfield and North Bloomfield substations, all modification work will be performed within the existing, graveled, substation yards. Some staging areas on Eversource property at these two sites may require vegetation mowing or scrub removal.

At Rood Avenue Substation, the expansion work and associated staging areas will be located principally within or adjacent to the existing substation yard, a previously graveled area, and in the vicinity of Eversource's existing 3642/1779, 1751, and 1448 overhead lines, where vegetation is presently managed in accordance with protocols for overhead line clearances. Within these areas, vegetation consists primarily of shrubland or low-growth species, but also includes some trees. This vegetation will be cleared for the Project modifications. All vegetation clearing will be performed in accordance with Eversource standards regarding work near overhead transmission facilities. (Other vegetation clearing will be required for the 115-kV line work at Rood Avenue Substation; refer to Sections 3.5 and 3.6.)

3.4.3 Site Preparation

The type of site preparation work required at each substation will vary, in accordance with the characteristics of each facility, the locations of the facility modifications, and the location of staging areas required to support the work (refer to the plans for each substation in Appendices A - C). Site preparation may include the following activities or BMPs:

a. Deploy temporary office trailers, construction storage containers and related equipment and materials to the substations or associated staging areas and set up temporary services required to support construction (e.g., portable toilets).

b. Establish parking areas for construction workers.

c. Erect "construction zone" warning signs on the public roads that intersect with substation access roads.

d. Install protective fencing (e.g., snow fence) around work sites, if needed.

e. Install, as necessary, temporary soil erosion and sedimentation controls (e.g., silt fence, straw bales, wattles) near areas of planned soil disturbance that are in proximity to water resources (located outside the substation fence lines). Such controls will be maintained and replaced, as necessary, throughout construction. The primary objective of these controls will be to minimize the potential for erosion and sediment migration away from construction activities and into water resources.

f. Maintain temporary erosion and sedimentation controls until the disturbed areas are stabilized.

g. Grade and otherwise prepare the Rood Avenue Substation expansion area and any other work areas and equipment staging locations located outside the substation fence lines.

No blasting will be required for the substation modifications. The existing substation access roads will be used for ingress/egress to the substation work sites. No temporary access roads or improvements to these existing roads are expected to be required.

3.4.4 Erosion and Sediment Controls and Water Resource Protection

To minimize the potential for erosion and sediment migration during construction, the following general construction BMPs will be used:

a. Temporary erosion control structures will be installed as necessary to protect nearby water resources, and will be inspected on a routine basis, in accordance with regulatory requirements (refer to Volume 2, Attachment E). The primary types of erosion controls expected to be associated with the substation work are illustrated on detail sheets in Appendices A-C.

b. Trench dewatering will not be conducted within 25 feet of a wetland or watercourse, unless a fractionization tank ("frac tank"), dewatering bag, or equivalent engineering controls for sediment containment are employed.

c. Equipment will not be refueled within 25 feet of any wetland or watercourse, unless appropriate containment procedures are in place.

d. Petroleum products will not be stored, mixed, or loaded within 25 feet of a wetland or watercourse.

e. In case of an on-site reportable spill, the construction contractor will adhere to the *Spill Prevention and Control Plan* (refer to Volume 2, Attachment B).

In addition to these BMPs, all construction activities will comply with Eversource's BMPs (refer to Volume 2, Attachment D), which are consistent with the *2002 Connecticut Guideline for Erosion and Sediment Control*. Additional information related to sediment and erosion controls at the substations is provided in Section 5.2 and Appendices A-C.

Pursuant to CGS Section 22a-430b, 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 E). Pursuant to the requirements of this General Permit, prior to the start of construction, Eversource will submit to CT DEEP a Registration Form and will prepare a *Stormwater Pollution Control Plan* regarding the Project.

3.4.5 Foundation and Equipment Installation

The process for installing structure and equipment foundations at the substations will generally involve excavation, form work, steel reinforcement, and concrete placement. No blasting is expected to be required for this work.

Excavated material will either be reused on-site or disposed of off-site in accordance with regulatory requirements. Temporary spoil stockpiles will be protected with appropriate erosion and sedimentation controls as required.

If groundwater is encountered in excavations, the water will be pumped from the excavated area and discharged in accordance with applicable requirements. The water may be discharged on-site into an appropriate sediment control basin or into a dewatering bag; 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. Catch basin inlet protection will be installed as needed to prevent disturbed soils excavate and construction debris from entering storm water systems.

After the foundations are installed, construction activities will shift to the erection of structures and equipment as specified for each substation modification (refer to Appendices A – C for details regarding the equipment to be installed at each substation).

3.4.6 Testing and Interconnection

All of the new substation equipment will be tested and commissioned prior to being placed into service.

3.4.7 Final Stabilization, Cleanup, and Restoration

The final steps of the construction process at each substation will be the collection and removal of all remaining construction debris, stabilization/restoration of disturbed areas, completion of site security measures, and demobilization of temporary office trailers and other materials from the sites. Construction debris will be properly disposed of in accordance with local, state, and federal regulations. The contractor will remove all excess soil and rock and dispose of it in accordance with local, state and federal regulations.

Within each substation, areas affected by Project construction are expected to be stabilized using trap rock or gravel. Temporary erosion and sedimentation controls will be left in place and maintained, as necessary, until final stabilization is achieved. Flagging denoting water resource protection areas also will remain in place (if applicable), typically until the completion of stabilization activities.

In addition, at Rood Avenue Substation, a new permanent gravel access road will be installed outside the expanded substation fenced area on Eversource property. This permanent access road, which will be approximately 20 feet wide, will be aligned within the area used for the construction of the substation modifications and related line modifications. A new catch basin also will be installed outside the existing substation gate (refer to Appendix A).

3.4.8 Landscaping: Rood Avenue Substation[4]

Pursuant to Condition 1(e) of the Council's ruling in Petition No. 1217, Eversource will install landscape plantings along the north side of the expanded Rood Avenue Substation fenced area. The objective of this landscaping will be to screen or otherwise improve the aesthetics of the substation, as viewed from Sunnyfield Drive in the Town of Windsor.

[4] *Note*: No landscaping is proposed for the North Bloomfield or Bloomfield substations as part of the Project.

Eversource anticipates that the landscaping will be performed subsequent to or after the completion of the substation modifications, during appropriate seasonal windows for planting. Appendix A includes a drawing that illustrates the anticipated area within which the landscaping will be located.

3.4.9 Site Security and Maintenance

The three existing substations include site security measures (e.g., fencing, low-level lighting) that will be maintained during Project construction. Additional low-level lighting may be added in the vicinity of the new equipment installations. Further, additional lighting may also be installed to allow for work at night or under emergency conditions.

At Rood Avenue Substation, the security fence will be extended to encompass the substation expansion area. Fencing will be maintained throughout the construction process to provide site security.

The Project modifications to the Rood Avenue, Bloomfield, and North Bloomfield substations will not substantially affect or alter existing maintenance practices at these facilities.

3.5 CONSTRUCTION PROCEDURES: 1779 UNDERGROUND LINE LOOP (ROOD AVENUE SUBSTATION)

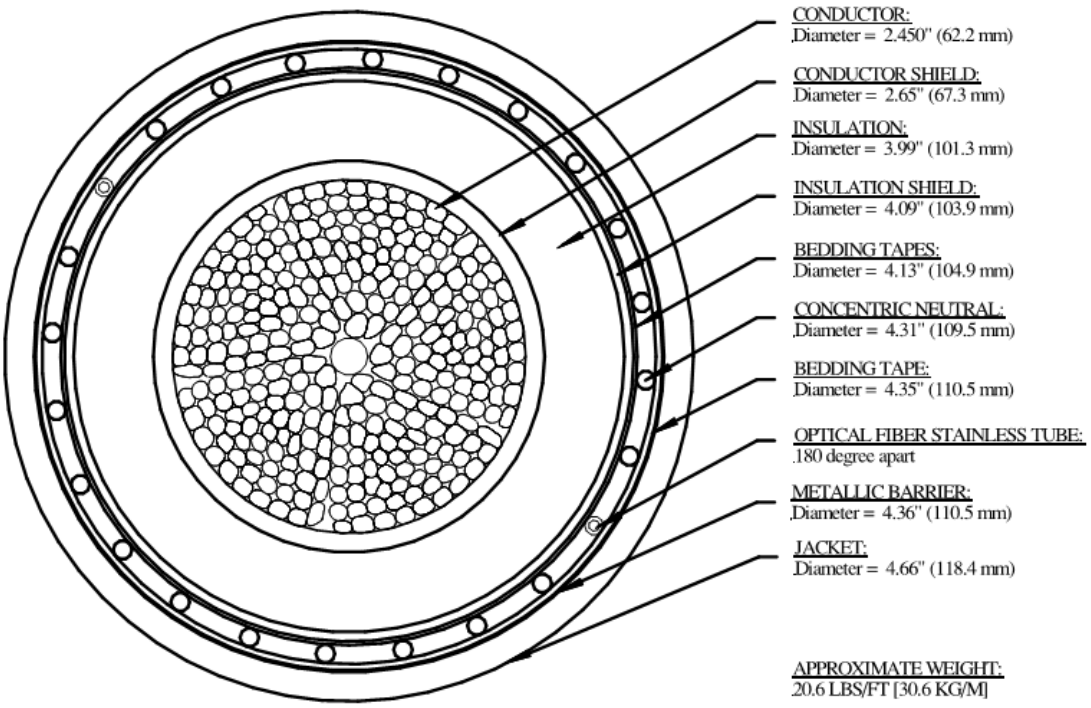
The drawings in Appendix A provide information concerning the underground cable segment for the 1779 Line loop at Rood Avenue Substation, and typical drawings of the cable system and associated structures for the transition of the cable system to the overhead portion of the 1779 Line and connection to the substation. The following summarizes information regarding the cable design and construction procedures.

3.5.1 Underground Cable Design

The approximately 800-foot single-circuit 115-kV underground transmission cable for the 1779 Line loop into and out of Rood Avenue Substation will include three cables, or phases. Each phase of the circuit will consist of one 5000-kcmil copper-conductor cable, approximately 4.7 inches in diameter, insulated to 115 kV with approximately 1.4 inches of XLPE insulation.

Figure 3-3 depicts a cross-section of a typical 5000-kcmil copper-conductor XLPE 115-kV cable. Three electric cables will be installed in PVC ducts encased in concrete. Smaller conduits will also be installed for the communications, temperature monitoring, and ground continuity cables. The power cables will be installed one cable per duct. Appendix A includes details regarding the underground duct back and cable system.

Figure 3-3: Typical 5000-kcmil Copper Conductor 115-kV Cable Cross-Section



3.5.2 General Construction Sequence

Material staging for the underground cable system construction will be within the same areas identified for the overall Project work at Rood Avenue Substation (refer to Appendix A). The following typical sequence of activities will be involved in the construction of the underground cable system for the 1779 Line loop:

a. Conduct pre-construction surveys as necessary to identify underground facilities and subsurface characteristics along the cable route.

b. Survey and mark the cable system route and transition structure sites.

c. Establish erosion and sedimentation controls, as necessary, to protect water resources.

d. Install construction work zone signs and implement other traffic control procedures, as needed, along Rood Avenue (unless otherwise already installed for the substation construction).

e. Clear vegetation in the cable work area and excavate a trench for the cable conduits.

f. Install the conduits.

g. Encase the conduits in concrete.

h. Backfill the trench with a concrete-like substance known as a fluidized thermal backfill (FTB) and restore disturbed areas.

i. Pull the cables into the conduits.

j. Terminate the cables on the transition structures.

k. Stabilize areas affected by construction, using gravel within the substation and on the new access road or by seeding (outside the substation), as necessary.

The sequence in which some of these construction activities will be performed will depend on construction scheduling. The types of activities generally expected to be involved in the underground cable system installation are summarized below.

3.5.3 Summary of Construction Activities

To install the duct bank, a trench will be excavated approximately 6 to 10 feet deep and approximately 5 feet wide. Excavated soil and rock will typically be placed directly into dump trucks and hauled either off-site to a suitable disposal area or to a temporary storage area on-site for screening/testing prior to final disposal; in some areas, excavated material may be re-used for backfill. Rock will be removed using mechanical methods; blasting is not anticipated. If groundwater is encountered, dewatering will be performed in accordance with authorizations from applicable regulatory agencies and may involve discharge to catch basins, temporary settling basins, temporary holding tanks (frac tanks), or vacuum trucks.

The duct bank system will consist of three 8-inch PVC conduits for the XLPE cables; one 2-inch PVC conduit for the ground continuity conductor; one 2-inch conduit for future temperature sensing fiber cables; and two 4-inch PVC conduits for future fiber optic relaying cables. The conduit will be installed in sections, each of which will be about 10 to 20 feet long and will have a bell and spigot connection. Conduit sections will be joined by swabbing the bell and spigot with glue then pushing the sections together. After installation in the trench, the conduits will be placed into spacers that hold the conduit in the desired configuration and then encased in high strength concrete. The trench will then be backfilled with FTB with sufficient thermal characteristics to help dissipate the heat generated by the cables.

Small portions of the trench (~200 feet) will likely have to be left open between work shifts. However, all such areas will be on Eversource property. During non-work hours, plywood or steel plates will be installed over the open trench and barriers will be placed around such areas as appropriate. After backfilling, the trench area within the substation will be stabilized with gravel; outside the substation fence line, the area over the trench will either be stabilized with gravel or reseeded as necessary.

After the duct bank is in place, the conduits will be swabbed and tested (proofed), using an internal inspection device (mandrel), to check for defects. Mandrelling is a testing procedure in which a "pig" (a painted aluminum or wood cylindrical object that is slightly smaller in diameter than the conduit) is pulled through the conduit. This is done to ensure that the "pig" can pass easily, verifying that the conduit has not been crushed, damaged, or installed improperly.

After successful proofing, the transmission cables and ground continuity conductors will be installed and terminated. Cable reels will be delivered by special tractor trailers to the site, where the cable will be pulled into the conduit using a truck-mounted winch and special cable handling equipment. A single cable will be pulled into place within each conduit.

To install each transmission cable and ground continuity conductor in the conduits, the large cable reel will be set up over one terminus point, and a winch will be set up at the other terminus points of the duct bank at the transition structures. The cables and the ground continuity conductors (during a separate mobilization) will then be inserted in the conduits by winching a pull rope attached to the ends of each cable.

At the transition structures, terminations will be connected to the ends of the cables. These terminations will link the underground cables to the overhead conductor.

3.6 CONSTRUCTION PROCEDURES: OVERHEAD LINE CONNECTIONS (ROOD AVENUE SUBSTATION)

As part of the Rood Avenue Substation modifications, the existing 1448 and 1751 line entries to the substation will be modified and the existing 1779 Line 115-kV overhead conductors between Structures 20077 and 20076 will be removed. These construction activities will be performed in uplands, except at and near Structure 20076 on the 1779 Line and Structure 10142B on the 1448 Line, where work in wetland W26 will be required.

Standard overhead transmission line construction procedures, as generally summarized below, will be used to perform these activities[5]:

a. Survey and stake the relocated structure locations.

b. Mark the boundaries of the previously delineated wetland (wetland W26, refer to Appendix A) near the work sites.

c. Clear vegetation from work sites.

d. Install erosion and sedimentation controls in accordance the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control* and the Company's BMP Manual.

e. Install temporary access roads to work pads as necessary. Temporary access will be constructed of timber mats.

f. Prepare level work (crane) pads as necessary at the structure removal and installation sites. Work pad installation may involve grading and requires the installation of a stable base (consisting of

[5] Construction staging areas and offices for the overhead transmission line work are expected to be co-located within the same areas identified for the overall Rood Avenue Substation modifications (refer to Appendix A).

gravel, timber mats, or equivalent) for drilling and other structure installation equipment. For work in wetlands, timber mats will be used.

g. Install new structures.

h. Install counterpoise, where needed. Depending on site-specific soil conductivity, supplemental grounding will be installed.

i. Install shield wires, OPGW, and conductors.

j. Remove existing Structure 10143A on the 1751 Line. Remove the 1779 Line conductor span between Structures 20077 and 20076.

k. Remove temporary timber mats and construction debris, and restore disturbed sites. Haul construction debris off site for disposal.

l. Maintain temporary erosion and sediment controls until vegetation is re-established or disturbed areas are otherwise stabilized. 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.

4. CONSTRUCTION SCHEDULE, OUTAGES, AND WORK HOURS

4.1 CONSTRUCTION SCHEDULE, INCLUDING OUTAGES

Line and equipment outages will be required for the modifications to each substation. Such outages must be approved by the Connecticut Valley Exchange (CONVEX). As currently planned, the substation modifications are scheduled for construction between October 1, 2016 and the end of the third quarter 2017, as follows:

General Construction Dates*	Substation Modification Construction Activity
Quarter 4, 2016	Construction contracts awarded; establish material laydown yards and field offices; begin receiving materials. Contractor mobilization, site preparation.
Quarter 1, 2017 – Quarter 3, 2017	Perform construction (foundations, equipment installation, clean-up and restoration, etc.), as summarized in Section 3.
Quarter 3, 2017	Testing, energization, substation site clean-up and restoration.

* Construction schedule is dependent on the receipt of D&M Plan approval from the Council and on the approval of outage schedules. Construction schedule for work in wetland W26 (Rood Avenue Substation line connections) will be dependent on the receipt of the USACE and CT DEEP authorizations.

This schedule may be refined after Eversource retains construction contractors for the Project and identifies and schedules the outages.

4.2 WORK HOURS

Construction work hours will typically be 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 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.

In addition, during winter, snow plowing and de-icing activities (which will be performed pursuant to the plan included in Volume 2, Attachment C) will typically commence, when necessary, prior to 7 AM to assure a safe environment for construction personnel prior to the start of the work day.

At all three substations, all construction activities performed during extended work hours will be confined to the Eversource property.

5. SPECIAL CONSTRUCTION PROTOCOLS AND PROCEDURES

Plans and procedures included in this section and in Volume 2 (as referenced in this section) apply to the construction work at all three stations, including the 1779 Line loop and related overhead line modifications at Rood Avenue Substation.[6]

This section provides resource-specific protocols and procedures applicable to the substation modification construction; additional details for each substation are provided in Appendices A-C. Volume 2 includes standard BMPs, as well as plans and guidance applicable to Project-wide construction activities (e.g., *Spill Prevention and Control Plan*; *Snow Removal and De-Icing Plan*).

5.1 EROSION AND SEDIMENTATION CONTROL PLAN

Eversource will install erosion and sedimentation control measures during substation modification 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 Guideline for Erosion and Sediment Control* and with Eversource's BMPs (refer to the detail sheets in Appendices A-C, and to Volume 2, Attachment D). Eversource's BMPs incorporate and are consistent with the *2002 Connecticut Guideline for Erosion and Sediment Control* (refer to Volume 2, Attachment D, pp. 1-4 for a list of the guidance documents used in preparing Eversource's BMPs). In addition, erosion and sedimentation controls will be installed to protect water resources, consistent with the Project's approvals from the USACE and CT DEEP.

Pursuant to CGS Section 22a-430b, 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 E). Pursuant to the requirements of this General Permit, prior to the start of construction, Eversource will submit to CT DEEP a Registration Form and will prepare a *Stormwater Pollution Control Plan* for the Project.

[6] The substation modifications will not require blasting, work in watercourses, vernal pools, active farmlands, threatened or endangered species habitats, or in / near public recreational areas. Thus, no special construction procedures pertaining to these topics are included in this D&M Plan. *Notes*: (a.) Eversource's Rood Avenue Substation includes a small population of Pink Lady Slipper (*Cypripedium acaule*); these plants, although not listed as threatened or endangered, were transplanted, at the request of the Town of Windsor, as part of Eversource's 2009 substation expansion. As illustrated on the map in Appendix A, Exhibit 2, this plant community will not be affected by the proposed Project because Eversource's construction contractors will be required to confine all work to the specific limits of disturbance. (b.) As illustrated on Appendix C, Exhibit 2, the North Bloomfield Substation is in the vicinity of mapped habitat for a State Species of Special Concern. However, all work at North Bloomfield Substation (substation modifications and staging) will occur within the graveled, fenced substation yard, which provides no habitat for this species. Eversource's Project personnel will be trained to recognize this species. In the unlikely event that the listed species is encountered during the substation modifications, Eversource's construction contractors will be required to adhere to the mitigation protocols listed in Appendix C, Exhibit 5.

Permanent stabilization will consist of the application of gravel or pavement (for areas within the station fence lines), or reseeding to establish vegetative cover on disturbed soils that will not otherwise be paved or graveled. After final stabilization is achieved, all temporary erosion and sedimentation controls will be removed and disposed of properly.

5.2 WETLANDS

The 115-kV transmission line reconfigurations at Rood Avenue Substation will require work within and near wetland W26, which extends linearly along Eversource's managed transmission line ROW adjacent to the substation. This wetland is characterized primarily by palustrine shrubs and herbaceous species.

For the work in wetland W26, timber mats will be used to create temporary work pads for construction support. Erosion and sedimentation controls will be installed as necessary to protect portions of W26 outside of the temporary work pads. After the completion of the structure reconfiguration work, the temporary work pads will be removed and the affected portions of wetland W26 will be restored. All work in wetland W26 will be in accordance with USACE and CT DEEP regulatory authorizations, as well as with Eversource's BMP Manual.

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

Dust Suppression

To minimize short-term adverse effects to air quality during construction, staging areas not already paved or graveled will be graveled and may be watered, as necessary, to suppress fugitive dust emissions. The public, paved roads at the intersection with the substation access roads will be periodically swept, as necessary to remove excess dirt tracked onto the pavement from the substation work areas.

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 vehicles and equipment, including 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.

- 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.

5.4 SOILS AND MATERIALS HANDLING AND DISPOSITION

Eversource's construction contractors 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 foundation excavations) will be handled and disposed of in accordance with regulatory requirements (depending on the type of material) and Eversource's BMP procedures.

If obvious polluted or contaminated soil is encountered, it must be reported to Eversource and handled in accordance with the appropriate regulatory requirements. If encountered, contaminated soils will be stockpiled on and covered by polyethylene sheeting. Sheeting used to cover the stockpile will be weighted to prevent the wind migration of contaminated dust. The materials will be tested to determine appropriate handling and disposition.

If groundwater is encountered in excavations, the water will be pumped from the excavated area and discharged to an upland area in a manner and location that will not result in a discharge to wetlands or watercourses. For example, the water may be discharged on-site – as necessary into appropriate sediment control devices or a filter bag; pumped into a temporary fractionization (frac) tank and then discharged into an appropriate upland area; or pumped into a tanker truck for appropriate off-site disposal (e.g., at appropriate upland sites or wastewater treatment facilities).

Recyclable materials will be removed from the substation sites and transported off-site for appropriate re-use or salvage, pursuant to Eversource policies. General waste materials and debris other than soil and groundwater will be collected in receptacles at the work sites or in secured containers at contractor staging areas or yards. Containers that are not removed or emptied at the end of the workday 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 at the substation sites or at contractor staging areas or yards.

5.5 LIGHTING AND NOISE MITIGATION

Project 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 (Rood Avenue Substation only), jackhammers, drilling rigs, and cranes.

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 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, Eversource will require its contractors to properly maintain equipment and vehicles to minimize noise emissions.

Because the substation and related line modification work will be performed principally during daylight hours, and because existing lighting is installed in and around each substation for safety and security concerns, 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.

5.6 SITE ACCESS, TRAFFIC CONTROL, AND CONSTRUCTION SIGNS

Access to all three substations during construction will be via the public road network and the existing substation access roads. Access to the 1779 Line loop and related overhead structure sites at Rood Avenue Substation will similarly be via the substation access road and the Eversource ROW (all on Eversource-owned land).

To minimize the potential for traffic issues during construction, Eversource will require its construction contractor(s) to implement access and traffic control measures. Such measures will include procedures for safe ingress and egress to the substation sites for construction equipment and other vehicles and for informing the public of construction work zones. For example, along the public roads that intersect with the substation access roads, signs will be erected to indicate the presence of construction work zones and flaggers or police personnel will be used to direct traffic, as needed.

The construction contractors 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 ROW. Signs will be consistent with the federal *Manual of Uniform Traffic Control Devices* ([MUTCD], 2009 edition, as revised May 2012, or the latest version)[7]. Flagmen and other traffic control measures may also be used as necessary.

[7] Connecticut has adopted the federal MUTCDs.

5.7 CULTURAL RESOURCES

No cultural resources were identified on the substation sites. Because the substation modifications and the related 115-kV line modifications at Rood Avenue Substation will be performed within areas affected by previous substation and transmission line development, it also is unlikely that unanticipated buried cultural materials will be discovered during construction.

However, Eversource will brief Project construction contractor managers regarding 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 Eversource. Construction work at the potential cultural resource discovery site will not resume until authorized by Eversource, after review and approval by a professional archaeologist retained by Eversource.

5.8 CONSTRUCTION EQUIPMENT / VEHICLE WASHING AND CLEANING

Concrete truck wash-out and vehicle washing will be allowed in designated areas, if practical on the substation sites and staging areas. All wash-out and washing 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 wash-out areas will conform to the relevant provisions of the *2002 Connecticut Guideline for Soil Erosion and Sediment Control* (as amended), Eversource'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 D and E).

5.9 WINTER WORK PROTOCOL

Because the substation and related line modification construction will require approximately a year to complete, some work activities will be conducted during the winter months. If required, 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 C.

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6. ENVIRONMENTAL COMPLIANCE

The Project construction contractors will be required to comply with all applicable environmental regulatory requirements, as well as with the Council-approved D&M Plan. Eversource will require construction contractors' management personnel to attend training regarding Project-specific requirements, including the specifications of this D&M Plan.

To verify the contractors' environmental compliance, Eversource personnel (or Eversource's representative) will routinely monitor Project construction activities for conformance to the D&M Plan and to other Project-specific permits and approvals.

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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), Eversource will provide written notification to the Council **a minimum of two weeks in advance** of the work commencement of:

a. Vegetation clearing or access work; and

b. Substation modification construction.

Pursuant to RCSA Section 16-50j-62(b)(4) and Condition 4 of the Council's Ruling regarding Petition No. 1217, Eversource also will provide written notification to the Council of the completion of construction. Such notice will be provided **within 45 days after the completion of construction**.

Pursuant to RCSA Section 16-50j-62(a)(1), Eversource also will provide written notification to and seek approval (as necessary) from the Council regarding the location and size of all areas to be accessed or used for site testing or staging that are 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. Eversource (or its agent) 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.*

Eversource 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, Eversource 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 access way 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, Eversource proposes to define a "significant" Project change as one that will substantially reduce the amount of protection to the environment, substantially increase potential public concern, or will 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, construction contractors, 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 Eversource. Data to be provided to Eversource by the change originator may include, for example:

    - Description of the change (location, type);
    - Reason/need for the change;
    - Date by which the change is required (timing);
    - Project schedule and cost implications (if applicable); and
    - Identification of effects (if any) on the environment, cultural resources, and the public.

    The Project change request will be supported by maps and drawings, as appropriate.

2. **Assess Significance of Proposed Change**. Eversource 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 Eversource approval.

3. **Significant Changes Requiring Notice to and Prior Approval by the Council.** After Eversource 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, Eversource 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 will 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, Eversource will provide verbal notification of the change to Council staff and will request that the Council approve the change expeditiously. Eversource 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, Eversource 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, Eversource 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 Eversource determines that a D&M Plan change request is "non-urgent", Eversource 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 Eversource approval prior to implementation, as well as Project documentation. Documentation of minor changes will be provided in the monthly construction progress reports that will be submitted to the Council.

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, Eversource 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. Eversource will provide general updates regarding the status of the Project in the Monthly Construction Progress Reports.

Figure 7-1
D&M Plan Change Process

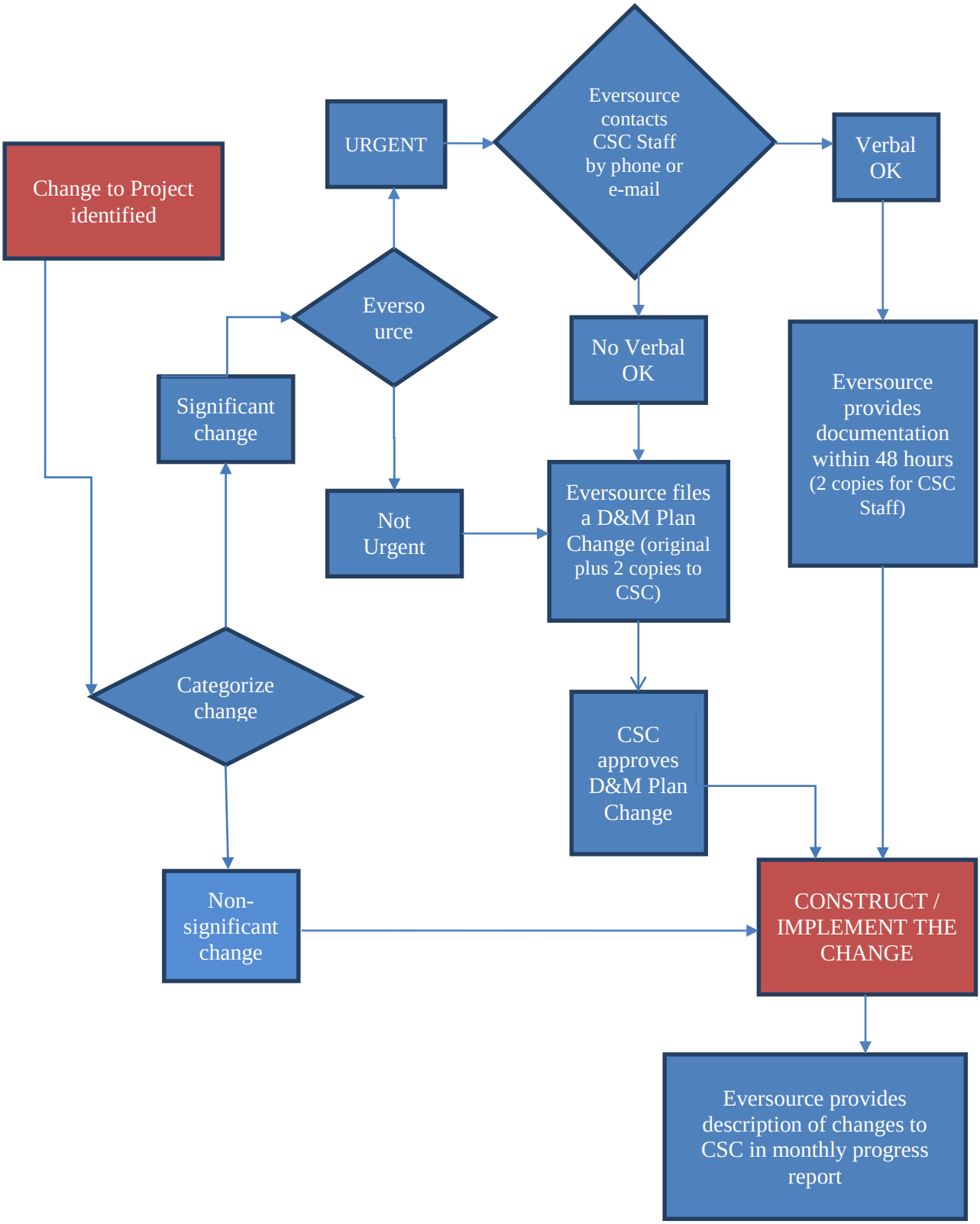

Table 7-1
Reports to be Provided to the Council: Petition No. 1217

Report Type (Regulatory Requirement)	Content
Monthly Construction Progress Report (RCSA Section 16-50j-62(b)(3))	Monthly construction progress report will summarize the status of the Project construction (by location, percent complete) and will also identify changes and deviations (if any) to the approved D&M Plan, including both significant changes involving Council pre-approval and minor changes that did not require Council action.
Final Report (RCSA Section 16-50j-62(c))	Eversource 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.

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8. PUBLIC REVIEW AND OUTREACH

8.1 PROJECT PLANNING AND D&M PLAN

As part of the Project planning process, Eversource consulted with officials of the towns of Bloomfield and Windsor and conducted Project outreach with abutting property owners. Prior to the submission of this D&M Plan to the Council, Eversource provided a draft of the Plan to the two towns and met with municipal officials. Along with the provision of the draft D&M Plan, Eversource extended an invitation for municipal officials to provide comments regarding the Plan and offered to meet with municipal officials to review the Plan.

Accordingly, Eversource met with municipal officials from the Town of Windsor on June 21, 2016. The officials had no concerns with respect to the substation and related line modifications. In early July, Town of Bloomfield officials provided e-mail comments to Eversource, requesting that erosion and sedimentation controls be installed around laydown and staging areas at the Bloomfield and North Bloomfield substations, both to protect nearby water resources and to demarcate the limits of these Project support areas. Bloomfield officials also requested that the Project maps more clearly illustrate the locations of water resources near the two substations. This D&M Plan addresses the Town of Bloomfield's comments.

In conjunction with the submission of this D&M Plan to the Council, Eversource will post the filed D&M Plan on the Project web site and will provide the filed D&M Plan to the towns of Windsor and Bloomfield. The Project website is accessible from the Eversource homepage (www.Eversource.com). From this homepage, Project information can be accessed by clicking the "About" tab and then the "Major Projects and Infrastructure" tab to view a list of the Company's ongoing and proposed projects, including this Project. Included on the website are an e-mail address (transmissioninfo@eversource.com) and a telephone number (800-793-2202) to contact Eversource for more Project information or to provide comments about the Project.

8.2 PUBLIC OUTREACH DURING CONSTRUCTION

Throughout the Project planning and the Council's siting processes, Eversource conducted extensive community outreach, including direct coordination with landowners, and municipal officials. Eversource will continue its outreach efforts through the Project's construction phase.

Eversource's Project information and email address are currently available, via the website noted in Section 8.1, and will continue as the primary means for residents, businesses, and other stakeholders to contact Project representatives throughout Project construction. As referenced in Section 8.1, the public can also access the Project website, which provides an overview of the Project, a map of the Project facilities, and Eversource contact information.

In addition, Eversource representatives will contact adjacent and nearby residents and businesses, via mail, to notify them of the start of construction activities. Project representatives will be available throughout the construction process to address any specific questions or concerns regarding the substation modifications and the related 115-kV transmission line reconfigurations.

9. GLOSSARY OF TERMS

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

BMP: Best Management Practice

CGS: Connecticut General Statutes

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

ConnDOT: Connecticut Department of Transportation

Council or CSC: Connecticut Siting Council

CT DEEP: Connecticut Department of Energy and Environmental Protection

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

dBA: Decibel, on the A-weighted scale.

DCT: Double-circuit tower

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

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

Eversource: Also "the **Company**": The Connecticut Light and Power Company doing business as Eversource Energy.

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

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

FTB: Fluidized thermal backfill (for underground cable system)

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.

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

kV: Kilovolt, equals 1,000 volts

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.

MUTCD: Manual of Uniform Traffic Control Devices

NAAQS: National Ambient Air Quality Standards

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

Petition: Petition No. 1217, CSC number for this Project

Project: Bloomfield - Windsor Upgrades Project

RCSA: Regulations of Connecticut State Agencies

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

ROW: Right-of-Way

SPCP: Spill Prevention and Control Plan

Stormwater Pollution Control Plan: 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.

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

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

USACE: United States Army Corps of Engineers

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

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

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

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 USACE have formal definitions of state and federal jurisdictional wetlands, respectively.

APPENDIX A

Drawings and Photographs
Rood Avenue Substation and 115-kV Line Connections

Exhibit 1:	**Key Map/Site Locus**
Exhibit 2:	**Aerial Photograph**
Exhibit 3:	**General Arrangement Plans: Substation**
Exhibit 4:	**Underground Cable System**
Exhibit 5:	**Overhead Transmission Line Structures**
Exhibit 6:	**1779 Line Loop and Related Structure Modification Details - Rood Avenue Substation Loop and Line Entries**
Exhibit 7:	**Sedimentation and Erosion Control Details**

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Exhibit 1

Key Map/Site Locus

Rood Avenue Substation

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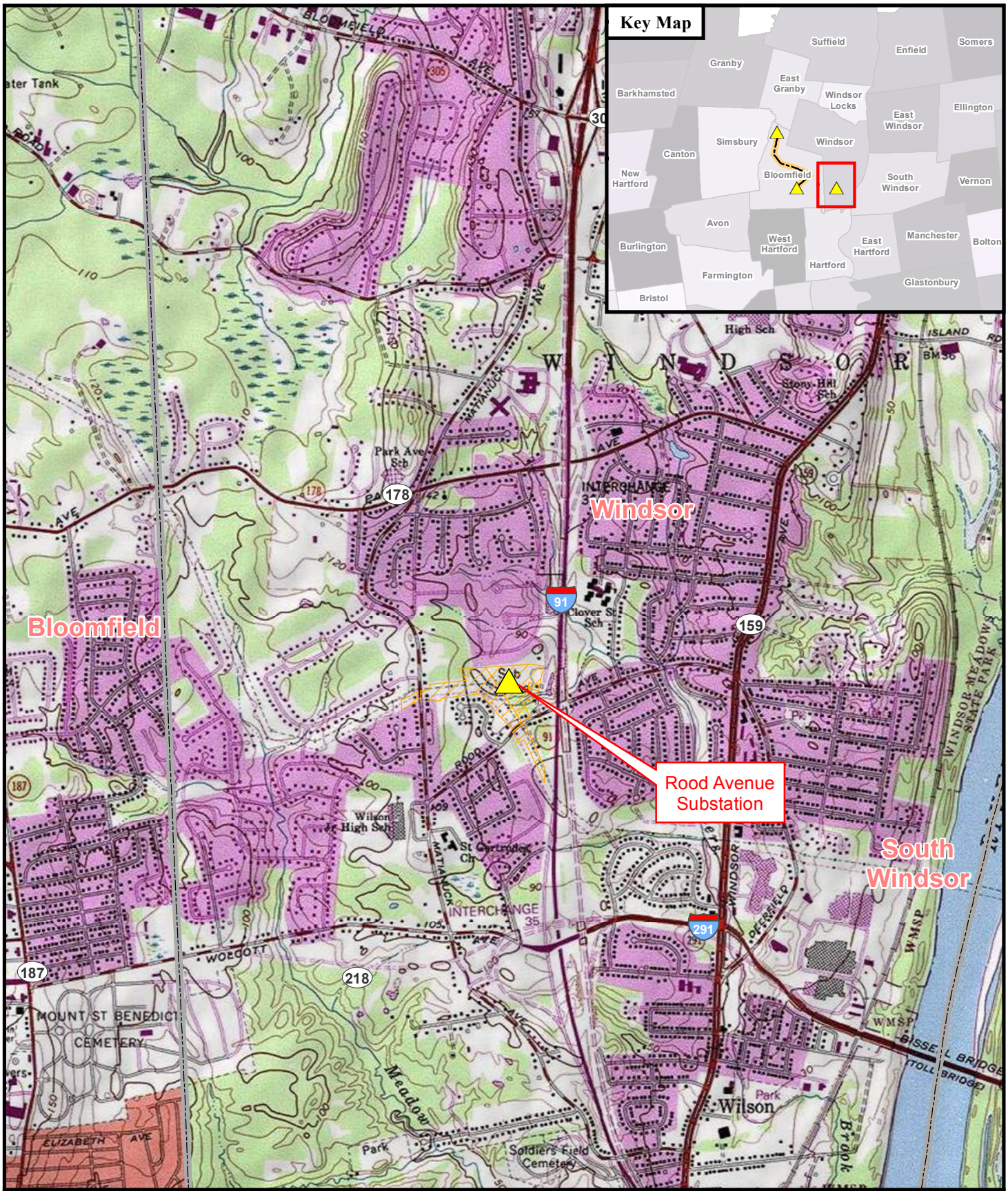

Source: USGS 7.5-Minute Quadrangles, CT DEEP, ESRI and Burns & McDonnell Engineering.

EVERSOURCE ENERGY

Exhibit 1: Key Map/Site Locus
Rood Avenue Substation
Bloomfield-Windsor
Upgrades Project

Date: July 2016

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Exhibit 2

Aerial Photograph

Rood Avenue Substation

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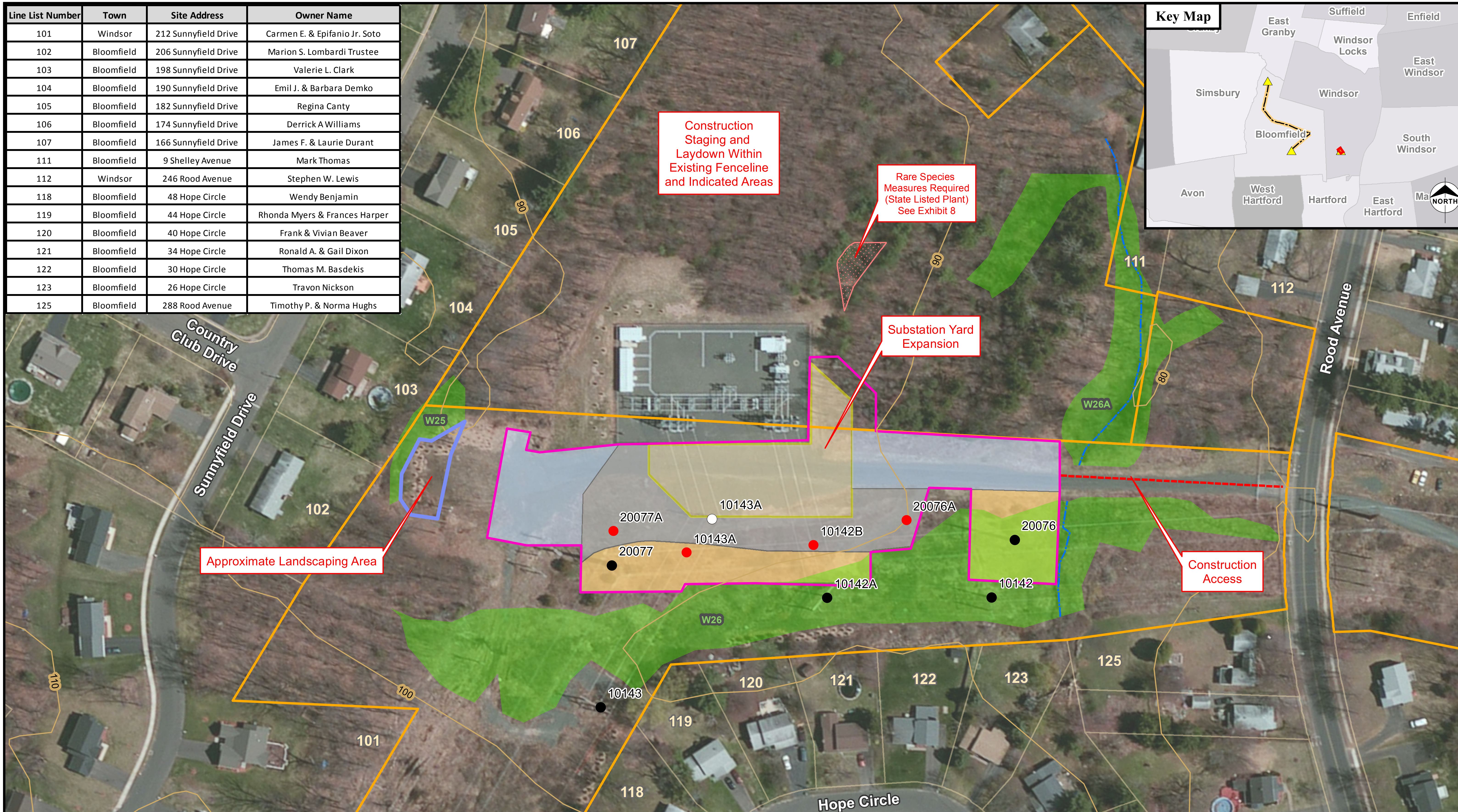
Line List Number	Town	Site Address	Owner Name
101	Windsor	212 Sunnyfield Drive	Carmen E. & Epifanio Jr. Soto
102	Bloomfield	206 Sunnyfield Drive	Marion S. Lombardi Trustee
103	Bloomfield	198 Sunnyfield Drive	Valerie L. Clark
104	Bloomfield	190 Sunnyfield Drive	Emil J. & Barbara Demko
105	Bloomfield	182 Sunnyfield Drive	Regina Canty
106	Bloomfield	174 Sunnyfield Drive	Derrick A Williams
107	Bloomfield	166 Sunnyfield Drive	James F. & Laurie Durant
111	Bloomfield	9 Shelley Avenue	Mark Thomas
112	Windsor	246 Rood Avenue	Stephen W. Lewis
118	Bloomfield	48 Hope Circle	Wendy Benjamin
119	Bloomfield	44 Hope Circle	Rhonda Myers & Frances Harper
120	Bloomfield	40 Hope Circle	Frank & Vivian Beaver
121	Bloomfield	34 Hope Circle	Ronald A. & Gail Dixon
122	Bloomfield	30 Hope Circle	Thomas M. Basdekis
123	Bloomfield	26 Hope Circle	Travon Nickson
125	Bloomfield	288 Rood Avenue	Timothy P. & Norma Hughs



Approx. Landscaping Area
Existing Structure To Remain
Existing Structure To Be Removed
New Structure
Approx. Limit of Disturbance
Eversource Property
NDDB
Staging/Laydown
Intermittent Stream IS-1
Delineated Wetlands
Expansion Area
Gravel Pad
Timber Mat

NORTH

Sedimentation and erosion controls shall be installed and maintained as necessary to protect water resources, and in accordance with Eversource's "BMP Manual: Connecticut (Construction and Maintenance Environmental Requirements)".

0 50 100 200 Feet

Source: CT DEEP, USGS and Burns & McDonnell Engineering.

EVERSOURCE ENERGY

Exhibit 2: Aerial Photograph
Rood Avenue Substation and Surroundings
Windsor, CT
Bloomfied-Windsor Upgrades Project

Date: July 2016

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Exhibit 3

General Arrangement Plans

Rood Avenue Substation

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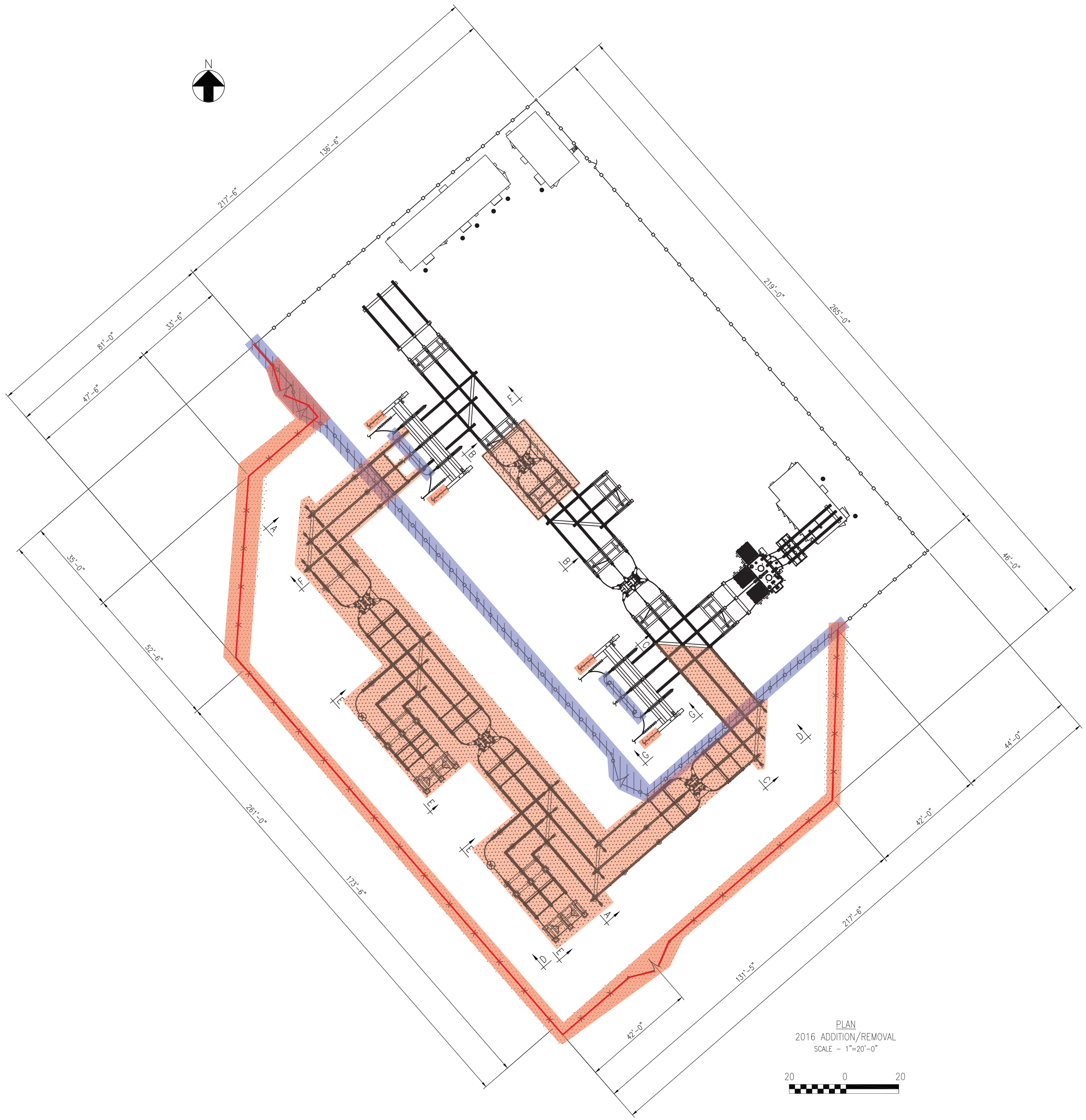

PLAN
2016 ADDITION/REMOVAL
SCALE – 1"=20'-0"

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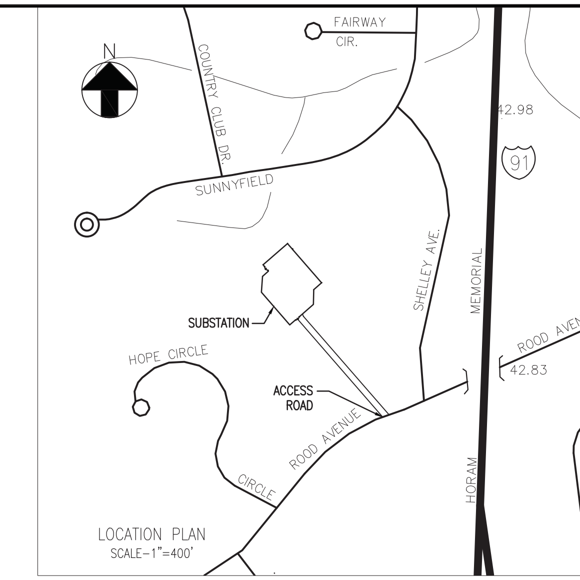


LOCATION PLAN
SCALE–1"=400'

400 0 400

LEGEND:

EXISTING FENCE
NEW FENCE

2016 ADDITION
2016 REMOVAL

REVISIONS DURING CONSTRUCTION

EVERSOURCE ENERGY

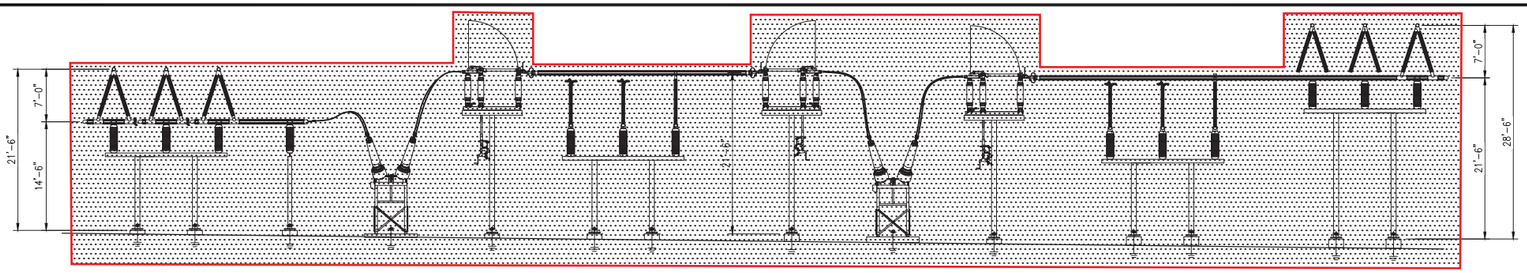
TITLE
ROOD AVE SUBSTATION
YARD ARRANGEMENT – PLAN & SECTIONS
CONNECTICUT SITING COUNCIL
WINDSOR, CT

BY	MSM	CHKD	GTB	APP	DSL	APP	
DATE	4/15/15	DATE	4/15/15	DATE	4/15/15	DATE	
H-SCALE	AS NOTED	SIZE	D	FIELD BOOK & PAGES			
V-SCALE	AS NOTED	V.S.		R.E. DWG			
R.E. PROJ. NUMBER				DWG NO.	26407-92001 PG 1		

ES VER: 05/2015

2/8/2016 5:13 PM – gtbiela – C:\Users\gtbiela\appdata\local\temp\AcPublish_9764\26407-92001.dwg – REV AC Additions – PLAN

ES VER: 05/2015



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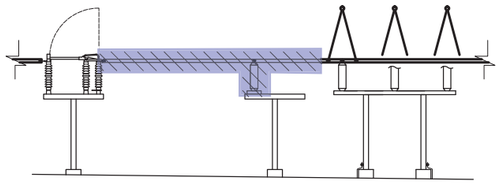

SECTION B–B
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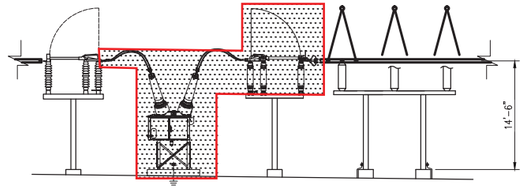

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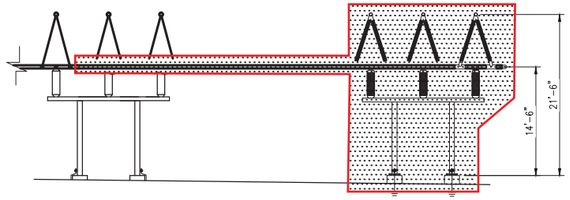

SECTION C–C
2016 ADDITION
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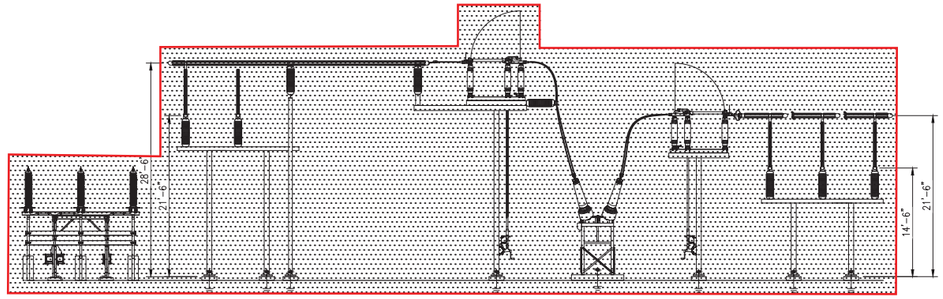
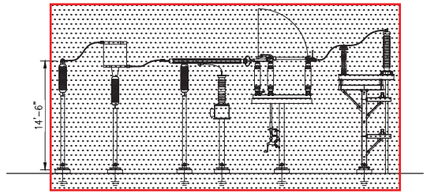
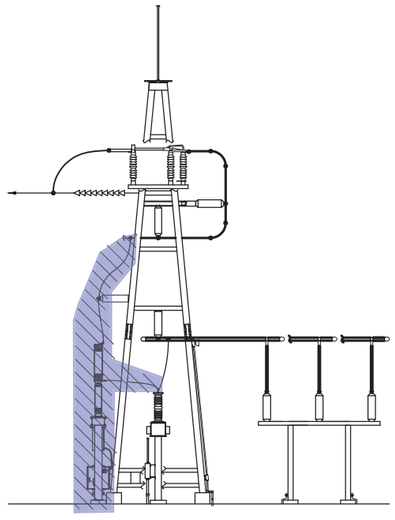


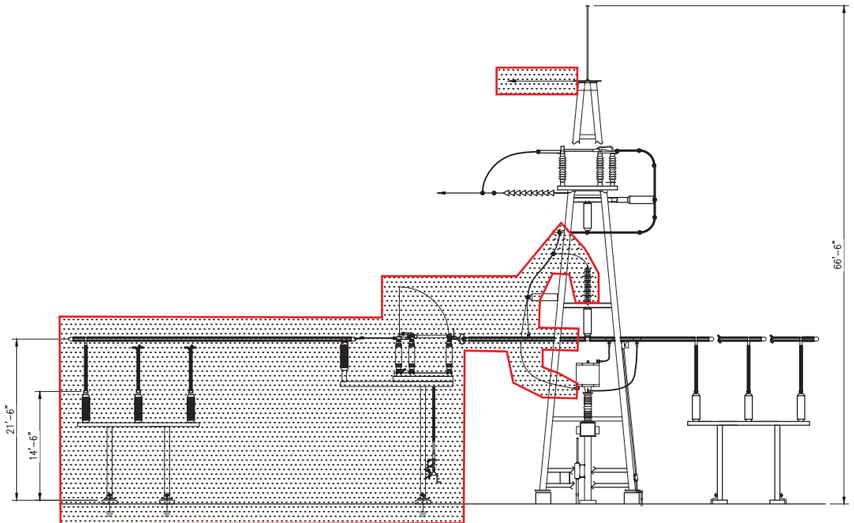
SECTION D–D
2016 ADDITION
SCALE – 1"=10'-0"



SECTION E–E
2016 ADDITION
SCALE – 1"=10'-0"

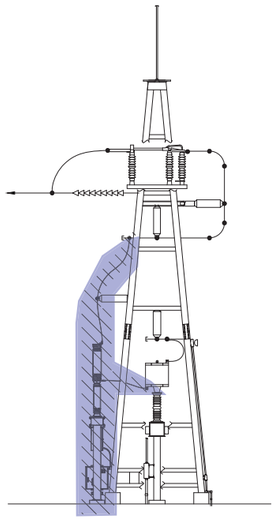


SECTION F–F
2016 REMOVAL
SCALE – 1"=10'-0"

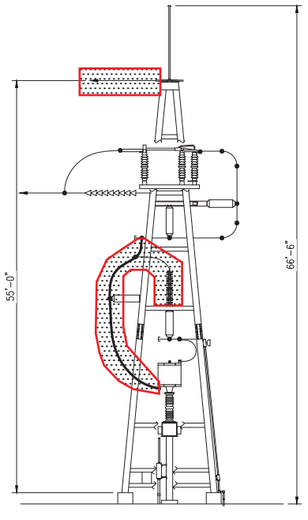


SECTION F–F
2016 ADDITION
SCALE – 1"=10'-0"

10 0 10



SECTION G–G
2016 REMOVAL
SCALE – 1"=10'-0"



SECTION G–G
2016 ADDITION
SCALE – 1"=10'-0"

2016 ADDITION

2016 REMOVAL

REVISIONS DURING CONSTRUCTION

EVERSOURCE ENERGY

TITLE

ROOD AVE SUBSTATION
YARD ARRANGEMENT – PLAN & SECTIONS
CONNECTICUT SITING COUNCIL
WINDSOR, CT

BY	MSM	CHKD	GTB	APP	DSL	APP
DATE	4/15/15	DATE	4/15/15	DATE	4/15/15	DATE
H-SCALE	AS NOTED	SIZE	D	FIELD BOOK & PAGES		
V-SCALE	AS NOTED	V.S.		R.E. DWG		
R.E. PROJ. NUMBER				DWG NO.	26407-92001 PG 2	

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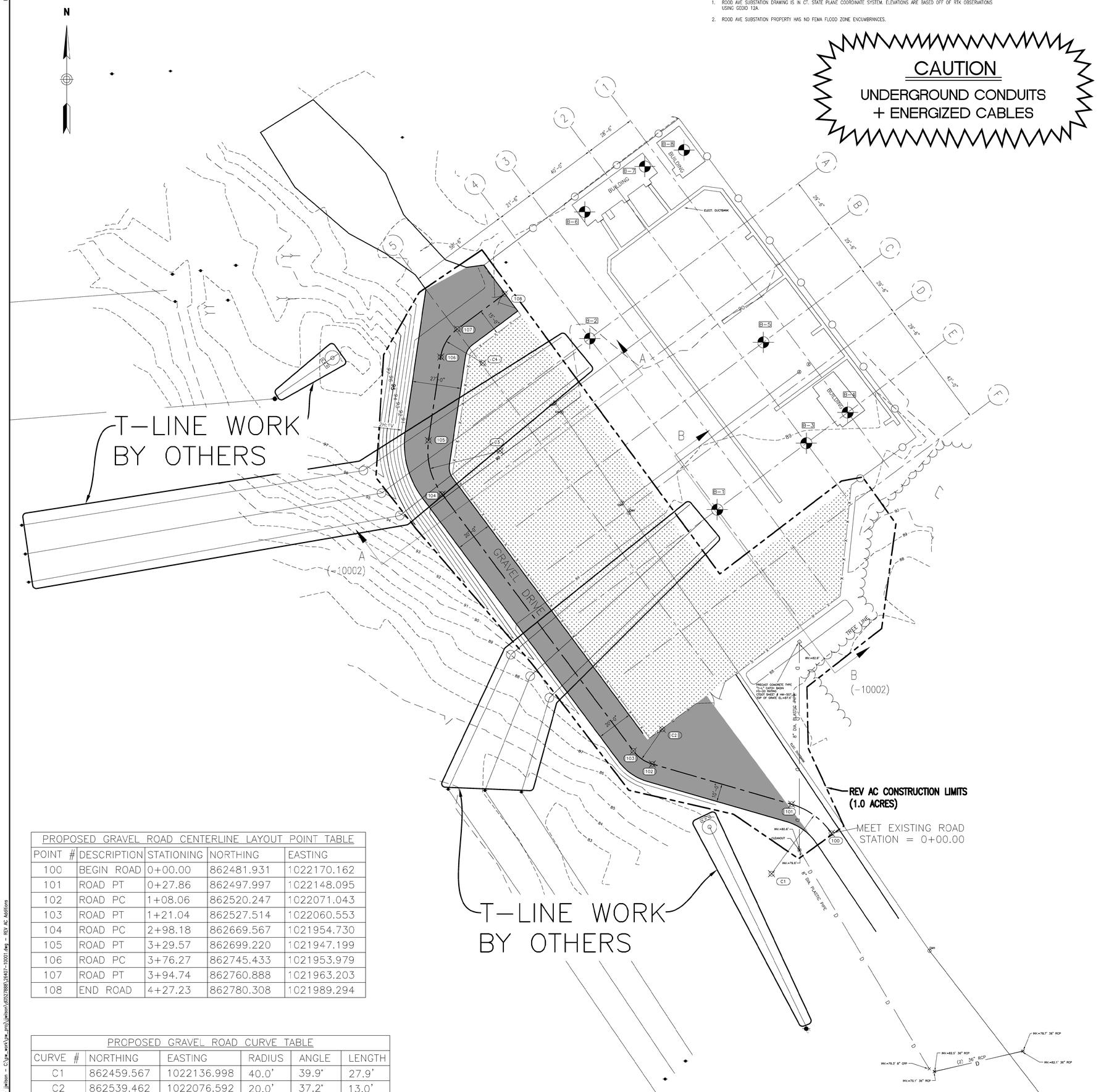
ES VER. 05/2015

EXIST. CONDITIONS SURVEY PROVIDED BY EVERSOURCE – 09/22/2015

1. ROOD AVE SUBSTATION DRAWING IS IN CT. STATE PLANE COORDINATE SYSTEM. ELEVATIONS ARE BASED OFF OF RTK OBSERVATIONS USING GEOID 12A.
2. ROOD AVE SUBSTATION PROPERTY HAS NO FEMA FLOOD ZONE ENCUMBRANCES.



SOIL BORING LOCATION (06/2008)
DR. CLARENCE WELTI, P.E., P.C.
(REVISED) GEOTECHNICAL STUDY FOR NEW SUBSTATION FOR NORTHEAST UTILITIES ROOD AVENUE (24J SUBSTATION), WINDSOR, CT

ELECTRICAL MANHOLE

DISTRIBUTION POLE

GUY ANCHOR

LIMITS OF PROPOSED CONSTRUCTION

385 EXISTING MAJOR CONTOUR

384 EXISTING MINOR CONTOUR

385 PROPOSED MAJOR CONTOUR

384 PROPOSED MINOR CONTOUR

FENCE

X X X X PROPOSED FENCE (504 L.F. APPROX.)

OHW OVERHEAD WIRE

D STORM DRAIN

LAYOUT AND MATERIALS

1. PROPOSED GRANITE BOUNDS AND ANY EXISTING PROPERTY LINE MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE SET OR RESET BY A PROFESSIONAL LICENSED SURVEYOR.
2. PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL VERIFY EXISTING LANDMARK ELEVATIONS AT INTERFACE WITH PROPOSED GRADES, AND EXISTING GROUND ELEVATIONS ADJACENT TO DRAINAGE FEATURES TO ASSURE PROPER TRANSITIONS BETWEEN EXISTING AND PROPOSED FACILITIES.
3. SYMBOLS AND LEGENDS OF PROJECT FEATURES ARE GRAPHIC REPRESENTATIONS AND ARE NOT NECESSARILY SCALED TO THEIR ACTUAL DIMENSIONS OR LOCATIONS ON THE DRAWINGS. THE CONTRACTOR SHALL REFER TO THE DETAIL SHEET DIMENSIONS, MANUFACTURERS' LITERATURE, SHOP DRAWINGS AND FIELD MEASUREMENTS OF SUPPLIED PRODUCTS FOR LAYOUT OF THE PROJECT FEATURES.
4. CONTRACTOR SHALL NOT RELY SOLELY ON ELECTRONIC VERSIONS OF PLANS, SPECIFICATIONS, AND DATA FILES THAT ARE OBTAINED FROM THE ENGINEER, BUT SHALL VERIFY LOCATION OF PROJECT FEATURES IN ACCORDANCE WITH THE PAPER COPIES OF THE PLANS AND SPECIFICATIONS THAT ARE SUPPLIED AS PART OF THE CONTRACT DOCUMENTS.

EROSION CONTROL

1. THE EROSION AND SEDIMENT CONTROLS SHALL BE EMPLOYED BY THE CONTRACTOR DURING THE EARTHWORK AND CONSTRUCTION PHASES OF THE PROJECT IN ACCORDANCE WITH THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL BY THE CONNECTICUT COUNCIL ON SOIL AND WATER CONSERVATION IN COOPERATION WITH THE CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION.
2. PRIOR TO STARTING ANY OTHER WORK ON THE SITE, THE CONTRACTOR SHALL NOTIFY APPROPRIATE AGENCIES AND SHALL INSTALL EROSION CONTROL MEASURES AS IDENTIFIED IN FEDERAL, STATE, AND LOCAL APPROVAL DOCUMENTS PERTAINING TO THIS PROJECT AS WELL AS THE BEST MANAGEMENT PRACTICES (BMPs) PUBLISHED BY EVERSOURCE TRANSMISSION AND MAINTENANCE.
3. CONTRACTOR SHALL INSPECT AND MAINTAIN EROSION CONTROL MEASURES, AND REMOVE SEDIMENT THEREFROM ON A WEEKLY BASIS AND WITHIN TWELVE HOURS AFTER EACH STORM EVENT AND DISPOSE OF SEDIMENTS IN AN UPLAND AREA SUCH THAT THEY DO NOT ENCUMBER OTHER DRAINAGE STRUCTURES AND PROTECTED AREAS.
4. CONTRACTOR SHALL BE FULLY RESPONSIBLE TO CONTROL CONSTRUCTION SUCH THAT SEDIMENTATION SHALL NOT AFFECT REGULATORY PROTECTED AREAS, WHETHER SUCH SEDIMENTATION IS CAUSED BY WATER, WIND, OR DIRECT DEPOSIT.
5. CONTRACTOR SHALL PERFORM CONSTRUCTION SEQUENCING SUCH THAT EARTH MATERIALS ARE EXPOSED FOR A MINIMUM OF TIME BEFORE THEY ARE COVERED, SEEDED, OR OTHERWISE STABILIZED TO PREVENT EROSION.
6. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER, CONTRACTOR SHALL REMOVE AND DISPOSE OF TEMPORARY EROSION CONTROL MEASURES AND CLEAN SEDIMENT AND DEBRIS FROM ENTIRE DRAINAGE AND SEWER SYSTEMS.

UTILITIES

1. THE EXISTING UTILITY INFORMATION SHOWN DOES NOT GUARANTEE THE ACTUAL EXISTENCE, SERVICEABILITY, OR OTHER DATA CONCERNING THE UTILITIES, NOR DOES IT GUARANTEE AGAINST THE POSSIBILITY THAT ADDITIONAL UTILITIES MAY BE PRESENT THAT ARE NOT SHOWN ON THE PLANS. PRIOR TO ORDERING MATERIALS AND BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL VERIFY AND DETERMINE THE EXACT LOCATIONS, SIZES, AND ELEVATIONS OF THE POINTS OF CONNECTIONS TO EXISTING UTILITIES AND, SHALL CONFIRM THAT THERE ARE NO INTERFERENCES WITH EXISTING UTILITIES AND THE PROPOSED UTILITY ROUTES, INCLUDING ROUTES WITHIN THE PUBLIC RIGHTS OF WAY.
2. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, OR EXISTING CONDITIONS DIFFER FROM THOSE SHOWN SUCH THAT THE WORK CANNOT BE COMPLETED AS INTENDED, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED IN WRITING TO THE OWNER'S REPRESENTATIVE FOR THE RESOLUTION OF THE CONFLICT AND CONTRACTOR'S FAILURE TO NOTIFY PRIOR TO PERFORMING ADDITIONAL WORK RELEASES OWNER FROM OBLIGATIONS FOR ADDITIONAL PAYMENTS WHICH OTHERWISE MAY BE WARRANTED TO RESOLVE THE CONFLICT.
3. SET CATCH BASIN RIMS, AND INVERTS OF SEWERS, DRAINS, AND DITCHES IN ACCORDANCE WITH ELEVATIONS ON THE GRADING AND UTILITY PLANS.
4. IF REQUIRED, THE LOCATION, SIZE, DEPTH, AND SPECIFICATIONS FOR CONSTRUCTION OF PROPOSED PRIVATE UTILITY SERVICES SHALL BE INSTALLED ACCORDING TO THE REQUIREMENTS PROVIDED BY, AND APPROVED BY, THE RESPECTIVE UTILITY COMPANY (GAS, TELEPHONE, ELECTRIC, WATER, FIRE ALARM, ETC.). FINAL DESIGN LOADS AND LOCATIONS TO BE COORDINATED WITH OWNER AND ENGINEER.
5. IF REQUIRED, THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR AND SHALL BE RESPONSIBLE FOR PAYING FEES FOR POLE RELOCATION AND FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE, FIRE ALARM, AND ANY OTHER PRIVATE UTILITIES, WHETHER WORK IS PERFORMED BY CONTRACTOR OR BY THE UTILITIES COMPANY.
6. UTILITY PIPE MATERIALS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED ON THE PLAN:
   A. WATER PIPES SHALL BE SPECIFIED BY THE WATER COMPANY.
   B. SANITARY SEWER PIPES SHALL BE POLYVINYL CHLORIDE (PVC) SEWER PIPE
   C. STORM DRAINAGE PIPES SHALL BE H-20 LOADING HIGH DENSITY POLYETHYLENE PIPE (HDPE), UNLESS OTHERWISE NOTED.

DEMOLITION

1. THE CONTRACTOR TO REMOVE AND DISPOSE OF EXISTING MANMADE SURFACE FEATURES WITHIN THE LIMIT OF WORK INCLUDING BUILDINGS, STRUCTURES, PAVEMENTS, SLABS, CURBING, FENCES, UTILITY POLES, SIGNS, ETC. UNLESS INDICATED OTHERWISE ON THE DRAWINGS. REMOVE AND DISPOSE OF EXISTING UTILITIES, FOUNDATIONS, AND UNSUITABLE MATERIAL WITHIN THE PROPOSED BUILDING FOOTPRINT AND TEN FEET BEYOND AND BENEATH PROPOSED EXTERIOR COLUMNS, PER DRAWINGS AND SPECIFICATIONS.
2. EXISTING UTILITIES SHALL BE TERMINATED, IF NOTED ON THE DRAWINGS, IN CONFORMANCE WITH LOCAL, STATE, AND INDIVIDUAL UTILITY COMPANIES STANDARDS SPECIFICATIONS, AND DETAILS. THE CONTRACTOR SHALL COORDINATE UTILITY SERVICE DISCONNECTS WITH THE UTILITY REPRESENTATIVES.
3. CONTRACTOR SHALL DISPOSE OF DEMOLITION DEBRIS IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS, ORDINANCES, AND STATUTES.

EXISTING CONDITIONS INFORMATION

1. THE EXISTING AND PROPOSED OVERHEAD TRANSMISSIONS LINES ARE DEPICTED IN THESE DRAWINGS FOR REFERENCE ONLY. THE DESIGN AND CONSTRUCTION SEQUENCE IS SUBJECT TO CHANGE. ANY ACTIVITIES THAT REQUIRE WORKING CLEARANCES IN THE VICINITY OF THE OVERHEAD LINES SHALL BE COORDINATED WITH EVERSOURCE IN ADVANCE.

GENERAL

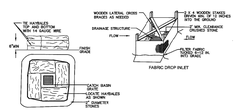
1. CONTRACTOR SHALL NOTIFY "CALL BEFORE YOU DIG" (1-800-922-4455) AT LEAST 72 HOURS BEFORE EXCAVATING.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. CONSTRUCTION ACTIVITIES SHALL BE IN ACCORDANCE WITH OSHA STANDARDS AND LOCAL REQUIREMENTS.
3. AREAS DISTURBED DURING CONSTRUCTION AND NOT RESTORED WITH IMPERVIOUS SURFACES (BUILDINGS, PAVEMENTS, WALKS, ETC.) SHALL RECEIVE 6 INCHES LOAM AND SEED.
4. WORK WITHIN THE LOCAL RIGHTS-OF-WAY SHALL CONFORM TO LOCAL MUNICIPAL STANDARDS. WORK WITHIN STATE RIGHTS-OF-WAY SHALL CONFORM TO THE LATEST EDITION OF THE STATE HIGHWAY DEPARTMENTS STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
5. UPON AWARD OF CONTRACT, CONTRACTOR SHALL MAKE NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN NECESSARY PERMITS, PAY FEES, AND POST BONDS ASSOCIATED WITH THE WORK INDICATED ON THE DRAWINGS, IN THE SPECIFICATIONS, AND IN THE CONTRACT DOCUMENTS. DO NOT CLOSE OR OBSTRUCT ROADWAYS, SIDEWALKS, AND FIRE HYDRANTS, WITHOUT APPROPRIATE PERMITS.
6. TRAFFIC SIGNAGE AND PAVEMENT MARKINGS SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
7. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
8. IN THE EVENT THAT SUSPECTED CONTAMINATED SOIL, GROUNDWATER, AND OTHER MEDIA ARE ENCOUNTERED DURING EXCAVATION AND CONSTRUCTION ACTIVITIES BASED ON VISUAL, OLFACTORY, OR OTHER EVIDENCE, THE CONTRACTOR SHALL STOP WORK IN THE VICINITY OF THE SUSPECT MATERIAL TO AVOID FURTHER SPREADING OF THE MATERIAL, AND SHALL NOTIFY THE OWNER IMMEDIATELY SO THAT THE APPROPRIATE TESTING AND SUBSEQUENT ACTION CAN BE TAKEN.
9. CONTRACTOR SHALL PREVENT DUST, SEDIMENT, AND DEBRIS FROM EXITING THE SITE AND SHALL BE RESPONSIBLE FOR CLEANUP, REPAIRS AND CORRECTIVE ACTION IF SUCH OCCURS.
10. DAMAGE RESULTING FROM CONSTRUCTION LOADS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO OWNER.
11. CONTRACTOR SHALL CONTROL STORMWATER RUNOFF DURING CONSTRUCTION TO PREVENT ADVERSE IMPACTS TO OFF SITE AREAS, AND SHALL BE RESPONSIBLE TO REPAIR RESULTING DAMAGES, IF ANY, AT NO COST TO OWNER.
12. SITE DEVELOPMENT CONSTRUCTION SHALL CONFORM TO NU SUB 210 REV.2 (08/25/2010).
13. GRADES SHOWN ARE FINAL GRADES AND INCLUDE 4" CRUSHED STONE SURFACE.

FENCE NOTES

1. THE SUBSTATION FOUNDATION PLAN (DWG #-11002) SHALL BE THE GOVERNING DRAWING FOR THE FENCE LAYOUT.
2. FENCE CONSTRUCTION DETAILS SHALL BE AS SHOWN ON DRAWING 26407-11005.

PROPOSED GRAVEL DRIVE (10,500 S.F. APPROX.)

YARD EXPANSION (21,000 S.F. APPROX.)



CATCH BASIN INLET PROTECTION
(NOT TO SCALE)

REFERENCE DRAWINGS

-	26407-10002	SITE DEVELOPMENT PROFILES
-	26407-11002	FOUNDATION PLAN
-	26407-11005	FENCE DETAILS
-	26407-33021	YARD ARRANGEMENT PLAN
-	26407-33024	DUCT BANK PLAN – LINE 1037 & 1873
-	26407-33025	DUCT BANK PROFILES – LINE 1037 & 1873

PROPOSED GRAVEL ROAD CENTERLINE LAYOUT POINT TABLE				
POINT #	DESCRIPTION	STATIONING	NORTHING	EASTING
100	BEGIN ROAD	0+00.00	862481.931	1022170.162
101	ROAD PT	0+27.86	862497.997	1022148.095
102	ROAD PC	1+08.06	862520.247	1022071.043
103	ROAD PT	1+21.04	862527.514	1022060.553
104	ROAD PC	2+98.18	862669.567	1021954.730
105	ROAD PT	3+29.57	862699.220	1021947.199
106	ROAD PC	3+76.27	862745.433	1021953.979
107	ROAD PT	3+94.74	862760.888	1021963.203
108	END ROAD	4+27.23	862780.308	1021989.294

PROPOSED GRAVEL ROAD CURVE TABLE					
CURVE #	NORTHING	EASTING	RADIUS	ANGLE	LENGTH
C1	862459.567	1022136.998	40.0'	39.9°	27.9'
C2	862539.462	1022076.592	20.0'	37.2°	13.0'
C3	862693.464	1021986.808	40.0'	45.0°	31.4'
C4	862742.034	1021977.232	23.5'	45.0°	18.5'

ISSUED FOR 30% REVIEW 03/11/16

REV AC ADDITIONS

REVISIONS DURING CONSTRUCTION					
AC	07/16	115KV S/S EXPANSION BY CAI W.O. #404326RD	MBP	GTB	MLM

NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP

EVERSOURCE ENERGY

TITLE: ROOD AVE 24J
SITE DEVELOPMENT
CIVIL PLAN & DETAILS
WINDSOR, CT

BY	MBP (CAI)	CHKD	GTB (CAI)	APP	MLM (CAI)	APP
DATE	03/16	DATE	03/16	DATE	XX/XX	DATE
H-SCALE	1" = 20'	SIZE	E	FIELD BOOK & PAGES		
V-SCALE	1" = 20'	V.S.				
E.E. PROJ. NUMBER				E.E. DWG NO.		
				DWG NO.	26407-10001	

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Exhibit 4

Underground Cable System

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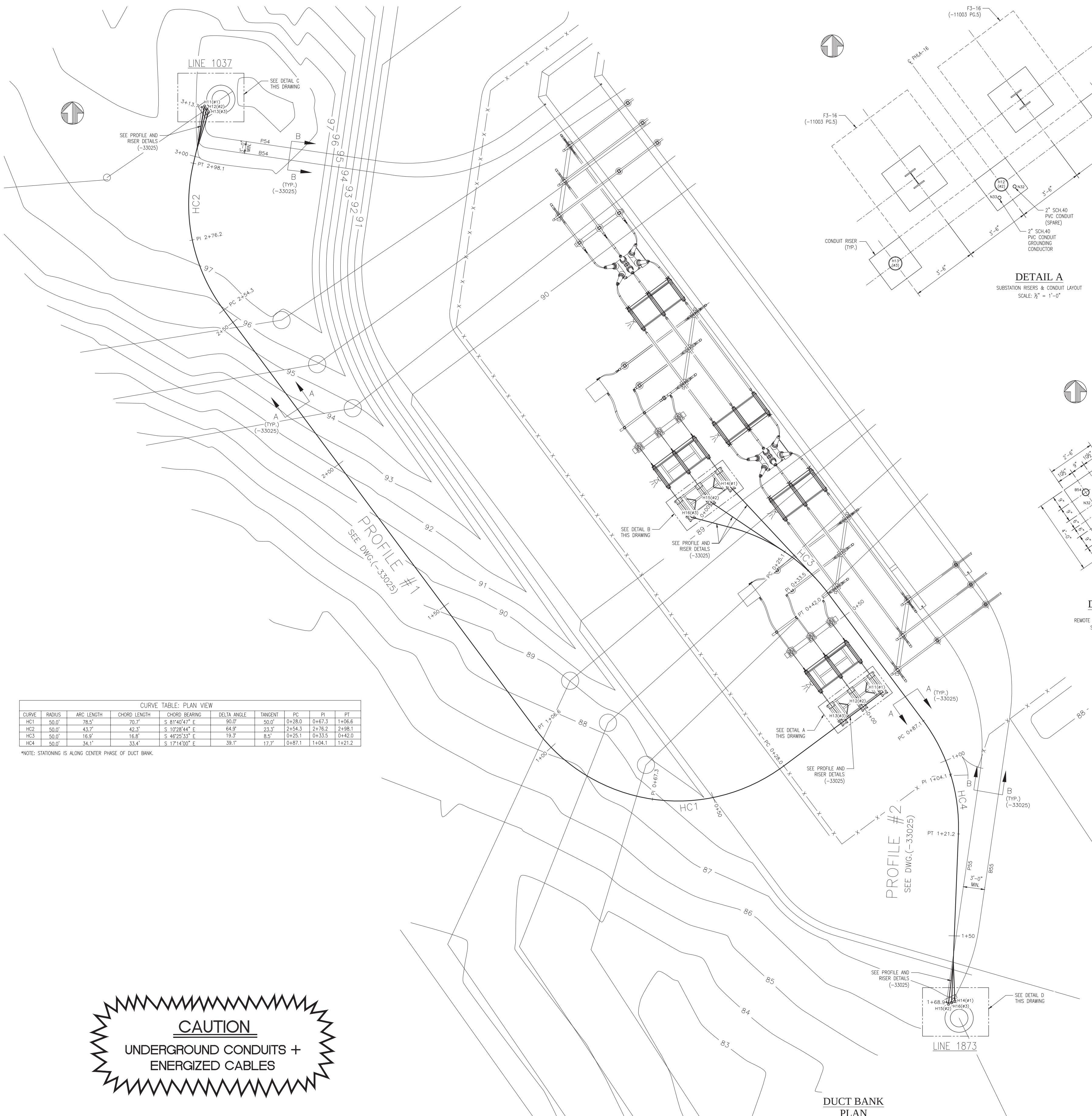


CAUTION

UNDERGROUND CONDUITS + ENERGIZED CABLES

DUCT BANK PLAN

SCALE: 3/32" = 1'-0"

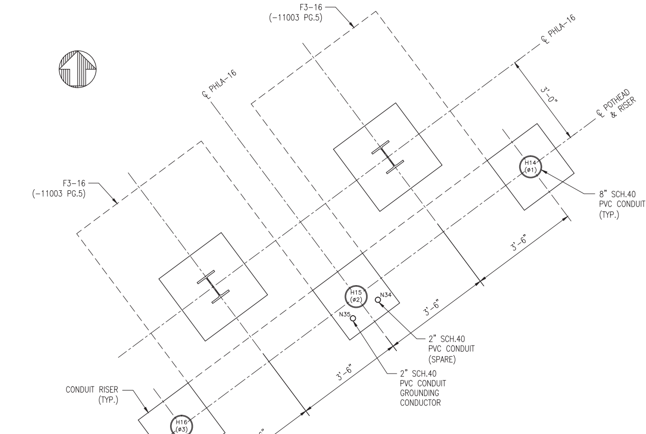
CURVE TABLE: PLAN VIEW									
CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE	TANGENT	PC	PI	PT
HC1	50.0'	78.5'	70.7'	S 81°40'47" E	90.0°	50.0'	0+28.0	0+67.3	1+06.6
HC2	50.0'	43.7'	42.3'	S 10°28'44" E	64.9°	23.3'	2+54.3	2+76.2	2+98.1
HC3	50.0'	16.9'	16.8'	S 46°25'33" E	19.3°	8.5'	0+25.1	0+33.5	0+42.0
HC4	50.0'	34.1'	33.4'	S 17°14'00" E	39.1°	17.7'	0+87.1	1+04.1	1+21.2

*NOTE: STATIONING IS ALONG CENTER PHASE OF DUCT BANK.

DETAIL A

SUBSTATION RISERS & CONDUIT LAYOUT

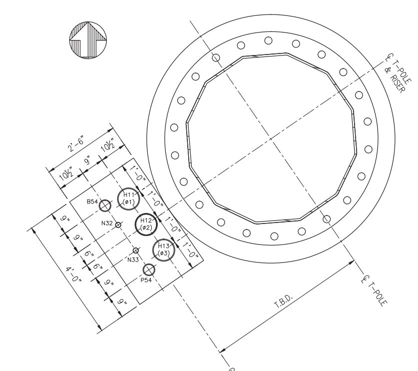
SCALE: 1/2" = 1'-0"



DETAIL B

SUBSTATION RISERS & CONDUIT LAYOUT

SCALE: 1/2" = 1'-0"

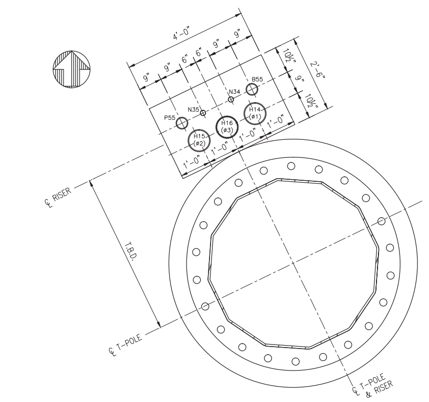


DETAIL C

LINE 1037

REMOTE RISER & CONDUIT LAYOUT

SCALE: 1/2" = 1'-0"



DETAIL D

LINE 1873

REMOTE RISER & CONDUIT LAYOUT

SCALE: 1/2" = 1'-0"

NOTE:

1. SITE DEVELOPMENT MATERIALS, METHODS AND CRITERIA SHALL BE IN ACCORDANCE WITH THE "GEOTECHNICAL STUDY FOR NEW SUBSTATION FOR NORTHEAST UTILITES ROOD AVENUE (24J SUBSTATION), WINDSOR, CT" BY DR. CLARENCE WELTI, P.E., P.C. (6/24/2008).
2. REFER TO UTRM234 FOR DUCT BANK CONSTRUCTION AND UTRM235 FOR CONDUIT MATERIALS AND INSTALLATION.

REFERENCE DRAWINGS

- 26407-10001 SITE DEVELOPMENT PLAN
- 26407-10002 SITE DEVELOPMENT PROFILES
- 26407-11002 FOUNDATION PLAN
- 26407-11005 FENCE DETAILS
- 26407-33001 YARD ARRANGEMENT PLAN
- 26407-33005 PG 1 CONDUIT PLAN
- 26407-33020 GROUNDING PLAN
- 26407-33024 DUCT BANK PLAN – LINE 1037 & 1873
- 26407-37001 PG 9 CONDUITS P39–P56
- 26407-37001 PG 10 CONDUITS B40–P57
- 26407-37001 PG 11 CONDUITS N19–N36
- 26407-37001 PG 12 CONDUITS H11–H28

ISSUED FOR
70% REVIEW
04/29/16

REV AC ADDITIONS
(NEW DRAWING)

REVISIONS DURING CONSTRUCTION					
AC	07/16	115KV S/S EXPANSION BY CAI W.O. #404326RD	MBP	GTB	MLM

NO.	DATE	AS BUILT REVISIONS	BY	CHK	APP	APP

EVERSOURCE ENERGY

TITLE: ROOD AVE 24J
DUCT BANK PLAN – LINE 1037 & 1873
CIVIL PLAN & DETAILS
WINDSOR, CT

BY: MBP (CAI)	CHKD: GTB (CAI)	APP: MLM (CAI)	APP:
DATE: 03/16	DATE: 03/16	DATE: XX/XX	DATE:
H-SCALE: AS NOTED	SIZE: E	FIELD BOOK & PAGES:	
V-SCALE:	V.S.:	R.E. DWG:	
R.E. PROJ. NUMBER:		DWG NO.: 26407-33024	

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Exhibit 5

Overhead Transmission Line Structures

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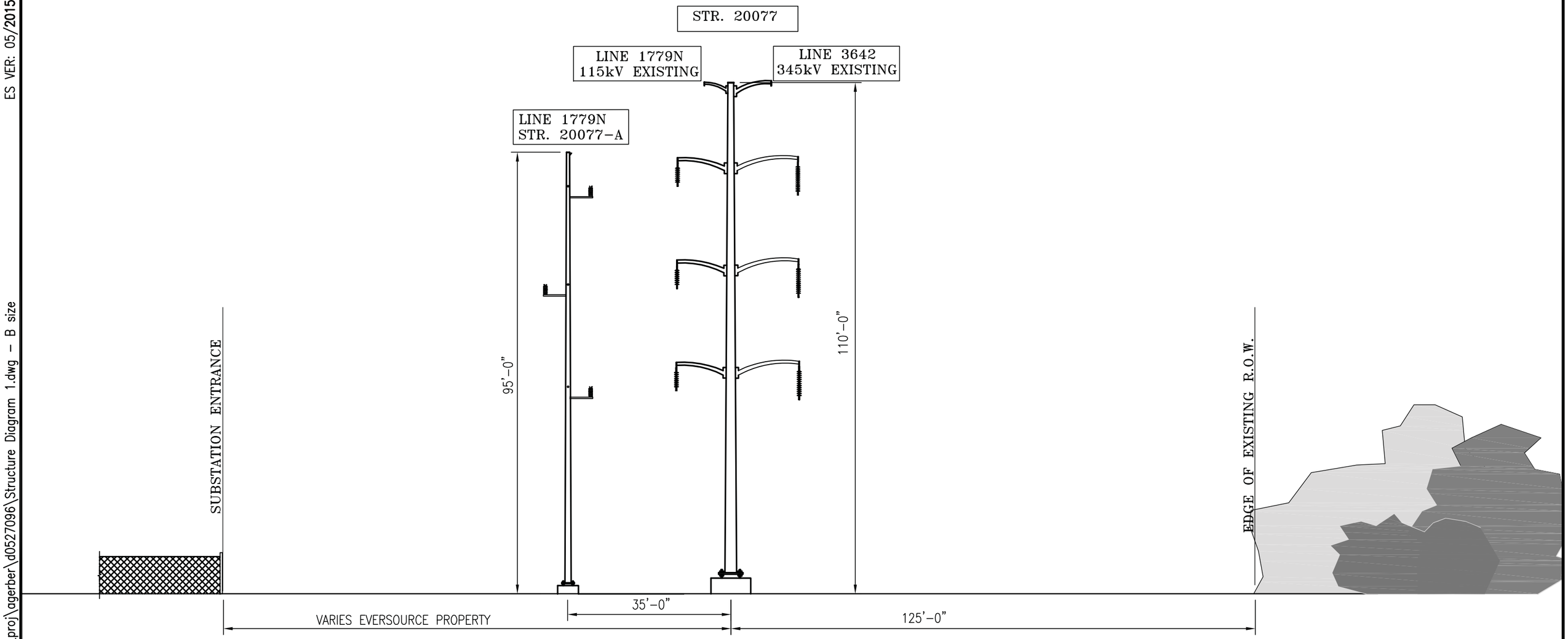
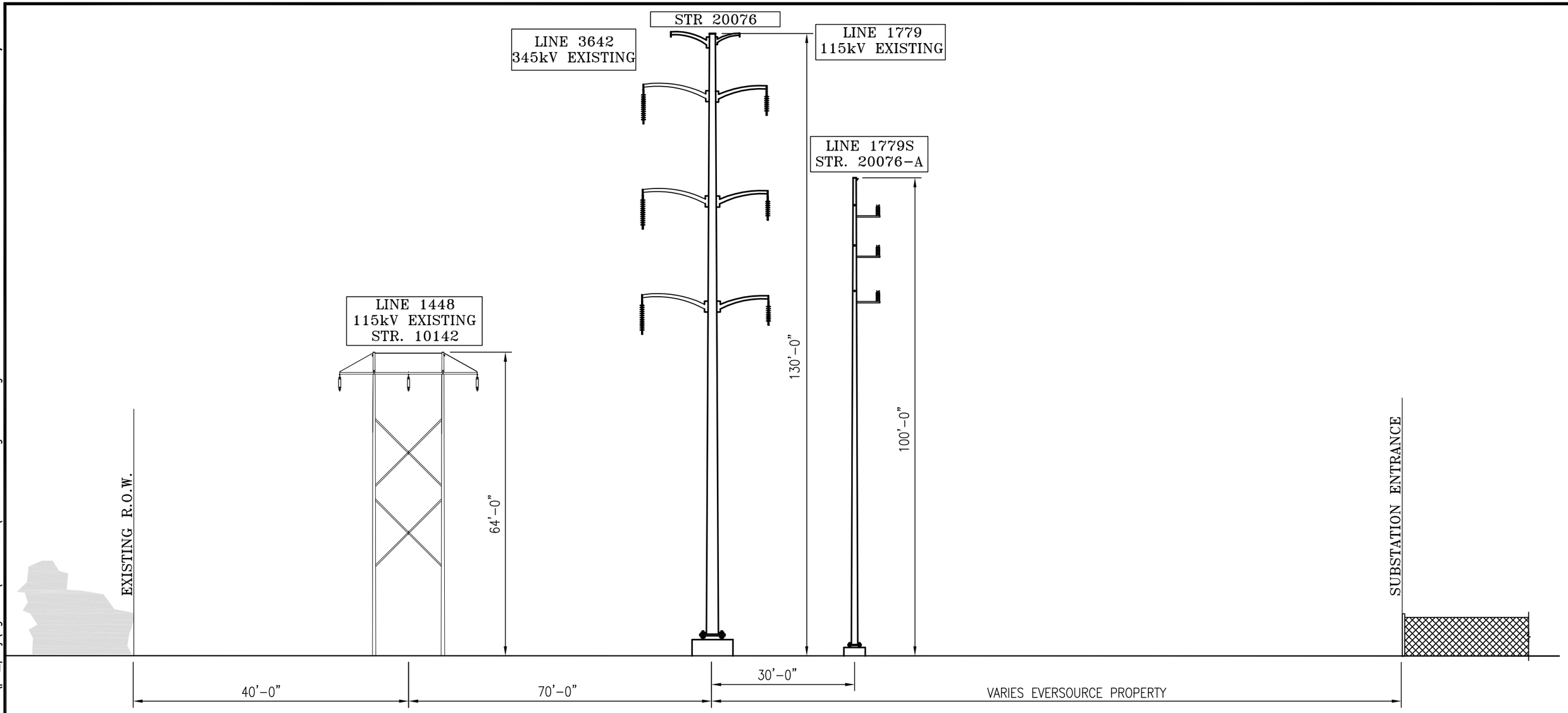


LOOKING EAST
TOWARDS ROOD AVENUE SUBSTATION

EVERSOURCE ENERGY

TITLE: BLOOMFIELD-WINDSOR UPGRADE PROJECT
ROOD AVENUE TRANSMISSION LINE RECONFIGURATION
PROPOSED STRUCTURE DIAGRAM
TOWN OF WINDSOR, CONNECTICUT

BY KSC/CAI	CHKD AGE/CAI	APP BRS/CAI	APP
DATE 9/21/15	DATE 9/21/15	DATE 9/21/15	DATE
H-SCALE N.T.S.	SIZE B	FIELD BOOK & PAGES	
V-SCALE N.T.S.	V.S.	R.E. DWG	
R.E. PROJ. NUMBER		DWG NO. STRUCTURE DIAGRAM 1	



LOOKING NORTH
TOWARDS ROOD AVENUE SUBSTATION

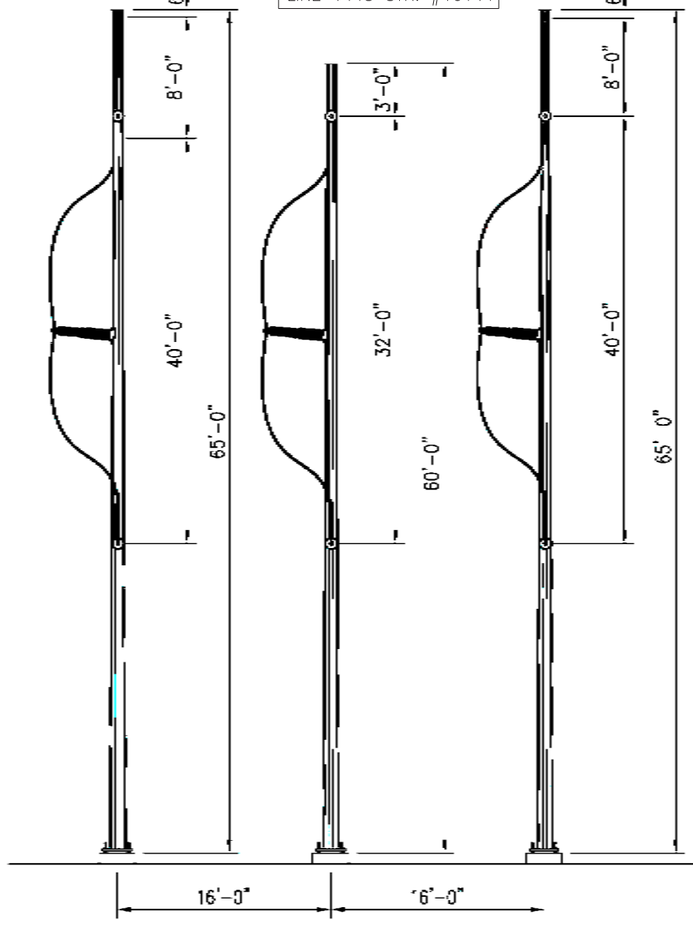
EVERSOURCE ENERGY

TITLE: BLOOMFIELD-WINDSOR UPGRADE PROJECT
ROOD AVENUE TRANSMISSION LINE RECONFIGURATION
PROPOSED STRUCTURE DIAGRAM
TOWN OF WINDSOR, CONNECTICUT

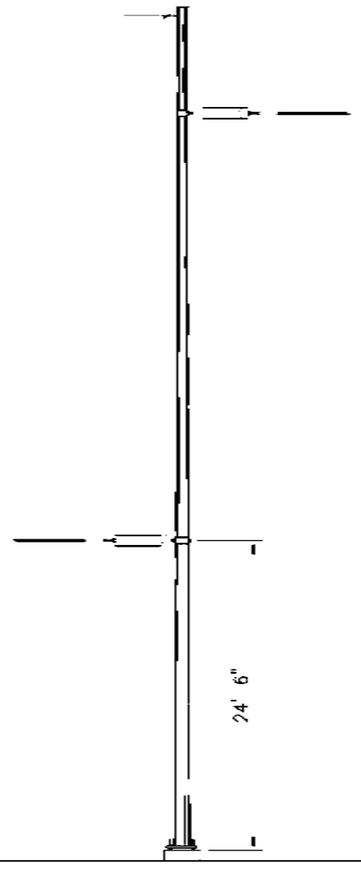
BY KSC/CAI	CHKD AGE/CAI	APP BRS/CAI	APP
DATE 9/21/15	DATE 9/21/15	DATE 9/21/15	DATE
H-SCALE N.T.S.	SIZE B	FIELD BOOK & PAGES	
V-SCALE N.T.S.	V.S.	R.E. DWG	
R.E. PROJ. NUMBER		DWG NO. STRUCTURE DIAGRAM 2	

ES VER: 05/2015

LINE 1751 STR. #10142
LINE 1448 STR. #10144



FRONT VIEW
N.T.S.



SIDE VIEW
N.T.S.

EVERSOURCE ENERGY

TITLE BLOOMFIELD-WINDSOE UPGRADE PROJECT
ROOD AVENUE TRANSMISSION LINE RECONFIGURATION
PROPOSED STRUCTURE DIAGRAM
WINDSOR, CT

BY RRH	CHKD EQ	APP	APP
DATE 2/12/16	DATE 2/12/16	DATE	DATE
H-SCALE N.T.S.	SIZE D	FIELD BOOK & PAGES	
V-SCALE N.T.S.	V.S.	R.E. DWG	
R.E. PROJ. NUMBER		DWG NO. STRUCTURE DIAGRAM 3	

3/3/2016 3:44 PM - hamihr - S:\hamihr\erwin\Bloomfield_Windsor_Upgrade\Structure_Diagram_3.dwg - Construction-All

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Exhibit 6

1779 Line Loop and Related Structure Modification Details

Rood Avenue Substation Loop and Line Entries

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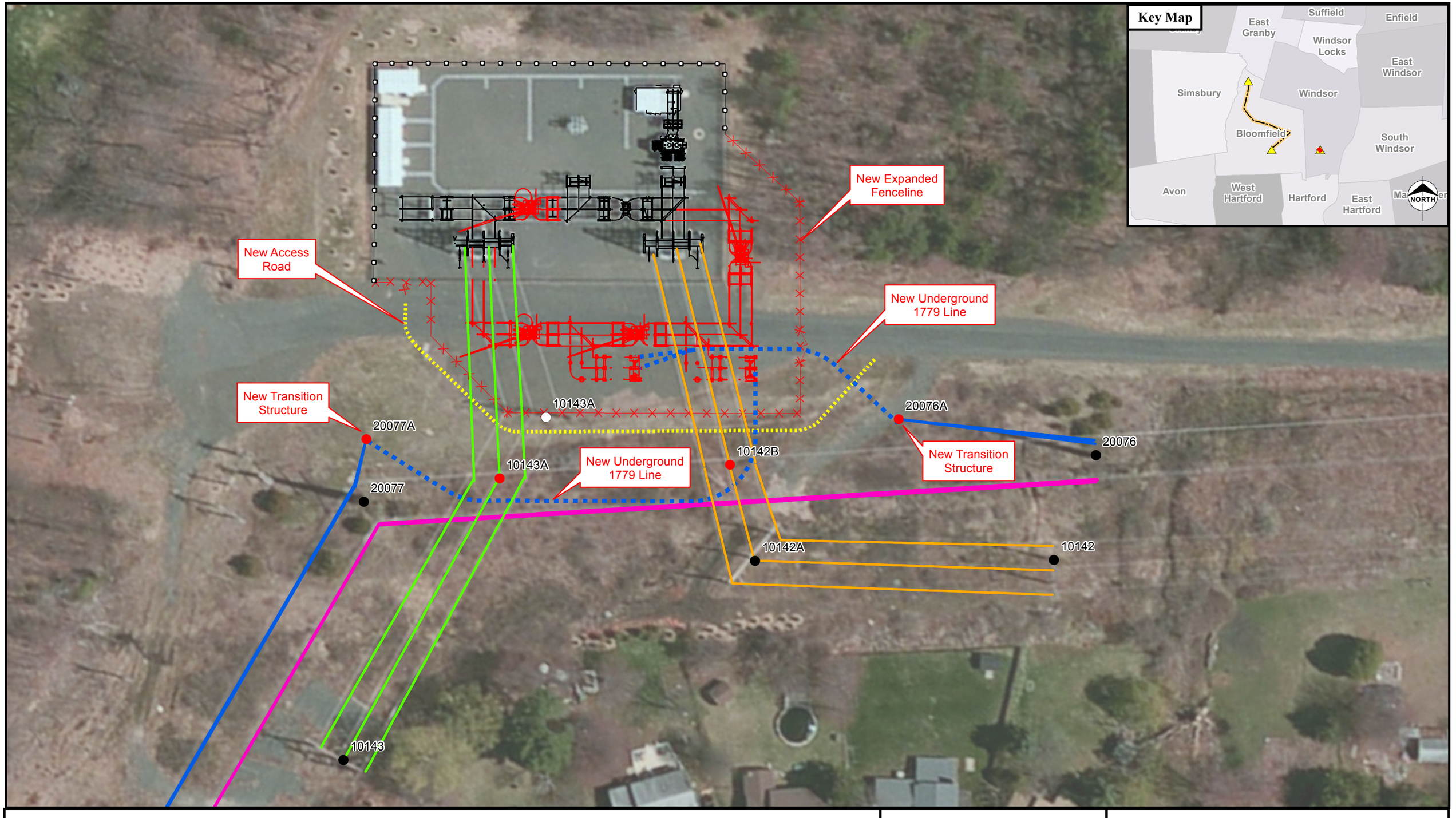

Existing Structure To Remain
Existing Structure To Be Removed
New Structure
1448 Line
1751 Line
1779 Line
1779 Line (underground)
3642 Line
Existing Fence to Remain
New Fence
New Access Road

NORTH

0 25 50 100 Feet

Source: CT DEEP, USGS and Burns & McDonnell Engineering.

EVERSOURCE ENERGY

Exhibit 6: 1779 Line Loop and
Related Structure Modification Details
Rood Avenue Substation Loop and Line Entries

Date: July 2016

Rood Avenue Detailed Design Staking Tables - 70% IFR

Transmission Line Reconfiguration

Structure Number	Status	Station (ft)	Structure Embedment (ft)	Struct. Height Above Ground (ft)	Total Structure Length (ft)	X Easting (ft)	Y Northing (ft)	Centerline Z Elevation (ft)	Ahead Span (ft)	Line Angle (deg)	Foundation	Structure Description
Rood Ave. SS	Existing	0	N/A	57.5		1022036	862755.3	89.931	142.986	0	N/A	1751 Rood Ave. Substation
10143-A	Proposed	142.986	N/A	65, 60, 65	65, 60, 65	1021921	862670.1	95.74	200.049	26.8585	Caisson	SCSP- 3PDE
10143	Existing	343.035	N/A	70	70	1021724	862636.4	91.555	425.302	3.4238	Caisson	SCSP- 3PDE
20077	Existing	69629.15	N/A	130	130	1021862	862722.8	98.009	458.238	50.8755	Caisson	DCSP- DE
20076-A	Proposed	71543.92	N/A	100	100	1022103	862485.5	87.654	0	0	Caisson	SCSP- DE
20076	Existing	71418.44	N/A	130	130	1022157	862372.5	81.381	125.482	-165.69	Caisson	DCSP- SU
10142-A	Existing	70578.88	N/A	70	70	1021978	862504.8	84.703	68.861	58.1117	Caisson	SCSP- 3PDE
10142-B	Proposed	70647.74	N/A	65, 60, 65	65, 60, 65	1022003	862568.8	90.1	136.969	26.5543	Caisson	SCSP- 3PDE
Rood Ave. SS	Existing	70784.71	N/A	57.5	57.5	1022105	862660.4	88.853	0	0	N/A	1448 Rood Ave. Substation
20077-A	Proposed	71123.75	N/A	95	95	1021894	862744.9	99.486	0	0	Caisson	SCSP- DE

* Highlighted structures are proposed

** Coordinate System

Horizontal: North American Datum of 1983 (NAD 83), Conneticut State Plane Coordinate System, Mainland, 2001

Vertical: North American Vertical Datum of 1988 (NAVD 88)

All units in US Survey Feet.

*** Existing structure dimensions are estimated

ISSUED FOR CLIENT REVIEW
70% SUBMITTAL

EVERSOURCE ENERGY

TITLE: BLOOMFIELD-WINDSOR UPGRADE PROJECT
ROOD AVENUE TRANSMISSION LINE RECONFIGURE
STAKING TABLE
TOWN OF WINDSOR, CONNECTICUT

BY KSC/CAI	CHKD AGE/CAI	APP	APP
DATE 3/2/16	DATE 3/2/16	DATE	DATE
H-SCALE N.T.S.	SIZE B	FIELD BOOK & PAGES	
V-SCALE N.T.S.	V.S.	R.E. DWG	
R.E. PROJ. NUMBER		DWG NO. STAKING TABLE	

Exhibit 7

Sedimentation and Erosion Control Details

Rood Avenue Substation

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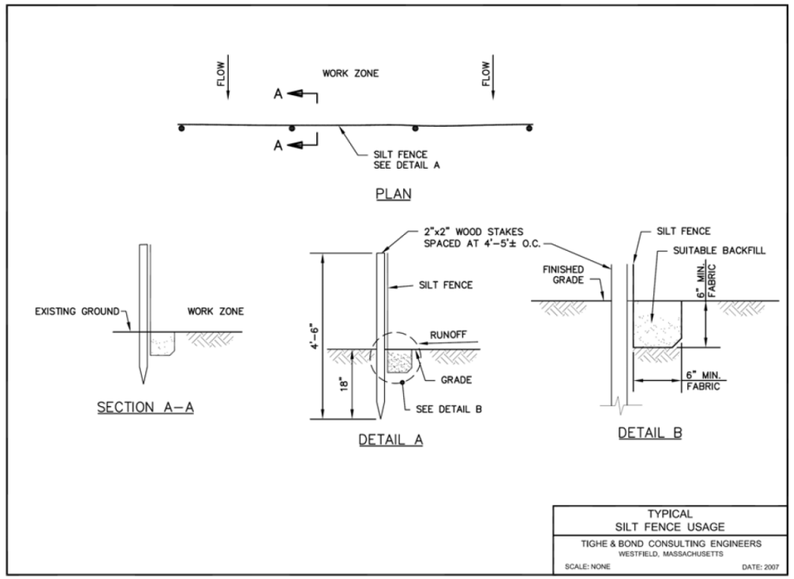

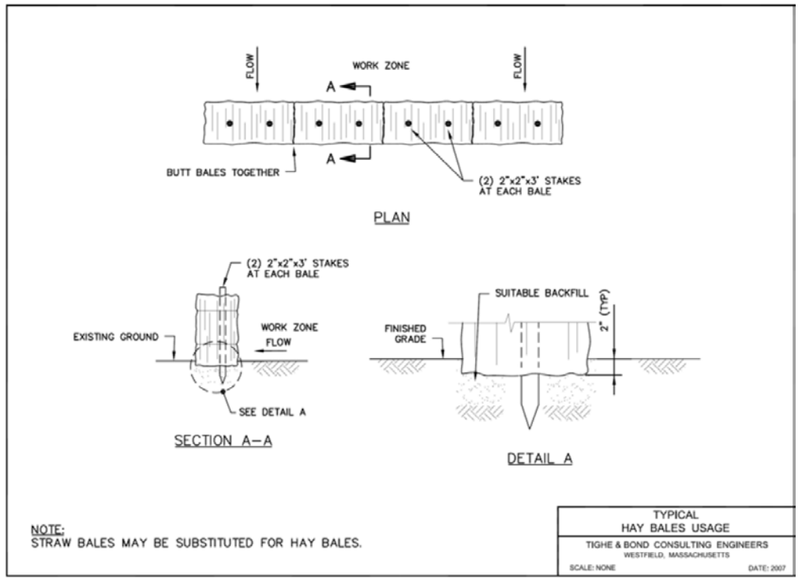

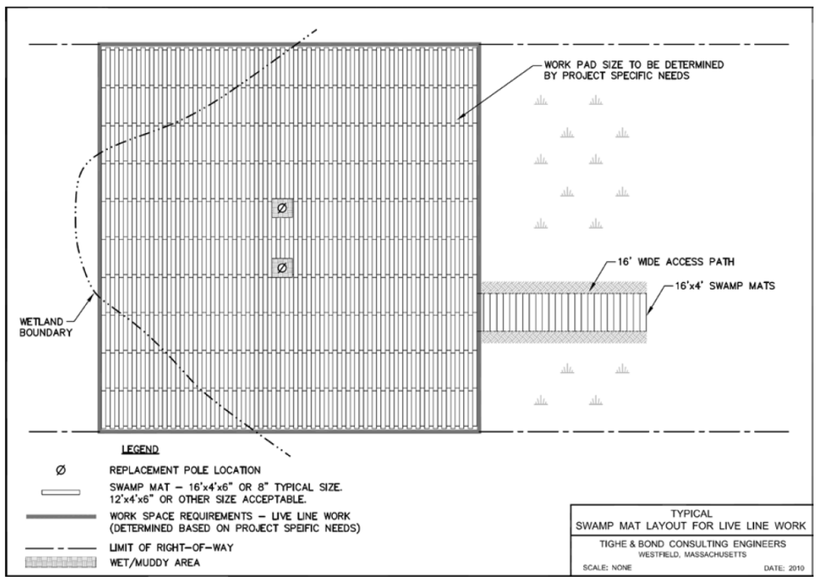

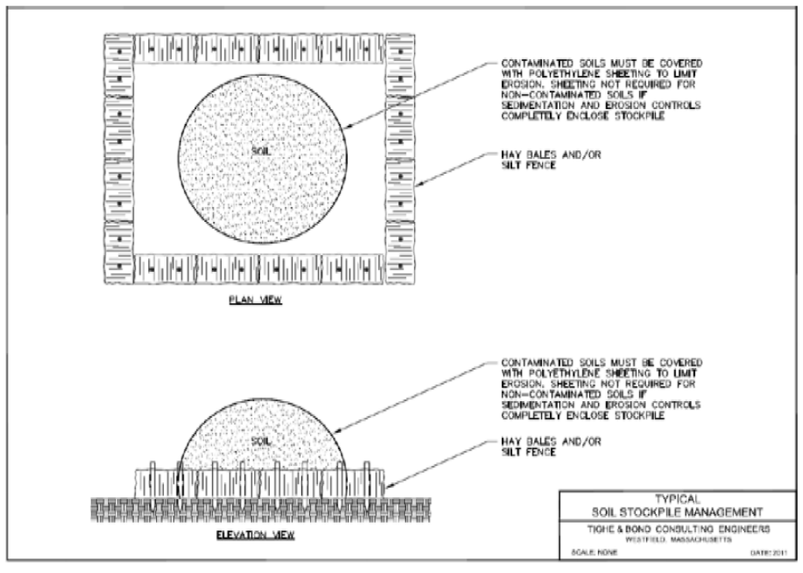

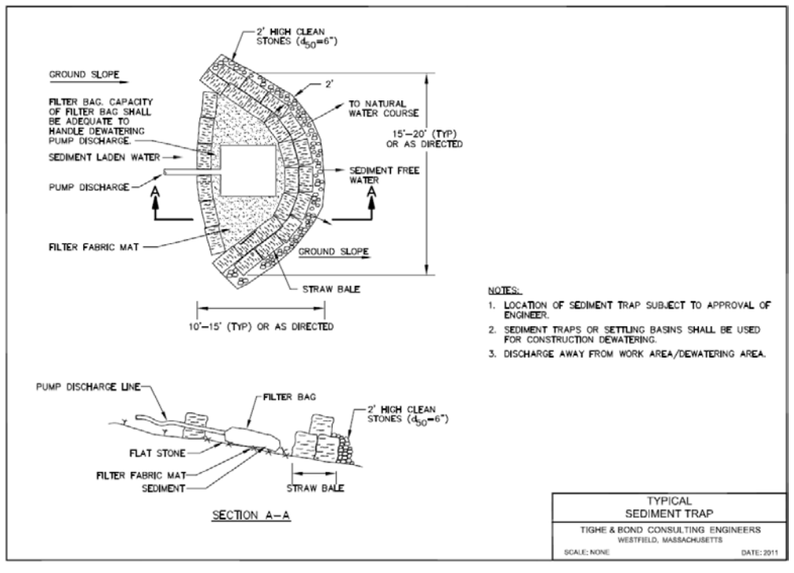

Note: This sheet depicts BMPs from Eversource's "*BMP Manual: Connecticut (Construction and Maintenance Environmental Requirements)*" that are typical for substation and related modification work. Other BMPs in this manual may apply on a site-specific basis.

Exhibit 4:

Sedimentation and Erosion Control Details

Rood Substation

Development & Management Plan

Modifications to the Rood Avenue Substation and Related Transmission Line Connections, Bloomfield Substation, and North Bloomfield Substation

July 2016 No Scale

EVERSOURCE ENERGY

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APPENDIX B

Drawings and Photographs

Bloomfield Substation

Exhibit 1: **Key Map/Site Locus**

Exhibit 2: **Aerial Photograph**

Exhibit 3: **General Arrangement Plans**

Exhibit 4: **Sedimentation and Erosion Control Details**

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Exhibit 1

Key Map/Site Locus

Bloomfield Substation

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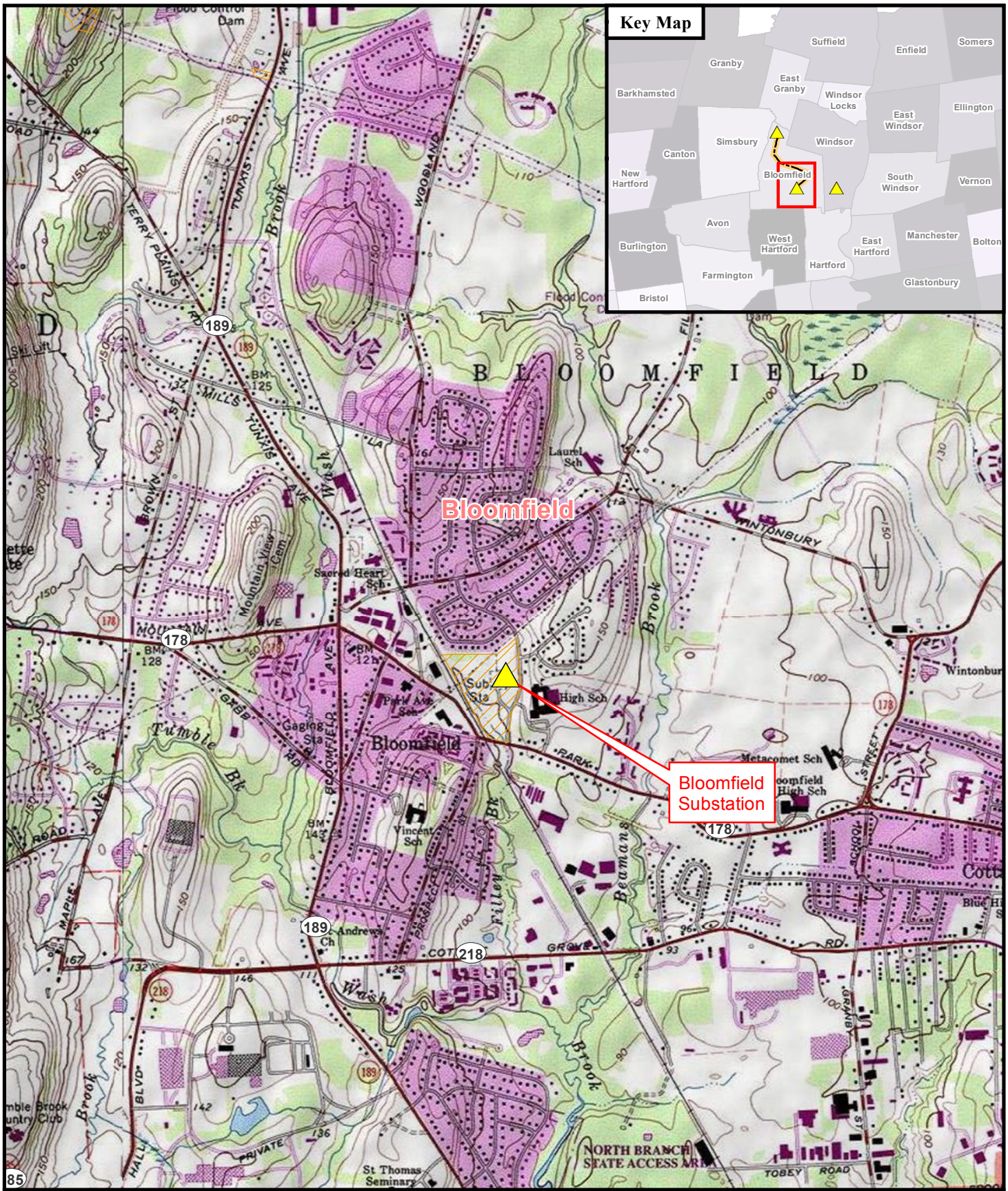

NORTH

0 1,000 2,000 Feet

1 inch = 2,000 feet

Facility

Eversource Property

Town Boundary

Source: USGS 7.5-Minute Quadrangles, CT DEEP, ESRI and Burns & McDonnell Engineering.

EVERSOURCE ENERGY

Exhibit 1: Key Map/Site Locus
Bloomfield Substation
Bloomfield-Windsor
Upgrades Project

Date: July 2016

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Exhibit 2

Aerial Photograph

Bloomfield Substation

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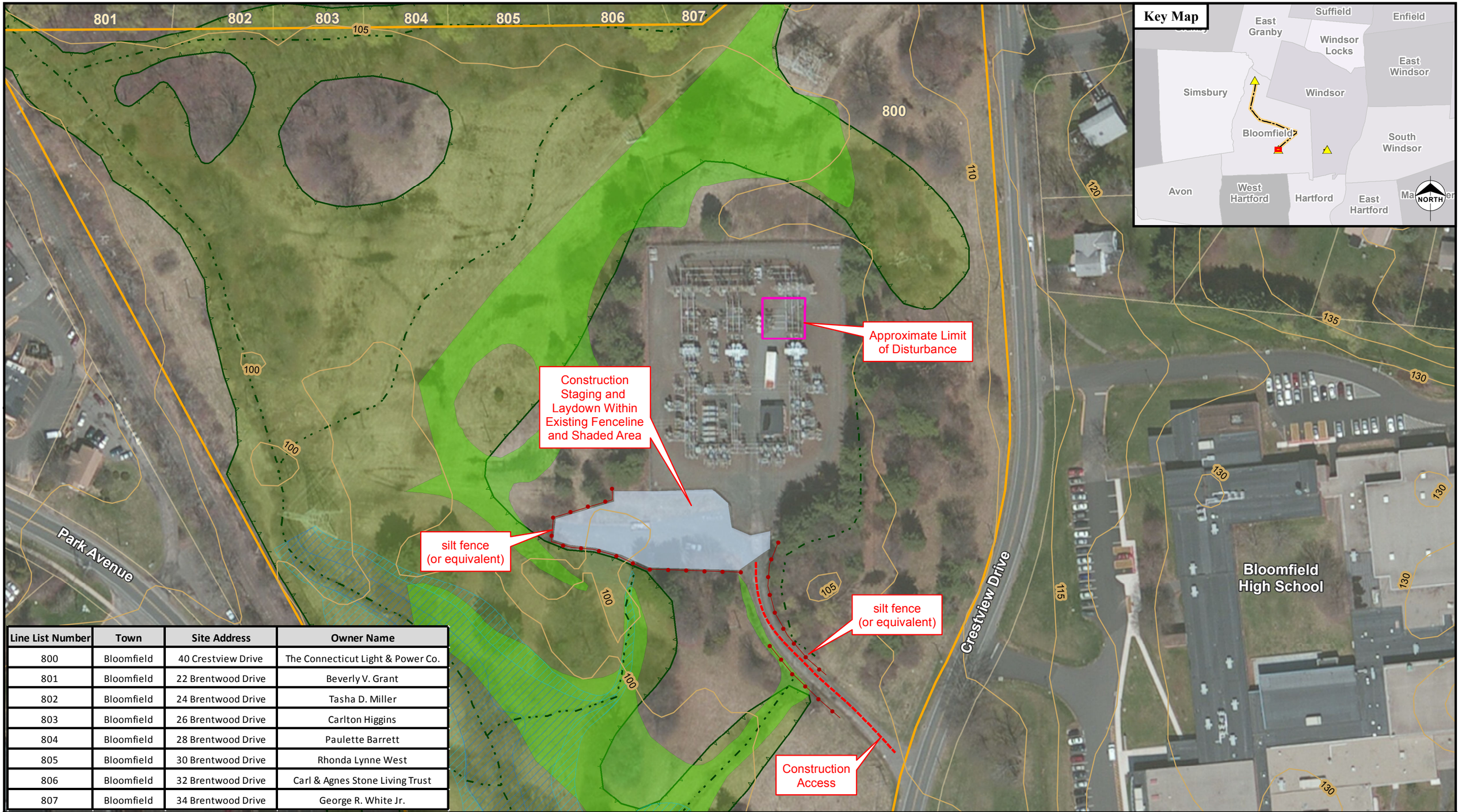

Line List Number	Town	Site Address	Owner Name
800	Bloomfield	40 Crestview Drive	The Connecticut Light & Power Co.
801	Bloomfield	22 Brentwood Drive	Beverly V. Grant
802	Bloomfield	24 Brentwood Drive	Tasha D. Miller
803	Bloomfield	26 Brentwood Drive	Carlton Higgins
804	Bloomfield	28 Brentwood Drive	Paulette Barrett
805	Bloomfield	30 Brentwood Drive	Rhonda Lynne West
806	Bloomfield	32 Brentwood Drive	Carl & Agnes Stone Living Trust
807	Bloomfield	34 Brentwood Drive	George R. White Jr.

- Silt Fence (or Equivalent)
- Eversource Property
- Approx. Limit of Disturbance
- FEMA 500-Year Flood Zone
- FEMA 100-Year Flood Zone
- Town of Bloomfield Watercourses
- Town of Bloomfield Wetlands
- Delineated Wetlands

Sedimentation and erosion controls shall be installed and maintained as necessary to protect water resources, and in accordance with Eversource's "BMP Manual: Connecticut (Construction and Maintenance Environmental Requirements)".

NORTH

0 50 100 200 Feet

Source: CT DEEP, USGS, Town of Bloomfield, and Burns & McDonnell Engineering.

EVERSOURCE ENERGY

Exhibit 2: Aerial Photograph
Bloomfield Substation and Surroundings
Bloomfield, CT
Bloomfied-Windsor Upgrades Project

Date: July 2016

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Exhibit 3

General Arrangement Plans

Bloomfield Substation

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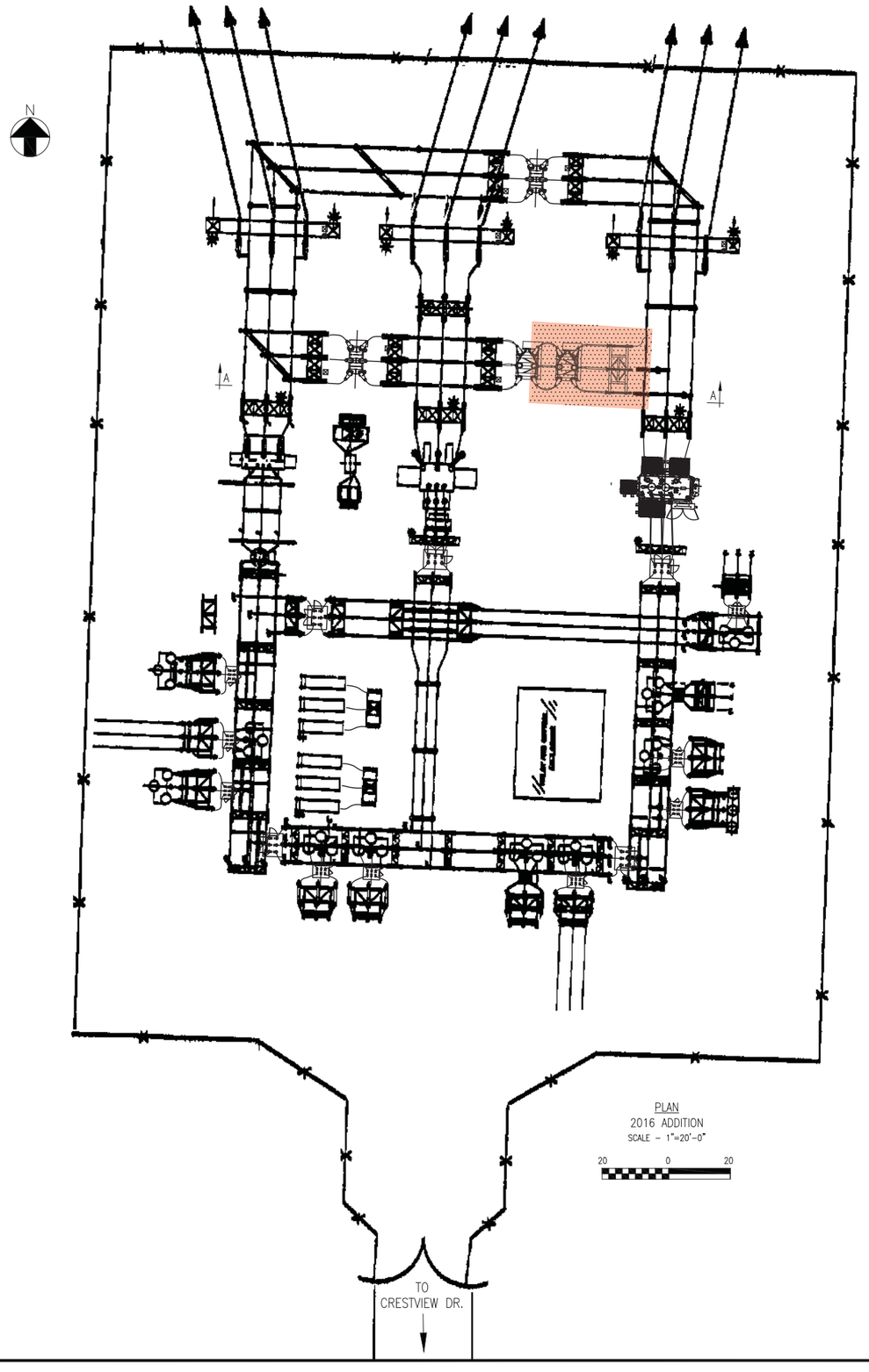
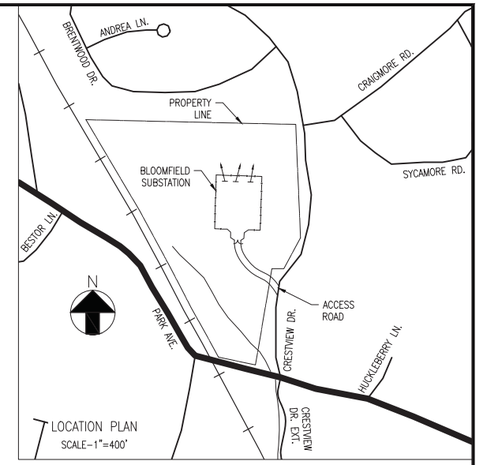
ES VER. 05/2015



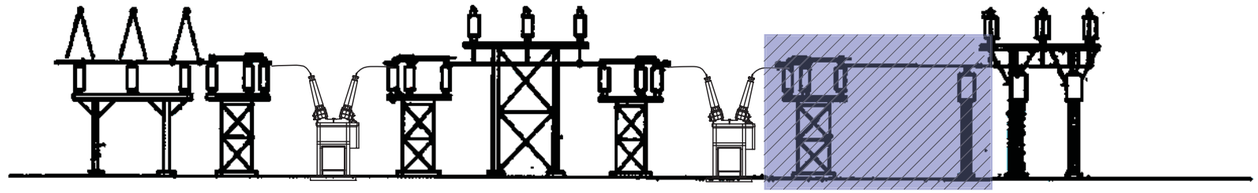
PLAN
2016 ADDITION
SCALE – 1"=20'-0"

20 0 20

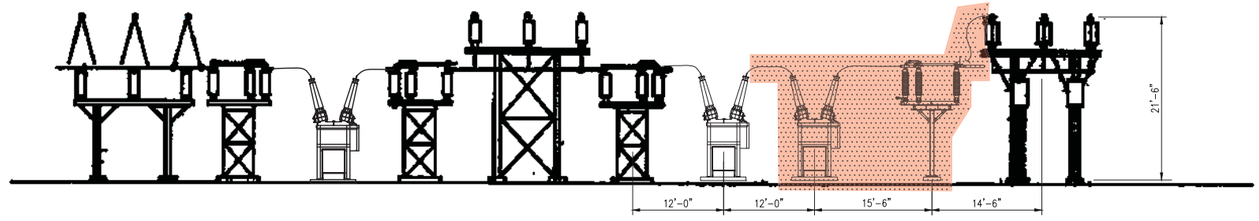


LOCATION PLAN
SCALE–1"=400'

400 0 400



SECTION A–A
2016 REMOVAL
SCALE – 1"=10'-0"



SECTION A–A
2016 ADDITION
SCALE – 1"=10'-0"

10 0 10

2016 ADDITION

2016 REMOVAL

REVISIONS DURING CONSTRUCTION

EVERSOURCE ENERGY

TITLE
BLOOMFIELD SUBSTATION
YARD ARRANGEMENT – PLAN & SECTIONS
CONNECTICUT SITING COUNCIL
BLOOMFIELD, CT

BY	DAK	CHKD	JPR	APP	JEL
DATE	10/04	DATE	10/04	DATE	10/04
H-SCALE	AS NOTED	SIZE	D	FIELD BOOK & PAGES	
V-SCALE	AS NOTED	V.S.		R.E. DWG	
R.E. PROJ. NUMBER				DWG NO.	11103-92001

12/11/2015 1:25 PM – jdegan – C:\pw_work\pw_pro\mameed\d0537553\11103-92001.DWG – REV AL Additions – PLAN & SECTIONS

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Exhibit 4

Sedimentation and Erosion Control Details

Bloomfield Substation

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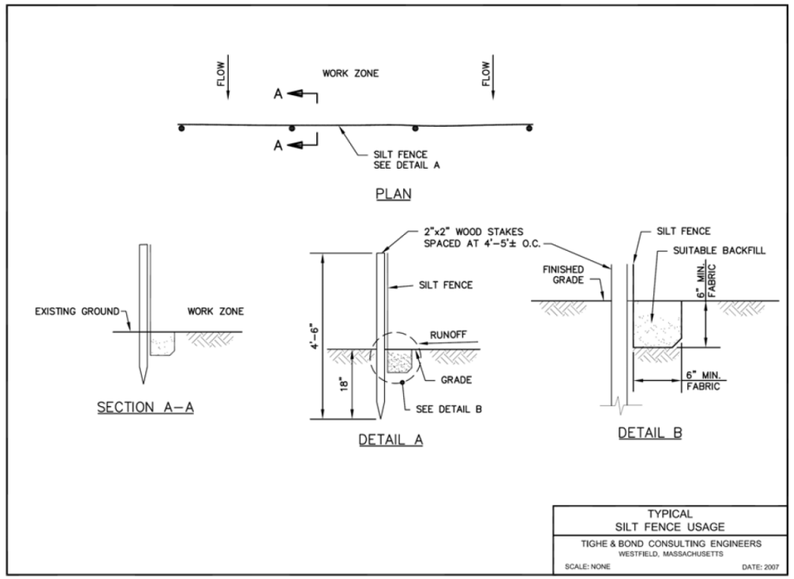

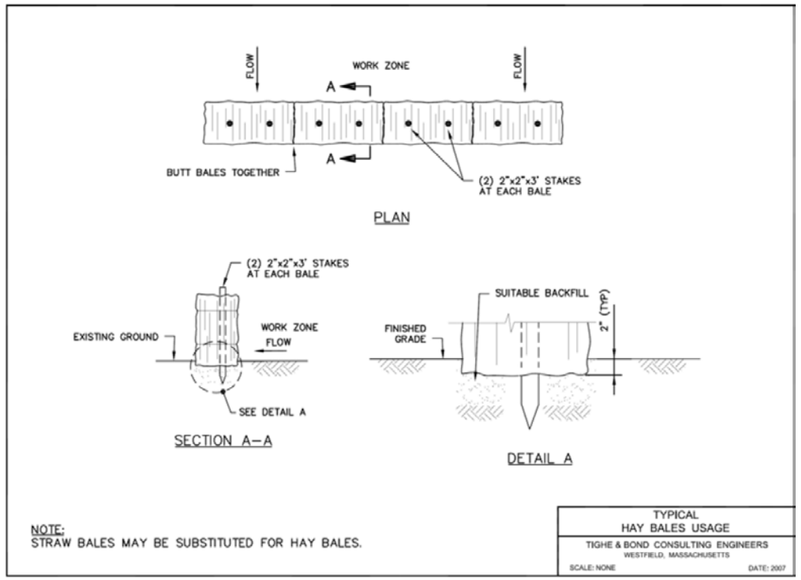

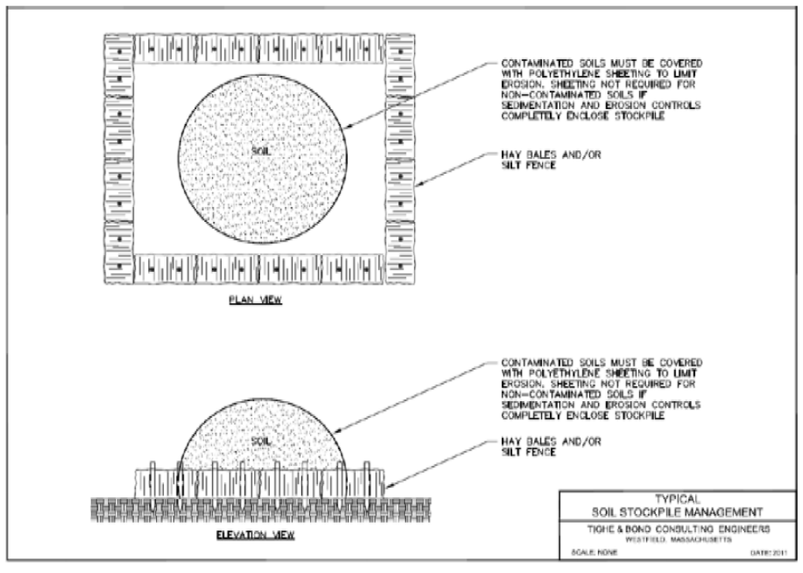

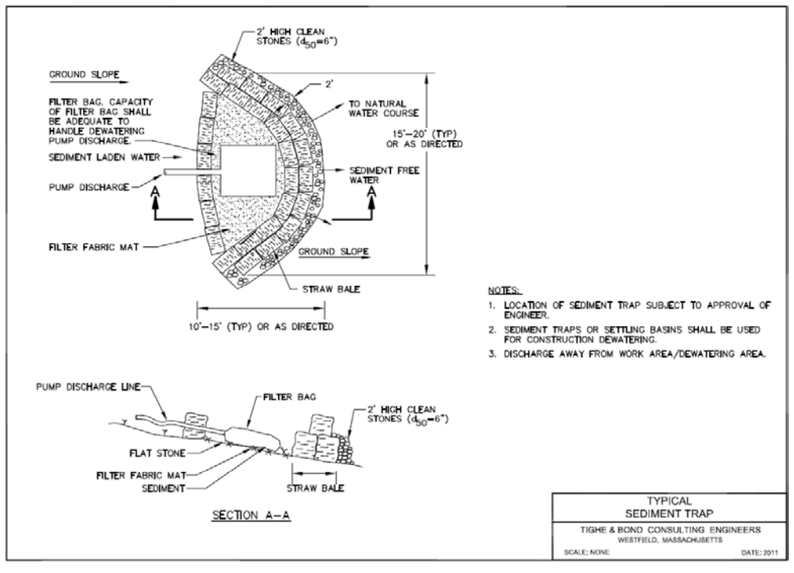

Note: This sheet depicts BMPs from Eversource's "*BMP Manual: Connecticut (Construction and Maintenance Environmental Requirements)*" that are typical for substation and related modification work. Other BMPs in this manual may apply on a site-specific basis.

Exhibit 4:

Sedimentation and Erosion Control Details

Bloomfield Substation

Development & Management Plan

Modifications to the Rood Avenue Substation and Related Transmission Line Connections, Bloomfield Substation, and North Bloomfield Substation

July 2016 No Scale

EVERSOURCE ENERGY

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APPENDIX C

Drawings and Photographs

North Bloomfield Substation

Exhibit 1: **Key Map/Site Locus**

Exhibit 2: **Aerial Photograph**

Exhibit 3: **General Arrangement Plans**

Exhibit 4: **Sedimentation and Erosion Control Details**

Exhibit 5: **State Species of Concern: Mitigation Protocols**

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Exhibit 1

Key Map/Site Locus

North Bloomfield Substation

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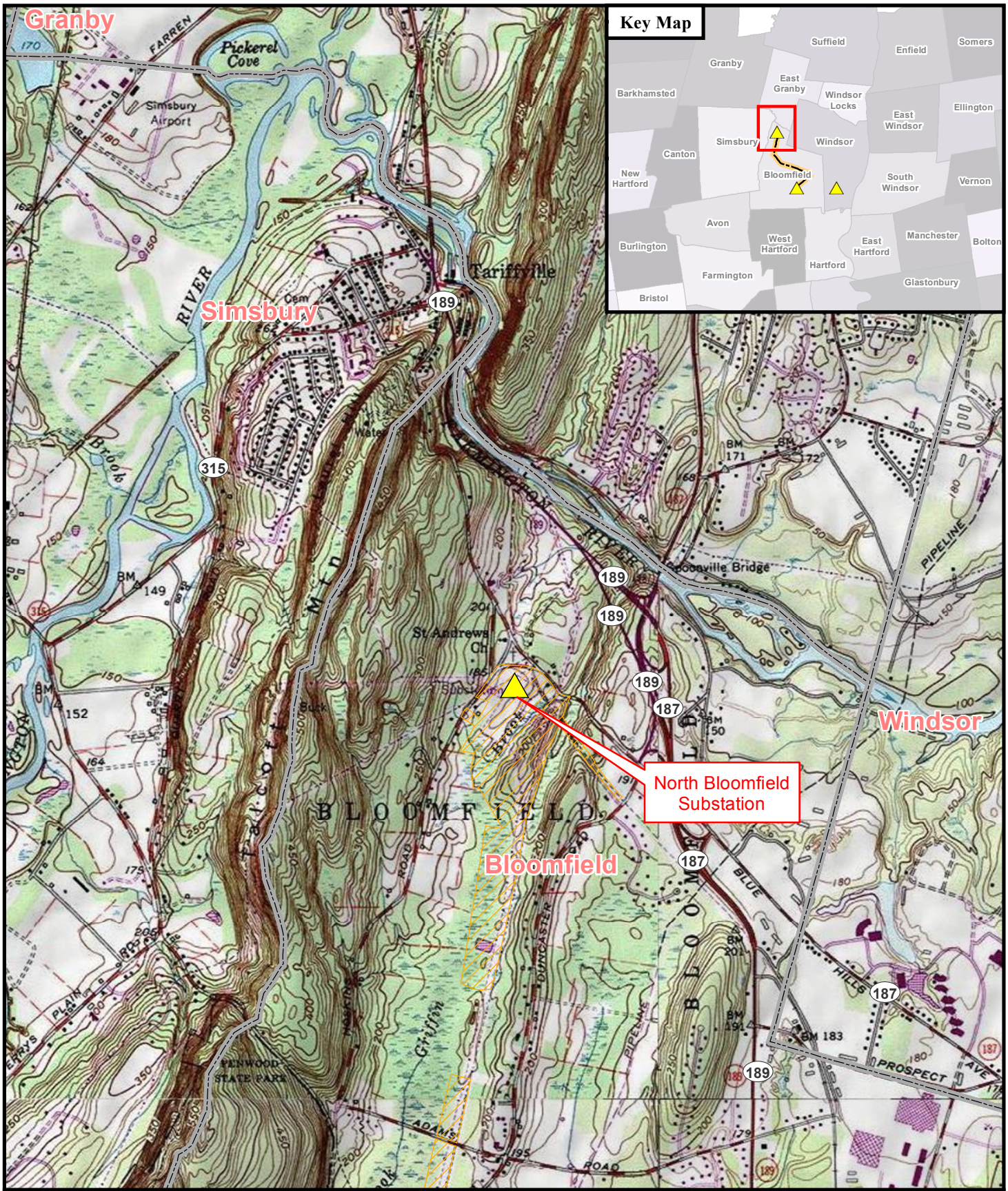

Source: USGS 7.5-Minute Quadrangles, CT DEEP, ESRI and Burns & McDonnell Engineering.

Exhibit 1: Key Map/Site Locus
North Bloomfield Substation
Bloomfield-Windsor
Upgrades Project

Date: July 2016

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Exhibit 2

Aerial Photograph

North Bloomfield Substation

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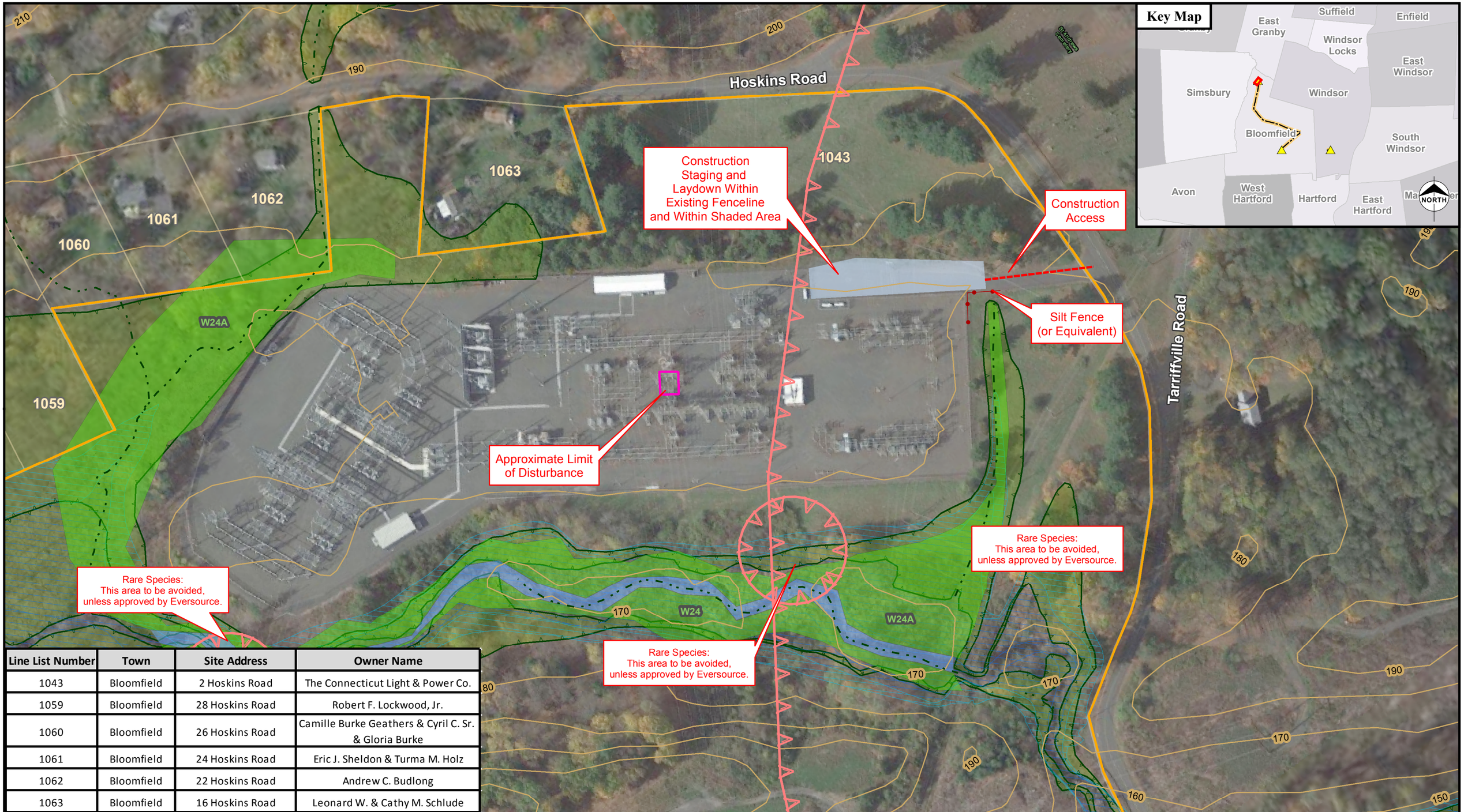

Line List Number	Town	Site Address	Owner Name
1043	Bloomfield	2 Hoskins Road	The Connecticut Light & Power Co.
1059	Bloomfield	28 Hoskins Road	Robert F. Lockwood, Jr.
1060	Bloomfield	26 Hoskins Road	Camille Burke Geathers & Cyril C. Sr. & Gloria Burke
1061	Bloomfield	24 Hoskins Road	Eric J. Sheldon & Turma M. Holz
1062	Bloomfield	22 Hoskins Road	Andrew C. Budlong
1063	Bloomfield	16 Hoskins Road	Leonard W. & Cathy M. Schlude

- Silt Fence (or Equivalent)
- Eversource Property
- Approx. Limit of Disturbance
- FEMA 500-Year Flood Zone
- FEMA 100-Year Flood Zone
- Town of Bloomfield Wetlands
- Town of Bloomfield Watercourses
- Delineated Wetlands
- Rare Species Area

Sedimentation and erosion controls shall be installed and maintained as necessary to protect water resources, and in accordance with Eversource's "BMP Manual: Connecticut (Construction and Maintenance Environmental Requirements)".

NORTH

0 50 100 200 Feet

Source: CT DEEP, USGS, Google, and Burns & McDonnell Engineering.

EVERSOURCE ENERGY

Exhibit 2: Aerial Photograph
North Bloomfield Substation and Surroundings
Bloomfield, CT
Bloomfied-Windsor Upgrades Project

Date: July 2016

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Exhibit 3

General Arrangement Plans

North Bloomfield Substation

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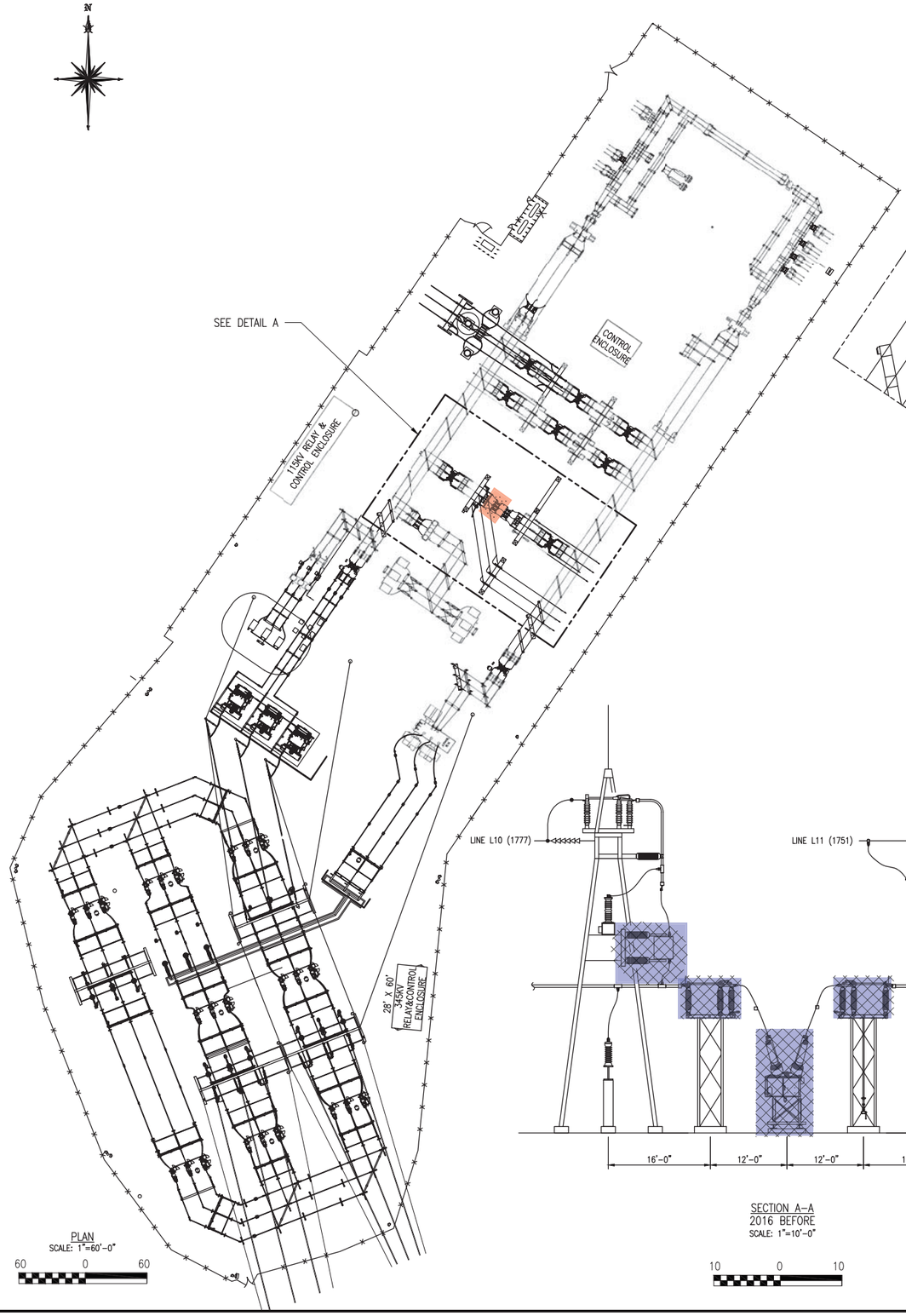
ES VER: 05/2015

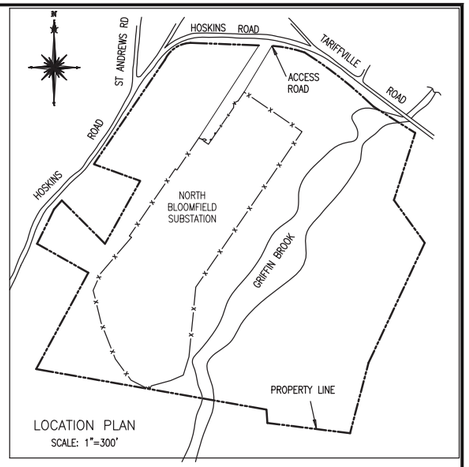


PLAN
SCALE: 1"=60'-0"

60 0 60

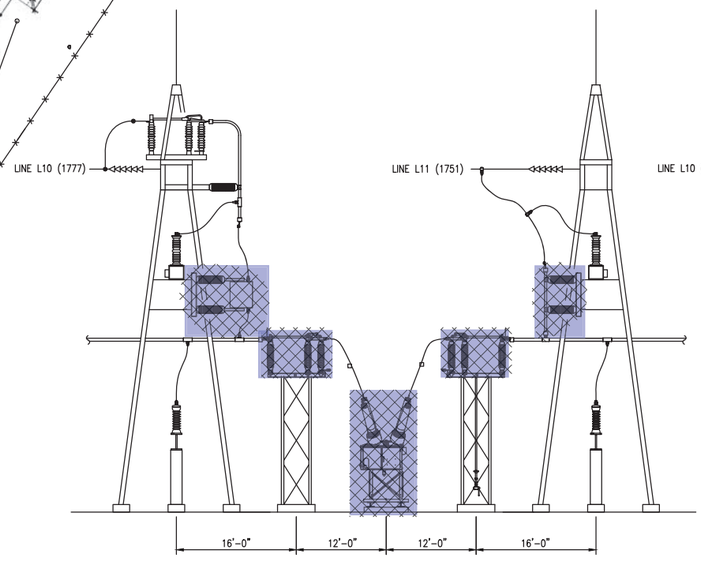
DETAIL A
SCALE: 1"=20'-0"

20 0 20



LOCATION PLAN
SCALE: 1"=300'

300 0 300



SECTION A-A
2016 BEFORE
SCALE: 1"=10'-0"

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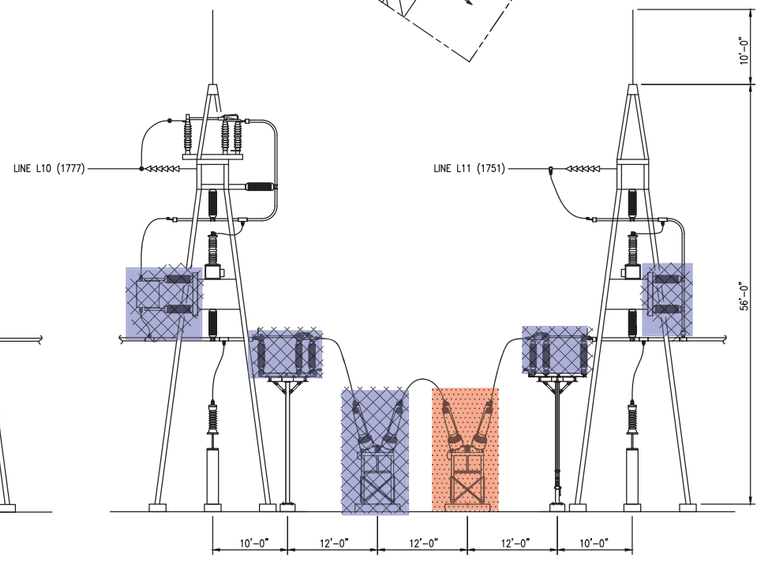

SECTION A-A
2016 AFTER
SCALE: 1"=10'-0"

10 0 10

2016 ADDITION

2016 RELOCATION

REVISIONS DURING CONSTRUCTION			

EVERSOURCE ENERGY

TITLE

NORTH BLOOMFIELD SUBSTATION
YARD ARRANGEMENT – PLAN & SECTIONS
CONNECTICUT SITING COUNCIL
BLOOMFIELD, CT

BY	JS	CHKD	REM	APP	REM	APP	PSM
DATE	02/88	DATE	02/88	DATE	02/88	DATE	02/88
H-SCALE	AS NOTED	SIZE	D	FIELD BOOK & PAGES			
V-SCALE	AS NOTED	V.S.		R.E. DWG			
R.E. PROJ. NUMBER				DWG NO.	11102-92001		

2/9/2016 8:18 AM - gtisiela - C:\Users\gtisiela.CAI-ENG\appdata\local\temp\AcPublish_6852\11102-92001.DWG - REV AK - 2016 Series Breaker

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Exhibit 4

Sedimentation and Erosion Control Details

North Bloomfield Substation

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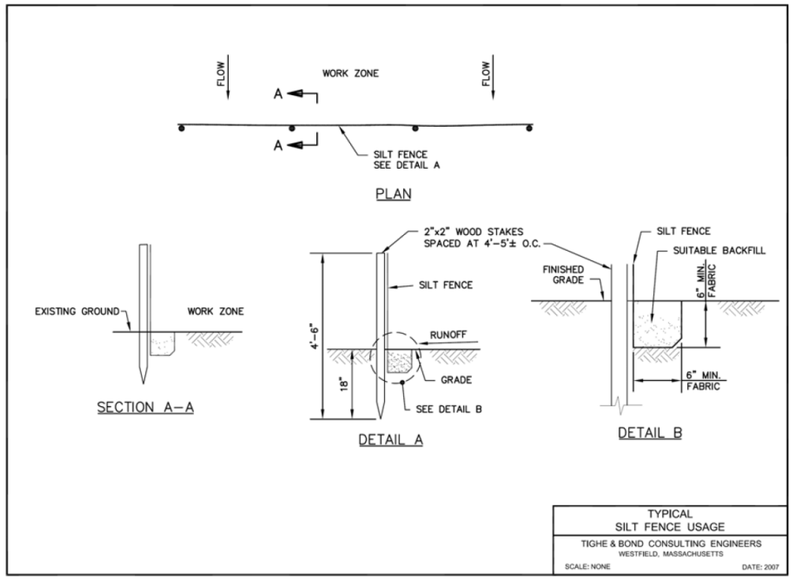

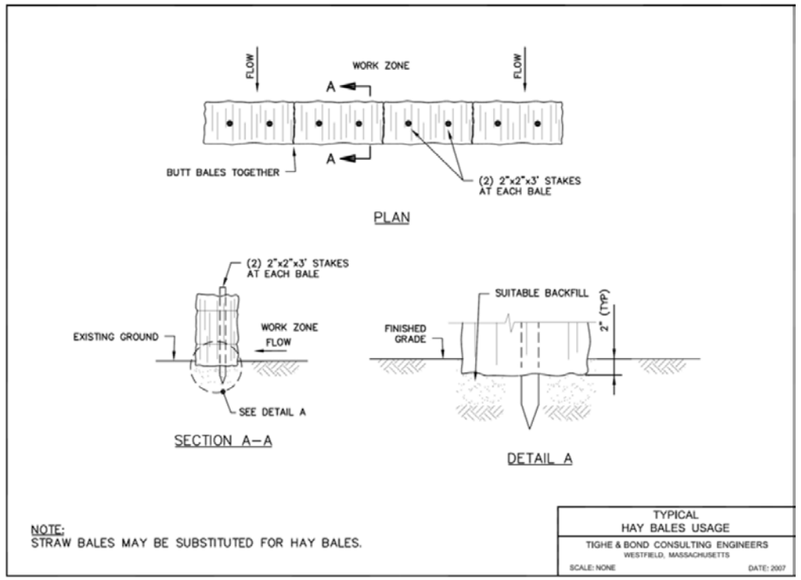

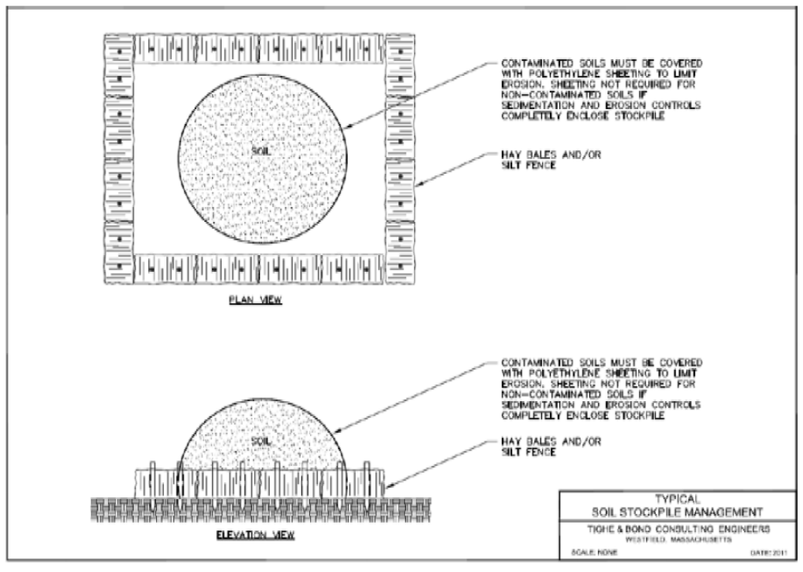

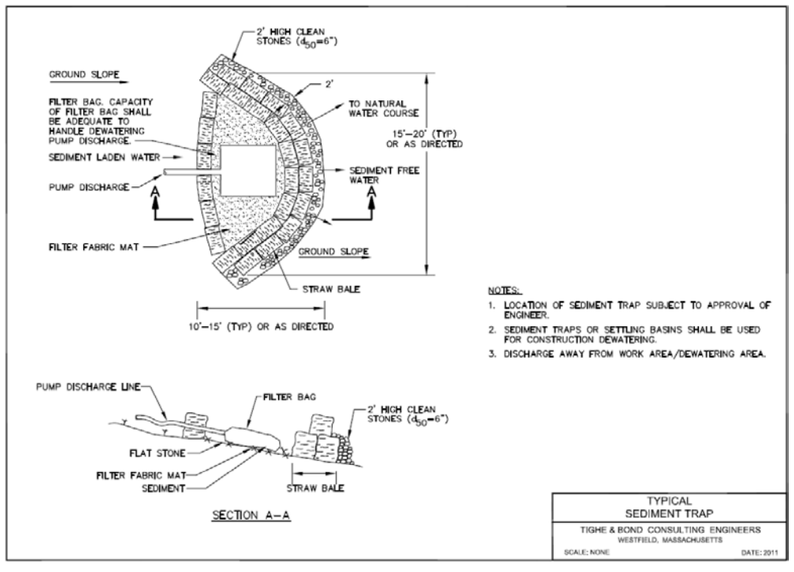

Note: This sheet depicts BMPs from Eversource's "*BMP Manual: Connecticut (Construction and Maintenance Environmental Requirements)*" that are typical for substation and related modification work. Other BMPs in this manual may apply on a site-specific basis.

Exhibit 4:

Sedimentation and Erosion Control Details

North Bloomfield Substation

Development & Management Plan

Modifications to the Rood Avenue Substation and Related Transmission Line Connections, Bloomfield Substation, and North Bloomfield Substation

July 2016 No Scale

EVERSOURCE ENERGY

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Exhibit 5

State Species of Concern: Mitigation Protocols

North Bloomfield Substation

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This Exhibit has been redacted because it contains confidential Natural Diversity Data Base information (CT DEEP).

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