MUNICIPAL CONSULTATION FILING

for the

MILVON TO WEST RIVER RAILROAD TRANSMISSION LINE 115-kV REBUILD PROJECT

City of Milford, Town of Orange, City of West Haven, City of New Haven
New Haven County, Connecticut

VOLUME 1: DESCRIPTION OF PROPOSED PROJECT

October 2021

Submitted to:

Chief Elected Officials of the Municipalities of Milford, Orange, West Haven, and New Haven

Prepared By:

THE UNITED ILLUMINATING COMPANY

Provided in accordance the pre-application process (Connecticut General Statutes Section 16-50l(e)) for filing an Application to the Connecticut Siting Council for a Certificate of Environmental Compatibility and Public Need for an Electric Transmission Facility.

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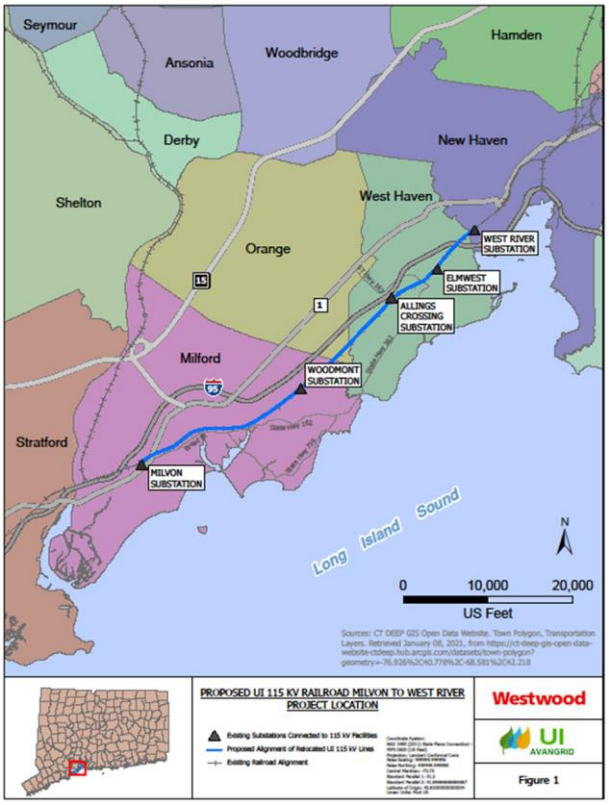
MILVON TO WEST RIVER RAILROAD TRANSMISSION LINE 115-kV REBUILD PROJECT

CITY OF MILFORD, TOWN OF ORANGE, CITY OF WEST HAVEN, CITY OF NEW HAVEN

EXECUTIVE SUMMARY

Figure 1: Project Area

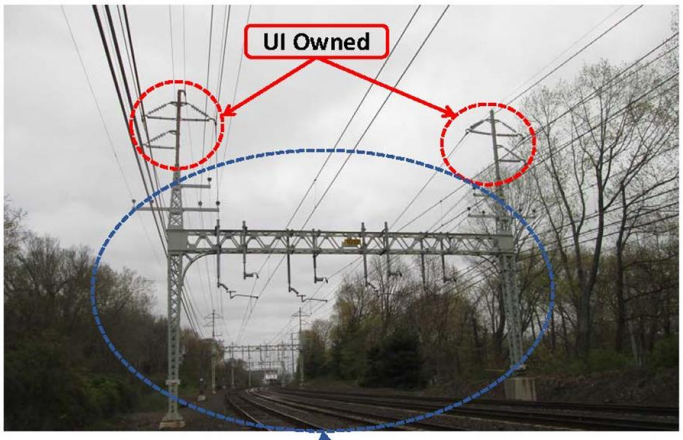


Proposed Project: To enhance the reliability and resiliency of the electric transmission grid, both in Connecticut and regionally, The United Illuminating Company (UI or the Company) proposes to rebuild approximately 9.5 miles of its two existing single-circuit 115-kilovolt (kV) overhead transmission lines that extend southwest-northeast within the Connecticut Department of Transportation's (CT DOT) Metro-North Railroad (MNR) corridor between the Company's existing Milvon Substation (located in the City of Milford) and West River Substation (located in the City of New Haven), all in southern New Haven County, Connecticut (refer to Figure 1). The existing 115-kV lines are aligned on bonnet structures on top of the northern and southern support columns for CT DOT's existing railroad catenary structures. The CT DOT owns in fee the corridor within which the MNR railroad lines and the UI 115-kV lines are located. CT DOT has an agreement with UI regarding the co-location of the 115-kV lines within its property.

Referred to as the ***Milvon to West River Railroad Transmission Line 115-kV Rebuild Project*** (Project), UI's proposed upgrades will relocate and rebuild the existing 115-kV lines from the bonnets fastened on top of the railroad catenary structures to independent new double-circuit self-supporting steel monopoles, located north of the railroad tracks, mostly within the CT DOT corridor. As part of the Project, UI also will interconnect the rebuilt 115-kV lines to five existing UI substations (Milvon, Woodmont, Allings Crossing, Elmwest, and West River substations, all located adjacent to the railroad corridor and presently connected to the existing 115-kV transmission lines); modify or remove certain existing transmission line structures situated along both the north and south sides of the MNR tracks; and decommission and remove the existing 115-kV facilities from the railroad catenary structures. Collectively, the location of the work both within and north/south of the CT DOT corridor is referred to herein as the "Project area". The Project is part of UI's long-term plan for relocating its electric transmission facilities from railroad catenary structures along the CT DOT corridor in Fairfield and New Haven counties and is consistent with recent federal commitments to modernize the nation's power grid to facilitate the transmission and delivery of clean and resilient energy to consumers.

History of UI Transmission Lines within the CT DOT Corridor: UI's Milvon-West River 115-kV lines are currently located within the CT DOT railroad corridor, on top of 186 overhead catenary structures that span the MNR rail lines.[1] The railroad catenary structures consist of heavy-duty steel lattice gantries (bridges) that extend above the railroad tracks and support overhead wires that supply electricity to the MNR rail lines. The catenary structures, which are owned by CT DOT and operated by MNR, were originally built between 1912 and 1914 to support signal and feeder wires for the electric operation of the trains.

Figure 2: Representative Catenary Structure with UI Facilities



UI attached 69-kV transmission lines to the catenary structures in the 1940s. At that time, UI constructed support columns, referred to as "bonnets", on top of either end of the CT DOT catenary structures, and then installed the 69-kV transmission lines on the bonnets, along with shield wires for lightning protection. In the 1980s, UI re-conductored the lines for 115-kV service. Today, one of the 115-kV lines is located on the northern catenary support column bonnet, while the other line is situated on the bonnet on the southern catenary support column.

Pursuant to a lease agreement between UI and CT DOT, UI owns the bonnets, along with the transmission line conductors, shield wires, insulators, and hardware. Figure 2 provides a representative view of a catenary structure with associated UI bonnets and facilities. The catenary structures with the UI bonnets and 115-kV facilities are typically about 60 feet tall, but in some cases reach heights over 80 feet.

In the 40 years since UI upgraded the lines on the catenary bonnets to 115-kV, various modifications have been made to the railroad electrical system, the catenary structures, and the transmission lines. For example, new railroad trolley wires, communications lines, and fiber were installed, increasing the mechanical loading on the catenary structures. Further, in some locations between Milvon and West River substations, to conform with current electrical industry standards, and improve system reliability based on system planning studies, UI removed small portions of the 115-kV lines from certain catenary structures and installed the lines on independent transmission line structures, adjacent to the railroad tracks. These structures, which include lattice steel towers and monopoles, range from approximately 60 feet to 140 feet in height.

Need for the Project: Given the age of the underlying infrastructure, the UI bonnets and related transmission line infrastructure as well as the overall mechanical loading on the catenary structures, UI conducted engineering analyses to evaluate the condition of the portion of the infrastructure that supports the 115-kV lines. Those analyses determined that the portions of the existing structures that support the transmission lines exhibit age-related physical limitations and that, to maintain the reliability of the bulk transmission grid, the 115-kV transmission lines must be rebuilt to meet current

[1] Within the CT DOT-owned corridor, MNR operates the rail lines, providing passenger service in Connecticut, and serving as a "host railroad" to Amtrak and freight carriers that also use the tracks in the Project area.

National Electrical Safety Codes (NESC) and UI standards which includes the ability to withstand extreme weather conditions (e.g., hurricane category 3 loads).

UI commissioned additional engineering studies, which led to the selection of the proposed Project - that is, rebuilding the 115-kV lines in a double-circuit configuration on monopoles and removing the existing 115-kV lines from the catenary structures.

Proposed Project: The Project will involve the following components:

- Rebuild the existing 115-kV lines between Milvon and West River substations in a double-circuit configuration, supported on galvanized steel monopole structures, and including optical groundwire (OPGW) and shield wire. A total of 143 new double-circuit monopoles and 16 new single-circuit monopoles will be installed. The monopoles will be offset from the catenary structures based on the CT DOT corridor width, clearance requirements specified by CT DOT / MNR, and electrical clearance standards. This offset will vary based on location, but on average will be 25 feet. The new structure heights will vary by location, ranging from 70 to 170 feet (the taller structures are required for clearance near the West Haven Train Station and to span elevated portions of Interstate 95).

- Remove or modify certain existing steel monopoles that were installed within the CT DOT corridor as part of previous UI transmission upgrade projects. In accordance with CT DOT's request, ownership of the UI steel and lattice structures that remain in the rail corridor after UI equipment has been removed will be transferred to CT DOT.

- Decommission and remove the existing 115-kV facilities on the railroad catenary structures, including (in most locations) the shield wire. In areas where the shield wire will remain to provide the MNR facilities with protection from lightning, the ownership of the shield wire will be transferred to CT DOT.

Specifically, 140 new double-circuit monopoles and six new single-circuit monopoles will be located north of and parallel to the railroad tracks, mostly on CT DOT property. In addition, 13 new 115-kV monopoles (three new double-circuit monopoles and 10 single-circuit monopoles) will be located on CT DOT property on the south side of the railroad tracks.

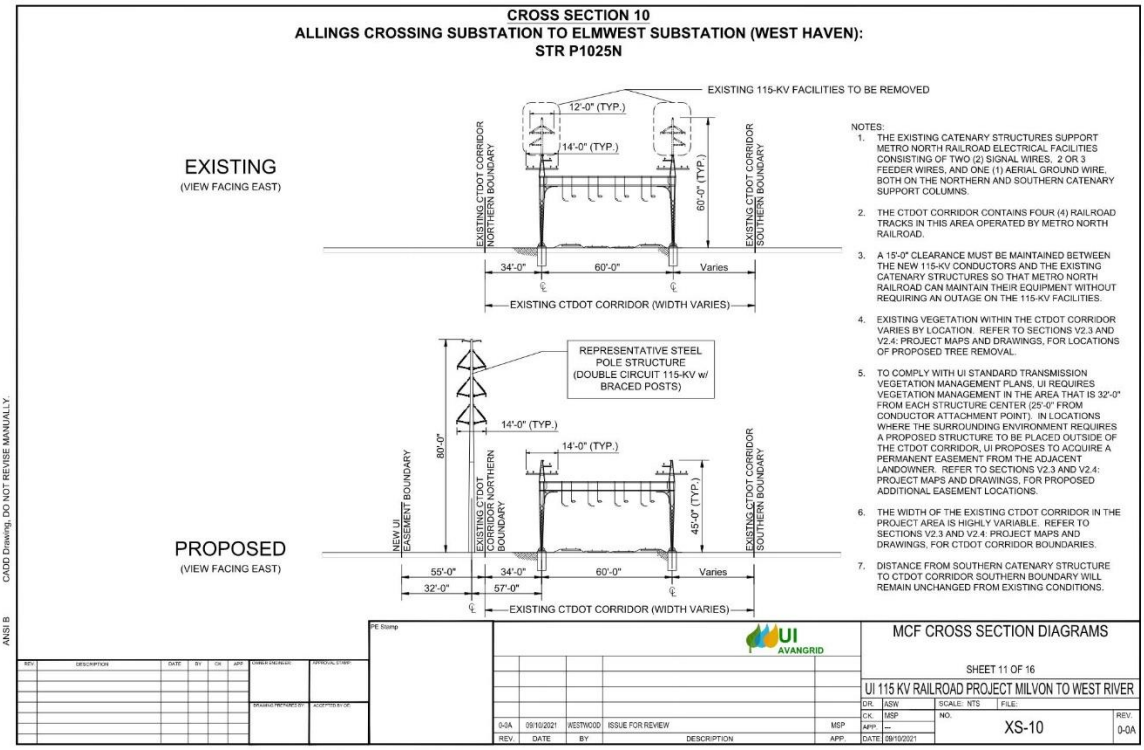
The total width of the CT DOT property varies, ranging from 90 to 260 feet, but generally is between 125 and 175 feet wide. Moreover, the railroad tracks are not uniformly located in the center of the CT DOT property. Along the northern portion of the CT DOT corridor, where UI proposes to align most of the rebuilt 115-kV lines, the distance between the northern catenary support column and the edge of the CT DOT property ranges from 5 to 145 feet. Along the southern side of the corridor, the distance from the southernmost catenary support column to the edge of the CT DOT property varies from 10 to 105 feet.

As a result, because of constraints such as narrow CT DOT corridor width, location of railroad spur lines, or terrain, in some locations, UI will have to acquire new permanent easements from the owners of properties that abut the northern CT DOT property boundary. Additional new permanent easement also will be required at select locations south of the CT DOT corridor (e.g., near UI's Elmwest and West Haven substations). The new easements will be required to adhere to mandated clearance distances between the 115-kV conductors, the railroad tracks, and the edge of the UI easement, as well as for UI's operation, maintenance and repair of the utility infrastructure.

Only 13 new double-circuit monopoles will be located on property outside of CT DOT's railroad corridor; 11 of these structures will be on properties located north of and adjacent to the northern CT DOT property boundary, while two structures will be located on properties south of the CT DOT railroad corridor boundary. Approximately 17.5 acres of new permanent easements will be required to accommodate the new structures and maintain conductor clearances.

Figure 3 is a representative cross-section depicting the existing and proposed 115-kV lines in relation to the CT DOT corridor and an area where UI must acquire additional permanent easements, directly north of the CT DOT property boundary.

Figure 3: Representative Cross-Section of Proposed Rebuilt 115-kV Lines



Construction Activities: UI plans to construct the Project in four segments, with each segment rebuilt and placed into service prior to the initiation of most work on the next segment. UI's proposed sequence for segment construction, which reflects coordination with CT DOT, is:

1. Elmwest Substation to West River Substation (1.25 miles)
2. Allings Crossing Substation to Elmwest Substation (1.24 miles)
3. Milvon Substation to Woodmont Substation (4.05 miles)
4. Woodmont Substation to Allings Crossing Substation (2.91 miles)

Temporary access roads will be required to reach each new structure site, as well as the catenary structures along the north and south side of the railroad tracks. Work pads also will be required to stage construction activities at each site. In addition, vegetation removal, including trees, will be required in certain locations.

Along each segment, most of the existing 115-kV facilities on the south side of the railroad tracks will not interfere with placing the rebuilt lines into service. As a result, the removal of the existing facilities

located along the south side of the railroad tracks may be performed at the same time as work on the next segment. Restoration of the areas affected by construction is expected to proceed by segment, after the new 115-kV facilities are installed and the existing facilities are removed. Table 1 summarizes the general sequence of Project construction activities along each segment (the actual sequence of construction work may vary).

Table 1: General Project Construction Sequence

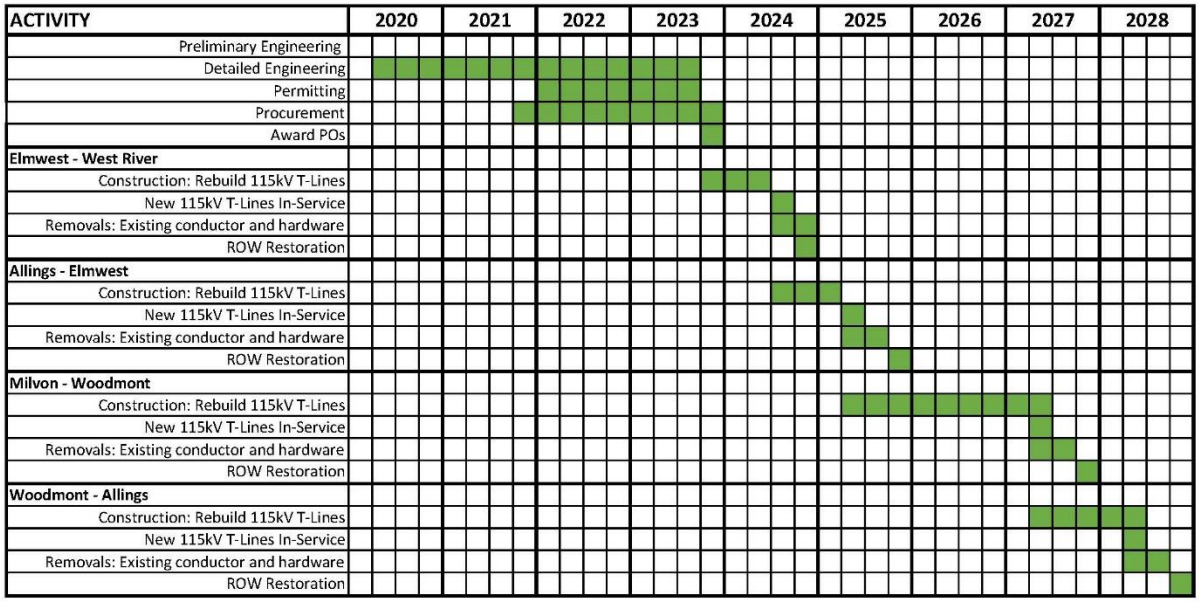
TYPICAL PRE-CONSTRUCTION ACTIVITIES (PER SEGMENT)
• Survey and stake construction work areas, including edge of CT DOT property and UI easement (where different) and proposed structure locations
• Confirm and re-flag environmental resource areas (e.g., wetland and watercourse boundaries) or other sensitive areas to be avoided
• Mark vegetation clearing limits
• Locate and mark utilities
TYPICAL CONSTRUCTION ACTIVITIES (PER SEGMENT)
• Establish laydown/material staging areas / contractor yard (s) to support the construction effort
• Establish temporary erosion and sedimentation controls as needed
• Remove or mow vegetation, where necessary
• Install temporary matting in wetlands as needed; install temporary bridges to traverse small watercourses
• Establish or upgrade access roads to new monopole sites
• Create a level work pad at each monopole site, as well as at conductor pulling sites and if necessary, at guard structure sites
• Install new structure foundations and assemble/erect new structures; remove some UI facilities from northern catenary structures as necessary
• Install conductors and OPGW
• Install rebuilt 115-kV line connections to UI substations
• Place the rebuilt 115-kV lines in service (by segment)
• Remove the existing 115-kV line facilities from the catenary structures. This activity will include establishing temporary construction access and work pads at the locations of the facilities to be removed. Existing access, upgrades to existing access, or new access roads will be required.
• Remove existing monopoles, lattice towers, and w-flange structures that are no longer required
• Remove temporary construction access and work pads along with associated matting and bridges
• Perform final clean-up and restore/stabilize areas affected by construction to pre-construction conditions (e.g., by seeding and re-vegetating as needed).
• Maintain erosion and sedimentation controls until areas affected by construction are stabilized

The Project will comply with the latest revisions of the NESC, the Institute of Electrical and Electronic Engineers and the American National Standards Institute; good utility practice; Connecticut regulations covering the method and manner of construction; UI's specifications and final engineering plans; and the conditions of regulatory and siting approvals obtained for the Project.

Overall Project Schedule and Work Hours: UI anticipates that the rebuilt 115-kV lines will be in service in the third quarter of 2028. At that time, the existing 115-kV facilities are expected to have been removed from the catenary structures; however, final restoration (e.g., site stabilization, reseeding, landscaping as appropriate) is likely to extend into 2029.

Table 2 summarizes the proposed Project schedule.

Table 2: Project Schedule



Project construction work hours will be determined based on consultations with MNR, taking into full consideration the necessary transmission line and railroad outages. Standard construction hours, for work that will not require railroad or transmission line outages, will be 7 AM to 7 PM, Monday through Saturday. However, UI anticipates that nighttime construction shifts will be required for work that will require railroad track outages (e.g., activities directly adjacent to the railroad tracks or on the catenary structures to remove the existing 115-kV facilities). Further, for some critical Project activities (e.g., those that must be completed during scheduled transmission line or railroad outages), work will be required 24 hours a day, on any day of the week.

Environmental Setting, Impacts, and Mitigation: The proposed 115-kV lines will extend along the CT DOT railroad corridor for approximately 9.5 miles, traversing southwest-northeast from Milvon Substation to West River Substation through southern New Haven County. The railroad was established more than 150 years ago and, as a result, a range of land uses adjoin the linear CT DOT corridor property.

Overall, the Project borders highly -developed suburban and urban areas, crossing 5.03 miles in the City of Milford, 0.46 mile in the Town of Orange, 3.86 miles in the City of West Haven, and 0.10 mile in the City of New Haven. Land in the vicinity of the CT DOT corridor include a mix of residential, commercial, and industrial developments. The railroad corridor also crosses U.S. Route 1, State Routes 162 and 10, and Interstate 95 and transits various watercourses and wetlands, both tidal and freshwater. The railroad and UI's existing 115-kV lines span all watercourses, including the Wepawaug, Indian, and West rivers.

To identify and evaluate the potential impacts of the Project, UI revaluated existing environmental features in the Project area and conducted studies of ecological, cultural, and visual resources within and adjacent to the CT DOT corridor and specifically in the areas that would be affected by the proposed Project. Information was compiled regarding ecological resources (geology, soils, groundwater, inland and tidal wetlands and watercourses, floodplains, vegetation and wildlife, fisheries, federal and state listed species), land uses (including recreational and community facilities), cultural resources, coastal resources, visual resources, transportation and air quality

UI's analyses determined that the Project is consistent with the long-established use of the CT DOT property for joint transportation and utility infrastructure purposes. The construction of the Project will result in primarily short-term impacts, which will be localized to the vicinity of construction sites. Potential impacts during construction will include temporary disturbance to subsurface and surficial (soil) materials, as well as inland and tidal wetlands and watercourses; removal of vegetation, including some mature trees; temporarily increased noise and air emissions associated with construction activities (e.g., drilling for structure foundations) and the operation of construction equipment/vehicles; traffic congestion due to the movement of construction equipment/vehicles on local roads leading to work sites; and potential inconvenience to railroad operations when rail outages are required. .

The Project will result in long-term impacts stemming from UI's acquisition of approximately 17.5 acres of new easement adjacent to the northern CT DOT property boundary, as well as the maintenance of the easement in vegetation consistent with the safe and reliable operation of the overhead transmission lines. Project construction will result in the removal of approximately 27 acres of forest vegetation, of which about 22 acres will be within UI's new permanent easement and thus will be managed in low-growth species, consistent with the operation of overhead transmission lines. The remaining forested areas affected by the Project construction are expected to revegetate naturally, ultimately returning to pre-construction conditions.

Based on UI's current plans, the Project also will affect water resources, resulting in approximately 0.3 acre of temporary impacts to small watercourses and approximately 4.7 acres of temporary impacts to wetlands. In addition, some new monopoles and permanent access roads must unavoidably be situated in water resources, resulting in an estimated 0.03 acre of permanent fill in watercourses and approximately 0.7 acre of permanent fill in wetlands. In addition, 10 new monopoles will be located in 100-year floodplains.

The Project also will result in a long-term change to the visual environment in the vicinity of the Project. Specifically, the proposed new double-circuit monopoles will be taller than then existing UI facilities on top of the catenary structures and thus will potentially be more visible from certain locations near the railroad corridor. The operation of the 115-kV lines will not cause any change to the ambient noise or air quality environment, coastal resources, or the transportation network,

To avoid or mitigate impacts associated with construction, UI will adhere to the conditions or permits and approvals from federal and state regulatory agencies, including the Connecticut Siting Council (CSC or the Council), the Connecticut Department of Energy and Environmental Protection (CT DEEP), U.S. Army Corps of Engineers (USACE), the U.S. Fish and Wildlife Service, and the Connecticut State Historic Preservation Office. Accordingly, UI will prepare Project-specific plans for stormwater management and control; the protection of state and federally listed plant and wildlife species; and the management of materials (e.g., excess spoil) generated during construction. UI also has been coordinating with and will continue to consult with the CT DOT and MNR to plan the Project to minimize impacts to railroad operations.

Additional measures to avoid or minimize environmental effects may be identified as part of the ongoing engineering design and constructability reviews and consultations with the municipalities and/or regulatory agencies, as well as during the process of submitting applications to and obtaining approvals for the Project from regulatory agencies such as the CSC, CT DEEP, and USACE.

Electric and Magnetic Fields: UI commissioned a study to measure the electric and magnetic fields (EMF) associated with the existing 115-kV lines and to model the anticipated EMF levels from the rebuilt 115-kV facilities. All calculated EMF levels associated with the Project will be a small fraction of those recommended for the general public by international health-based standards. The study found

that compared to existing overall EMF levels on both the north and south sides of the CT DOT corridor, the Project will generally result in a decrease in overall EMF levels. Compared to existing EMF levels, the post-construction EMF value calculations demonstrate a decrease in the existing EMF levels at the southern CT DOT corridor boundary and a generally minor increase at the northern CT DOT corridor boundary/new UI easement boundary. The Project design that UI proposes reconfigures the transmission lines to minimize magnetic fields and applies siting and design features that are consistent with the CSC's EMF Best Management Practices.

Alternatives: The proposed Project was selected as a result of a process whereby various alternatives were identified and assessed. UI first evaluated the portions of the railroad catenary structures supporting existing 115-kV lines and then identified and analyzed a range of alternatives, including No Action, line rebuild options both on and independent of the existing railroad catenary/bonnet structures, underground cable systems, and 115-kV overhead configuration options.

UI first determined that the consequences of the "No Action" (i.e., "do nothing") option would pose unacceptable risks to the resiliency of the local and regional electric transmission system and the provision of reliable service to customers (e.g., the structural failure of the existing UI support structures could result in a significant failure of the 115-kV circuits and/or a loss of power to one or more of the substations along the railroad corridor). The Company then considered rebuilding the existing 115-kV lines entirely in an underground double-circuit cable configuration (either along the CT DOT corridor or along roads); however, any underground cable system was found to be impractical because of significantly higher costs (compared to an overhead line) and environmental/social impacts. UI also eliminated from consideration any alternative that would involve rebuilding the 115-kV lines on an entirely new ROW, because of the lack of available space for such a corridor in the well-developed urban/suburban Project area.

UI then determined that continuing to co-locate the 115-kV lines predominantly within the CT DOT property would be the most practical rebuild approach and thus next identified and investigated four primary alternatives, including the proposed Project:

- *Alternative 1*: Install new double-circuit monopoles to support the 115-kV lines that are presently located on both the north and south catenary structure bonnets, with the new monopoles installed within and in some areas adjacent to the CT DOT property north of the railroad tracks (preferred solution = proposed Project).
- *Alternative 2*: Install new single-circuit monopoles, to separately support the north and south circuits and to be located on either side of the CT DOT railroad corridor.
- *Alternative 3*: Rebuild one 115-kV circuit on new single-circuit monopoles, making structural modifications to the catenary structures / bonnets to allow the continued support of the other circuit.
- *Alternative 4*: Rebuild the existing catenary structures / bonnets completely to correct all structural deficiencies to continue to support both 115-kV lines.

UI's analyses found that Alternatives 3 and 4 would involve significantly higher costs (approximately 200% more) than Alternatives 1 and 2, because of the more complicated construction process and longer schedule associated with the extensive coordination with CT DOT/MNR regarding the catenary structure rebuilds. Because of the overriding cost and schedule disadvantages, Alternatives 3 and 4 were eliminated from consideration. Alternatives 1 and 2 were evaluated further, taking into consideration electric transmission line design criteria (required clearance between the railroad tracks and adjacent public/private properties; conductor blowout specifications), the need for additional

permanent easement versus alignment of the new structures on CT DOT property, cost, and schedule. Based on these factors, Alternative 1 was selected.

Thereafter, UI conducted more detailed engineering design studies of Alternative 1 to refine the Project design, particularly the placement and configuration of the new monopoles. During this process, UI identified and assessed options for the alignment of the proposed double-circuit monopoles at various locations, including areas where UI recently installed new steel monopoles on the south side of the railroad tracks (as part of reliability projects), at substation interconnections, and in areas of environmental sensitivity (wetlands, land uses). For each of these locations, several options were evaluated taking into consideration cost, constructability, environmental resources, real estate, and future operation and maintenance requirements.

In summary, based on the results of the alternatives evaluation process, the proposed Project represents the optimal solution for upgrading the 115-kV lines between Milvon and West River substations, thereby maintaining the electric system to the benefit of Connecticut and New England consumers. The proposed Project represents the least cost, least environmentally damaging alternative for UI's 115-kV transmission line upgrades, continuing the co-location of the proposed new double-circuit monopoles primarily within the CT DOT property. Thus, the Project will be consistent with the historical use of the linear railroad corridor for both utility and transportation uses and will maintain the interconnections between the 115-kV lines to UI's existing Milvon, Woodmont, Allings Crossing, Elmwest, and West River substations.

Estimated Project Costs and Facility Service Life: The estimated capital cost for the siting, design, and construction of the Project is approximately $230 million. The Project transmission facilities are expected to have a service life of approximately 40 years.

Purpose of this Municipal Consultation Filing (MCF): In the first quarter of 2022, UI plans to submit to the CSC the Project's *Application for a Certificate of Environmental Compatibility and Public Need* (Application). At least 60 days prior to the submission of such an application, the Council requires applicants to provide project information, in the form of a MCF, to the potentially affected municipalities.

This MCF is a mechanism for informing municipal representatives about the proposed Project, for providing information about the Project planning, and for soliciting comments about the Project. Accordingly, UI is providing this MCF, for review and comment, to representatives of the municipalities of Milford, Orange, West Haven, and New Haven.

The MCF includes detailed information regarding UI's proposed Project plans, as well as background research regarding environmental, cultural, and visual resources and EMF. The MCF also includes a map volume that contains aerial-based maps of the proposed Project route and nearby environmental and other resources, as well as engineering drawings (cross-sections) of both the existing location of the UI facilities on the MNR catenary structures and the proposed location of the rebuilt 115-kV lines, in a double-circuit configuration, north of the railroad tracks.

The MCF process extends for 60 days, during which time UI will arrange to meet with municipal personnel to obtain input regarding the Project. UI's Project Application to the CSC, which will follow a similar format to this MCF, will incorporate responses to comments received during the MCF process.

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1. PROJECT OVERVIEW AND NEED

1.1 PROJECT BACKGROUND, LOCATION, AND PURPOSE

1.1.1 Project Need and Location

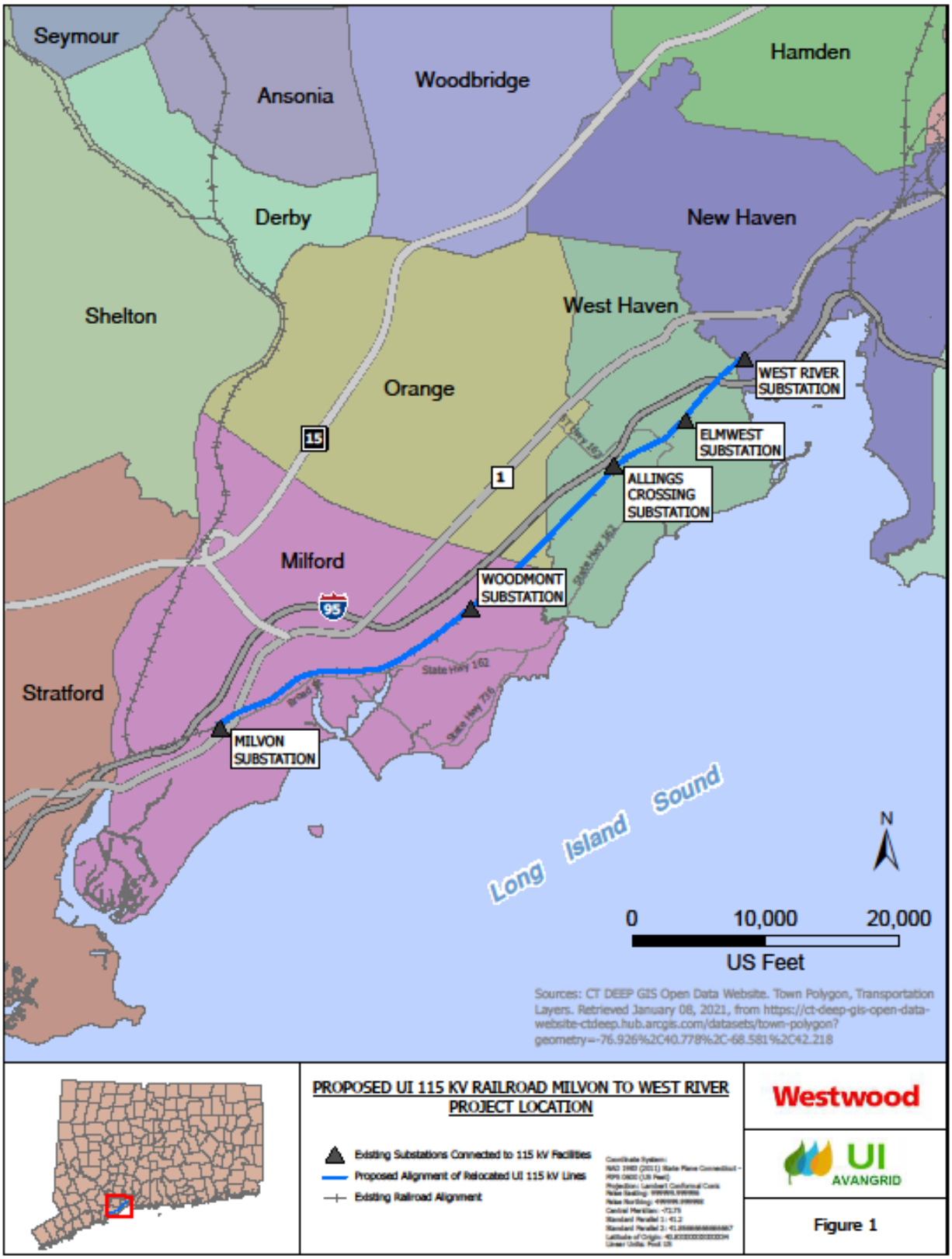
The United Illuminating Company (UI or the Company) proposes to rebuild its existing two single-circuit 115-kilovolt (kV) overhead lines that extend southwest-northeast within the Connecticut Department of Transportation's (CT DOT's) Metro-North Railroad (MNR) Railroad corridor between the Company's existing Milvon Substation (located in the City of Milford) and its existing West River Substation (located in the City of New Haven), all in New Haven County, Connecticut. The existing 115-kV lines are aligned on top of the northern and southern support columns of the existing railroad catenary structures. The CT DOT owns in fee the corridor within which the MNR railroad lines operate and the UI 115-kV lines are located.[2]

Referred to as the **Milvon to West River Railroad Transmission Line 115-kV Rebuild Project (Project)**, UI's proposed upgrades will relocate and rebuild the existing 115-kV lines from the railroad catenary structures to new double-circuit self-supporting steel monopoles, located mostly along the northern side of the railroad corridor. As part of the Project, UI also will interconnect the rebuilt 115-kV lines to five existing UI substations (all located adjacent to the transmission lines); modify or remove certain existing transmission line structures situated along both the north and south sides of the MNR tracks (all within the CT DOT corridor); and decommission and remove the existing 115-kV facilities from the railroad catenary structures. Figure 1-1 illustrates the general location of the Project.

UI's existing 115-kV lines extend approximately 9.5 miles (19 circuit miles) between Milvon and West River substations and traverse portions of southern Milford, Orange, West Haven, and New Haven. The lines also connect UI's Woodmont Substation (located adjacent to the railroad corridor in Milford), as well as UI's Allings Crossing and Elmwest substations (situated adjacent to the railroad corridor in the West Haven).

[2] CT DOT owns the corridor within which the rail lines are located and supports the operation of the MNR facilities, including those on the New Haven Main Line (which extends from New Haven to the New York border). Amtrak operates rail service in the Project area over the MNR tracks via an agreement with CT DOT; the service that Amtrak provides is an integral part of the New England regional transportation system. Specifically, MNR is a "host railroad", allowing Amtrak to operate its Acela and Northeast Regional rail service over the tracks in the Project area. CT DOT also has agreements to allow freight transportation to use the railroad tracks.

Figure 1-1: Project Location



Collectively, the distribution system provides electricity to approximately 57,000 UI customers in Milford, Orange, and West Haven.

The Project will enhance the reliability and resiliency of the electric transmission grid, both in Connecticut and regionally, and is part of UI's long-term plan for relocating its electric transmission facilities from railroad catenary structures along the CT DOT corridor in Fairfield and New Haven counties.[3] The Project also is consistent with recent federal commitments to modernize and make resilient the nation's power grid to facilitate the delivery of clean energy to electricity consumers.

1.1.2 Project Background

Historical Overview: UI Transmission Facilities and the Railroad Corridor

UI's Milvon-West River 115-kV lines are currently located within the CT DOT railroad corridor, on top of 186 catenary structures that span the railroad tracks. The railroad catenary structures consist of heavy-duty steel lattice gantries (bridges) that extend above the railroad tracks and support overhead wires that supply electricity to the trains. The catenary structures, which are owned by CT DOT and operated by MNR, were originally built between 1912 and 1914 to support MNR signal and feeder wires for the electric operation of the trains. These catenary structures also support an aerial ground wire, which acts as a shield wire and provides lightning protection for the railroad's signal and feeder wires.

UI attached 69-kV transmission lines to the catenary structures in the 1940s. At that time, UI constructed support columns, referred to as "bonnets", on top of either end of the CT DOT catenary structures, and then installed the 69-kV transmission lines on the bonnets, along with shield wires for lightning protection. UI's transmission lines were upgraded to 115-kV in the 1960s. Over the years, in some locations, the original shield wire that was installed to protect the MNR signal and feeder wires was removed or lowered.

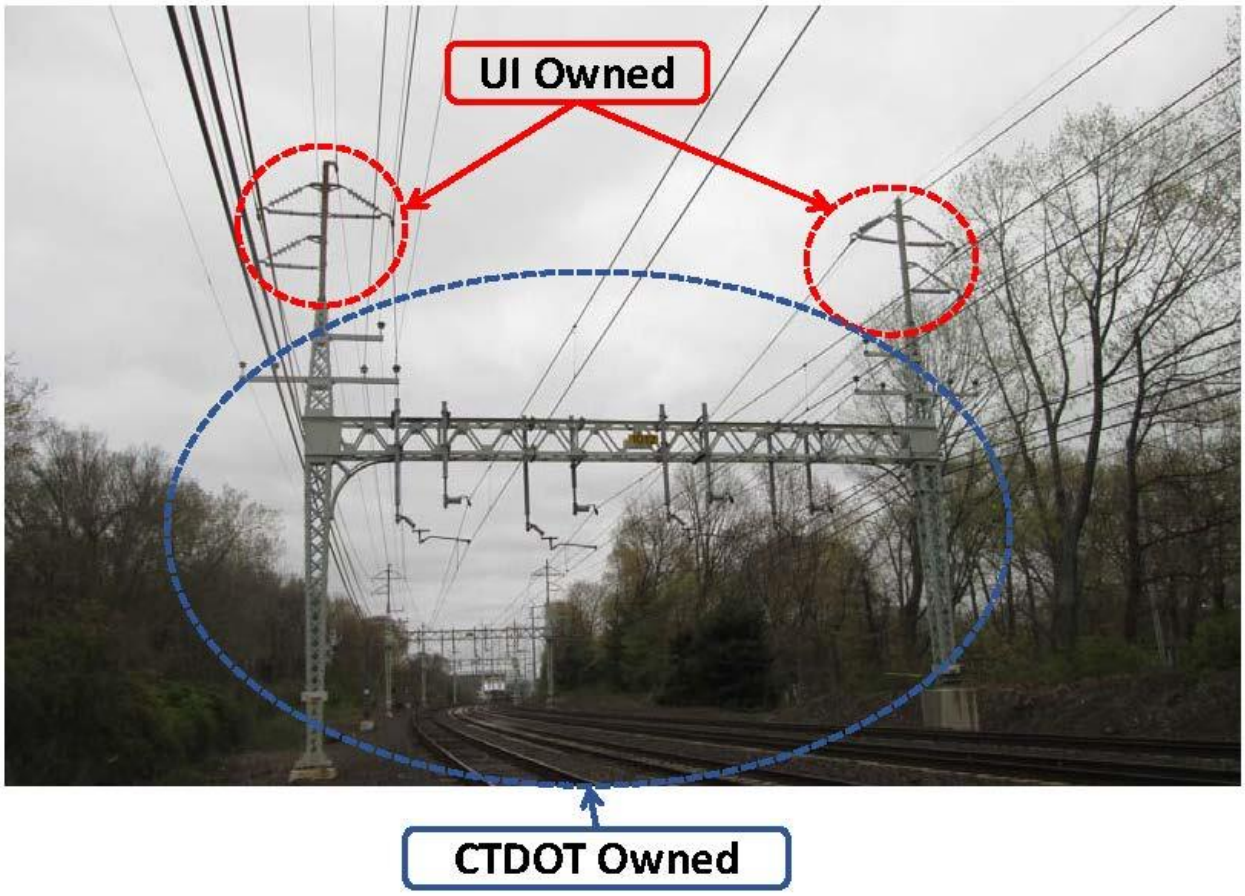
One of the 115-kV lines is situated on the bonnets on the northern catenary support columns, while the other line is located on bonnets on the south side of the catenary support columns. The 115-kV lines between Milvon and West River substations are assigned different UI circuit designations depending on location in relation to substation connections. For ease of reference in this document, the lines are

[3] To date, UI has removed its 115-kV lines from catenary structures along 2.3 miles of the CT DOT railroad corridor from Congress Substation in the City of Bridgeport to Baird Substation in the Town of Stratford (CSC Petition No. 1176) and along approximately 1.9 miles of the CT DOT railroad corridor from Baird Substation to just west of the Housatonic River, also in Stratford (CSC Petition No. 1304).

referred to collectively by location on the catenary structure bonnets: that is, the "northern 115-kV line" and the "southern 115-kV line" or, together, "the 115-kV lines".

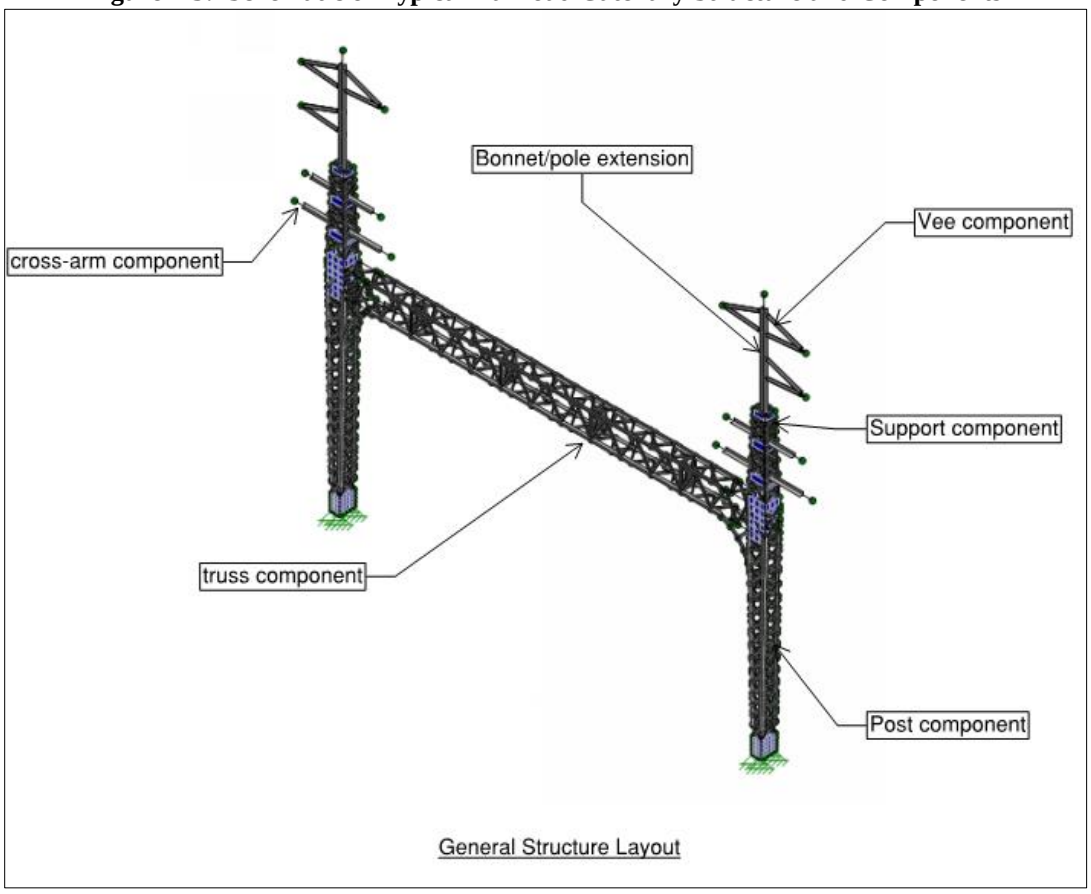
The bonnets and the transmission lines are owned by UI. Specifically, pursuant to the lease agreement between UI and CT DOT/MNR[4], the catenary structures support the UI-owned bonnet/pole extensions, along with conductors, shield wires, insulators, and insulator hardware. In all, these facilities typically average 60 feet in height. Figures 1-2 and 1-3 provide, respectively, a representative illustration and schematic of the catenary structures and the existing bonnets and 115-kV lines.

Figure 1-2: Representative View of Railroad Catenary Structure and UI Bonnets with 115-kV Lines



[4] UI's lease agreement for the use of the railroad corridor is with CT DOT, whereas its maintenance agreement is with MNR.

Figure 1-3: Schematic of Typical Railroad Catenary Structure and Components



Over the past 40 years, UI's transmission lines on the catenary structures have been modified and railroad operations also have evolved. In the 1980s, UI re-conductored the 115-kV lines (with no increase in mechanical loading on the catenary structures). Since then, various modifications have been made to the 115-kV lines, the railroad electrical system, and the catenary structures. For example, since the 1980s, new trolley wires for the railroad, communications lines, pully tensioning system components, and fiber were installed, increasing the mechanical loading on the catenary structures.

Taking into consideration the mechanical loading and the need to maintain conformance with national electric reliability codes, within the past 15 years, UI removed small portions of the 115-kV lines from certain catenary structure bonnets and rebuilt lines on monopoles near the railroad tracks, within the CT DOT corridor. Specifically, such monopoles were installed near Milvon and Allings Crossing substations, as well as between UI's Baird and Congress substations in Bridgeport, Milvon to Devon Tie substation in Milford, and the Housatonic River Crossing to Baird Substation in Stratford. These monopoles range in height from approximately 60 feet to 185 feet, with the tallest structures near the

Housatonic River Crossing in Stratford. In addition, near Interstate 95 in West Haven, the 115-kV lines are presently supported on lattice steel towers, which are 75 feet to 100 feet tall.

Milvon-West River and CT DOT Railroad Corridor Characteristics

The 115-kV transmission lines extend along the CT DOT railroad corridor through four municipalities and are connected to UI's five substations adjacent to this corridor, as summarized below:

Feature	Milford	Orange	West Haven	New Haven
Transmission Line Length (Approximate Miles)	5.03	0.46	3.86	0.10
Substations	Milvon Woodmont	N/A	Allings Crossing Elmwest	West River

The mileage between different Project segments (substation to substation) are approximately as follows:

Milvon – Woodmont:	**4.05 miles**
Woodmont – Allings Crossing:	**2.91 miles**
Allings Crossing – Elmwest:	**1.24 miles**
Elmwest – West River:	**1.25 miles**

Between Milvon Substation and West River Substation, the width of the CT DOT-owned corridor varies, as does the number of railroad tracks (three or four) within the corridor. In general, the CT DOT corridor ranges in width from approximately 125 feet to 175 feet. From the northern catenary support structures, the distance to the northern edge of the CT DOT property varies in width from 5 to 145 feet, depending on location.

Rationale for the Project

In 2018, UI conducted engineering analyses of the 115-kV lines between Milvon and West River substations. The purpose of these analyses, which included field observations of the catenary support structures, was to evaluate the asset condition of the portions of the existing catenary structures that support the 115-kV lines, given the as-built railroad mechanical loadings, as well as the age of both the bonnets and the steel catenary support system.

The analyses found that the existing structural support system for the UI transmission lines exhibits various physical limitations (e.g., age-related deterioration, corrosion). UI then identified and evaluated alternative solutions for upgrading the lines, ultimately determining that, to maintain the reliability of

the bulk transmission grid, the 115-kV lines must be relocated off the bonnets on the catenary structures and rebuilt using new galvanized steel monopoles, conductor, and optical ground wire (OPGW)[5].

Specifically, UI concluded that the 115-kV lines must be rebuilt to meet current National Electrical Safety Codes (NESC) and UI standards which includes the ability to withstand extreme weather conditions (e.g., hurricane category 3 loads). After the 2018 evaluations established the need for the Project, UI commissioned additional, more extensive analyses to refine the design and the location of the rebuilt 115-kV lines. These studies resulted in the identification of the proposed Project.

1.2 SUMMARY OF PROPOSED PROJECT FACILITIES

Along the approximately 9.5-mile railroad corridor between Milvon and West River substations, UI proposes to rebuild the 115-kV lines on primarily double-circuit monopoles, as well as to implement related Project modifications. The principal Project components will include:

- Rebuild the two existing 115-kV lines between Milvon and West River substations in a double-circuit configuration, supported on galvanized steel monopole structures, and including 72-fiber OPGW shield wire. A total of 143 new double-circuit monopoles will be installed. In addition, 16 new single-circuit monopoles will be installed to either maintain the existing 115-kV line substation interconnections or to support one of the re-built 115-kV lines at locations where existing single-circuit monopoles exist and will remain to support the second re-built 115-kV line. The new monopoles will be offset from the catenary structures based on the CT DOT corridor width, clearance requirements specified by CT DOT / MNR, and electrical clearance standards. This offset will vary based on location, but on average will be 25 feet. The new structure heights will vary by location but will generally range from 70 to 170 feet.

- Remove, partially remove, or modify (e.g., replace hardware) certain existing steel monopoles that were installed within the railroad corridor as part of previous UI transmission upgrade projects (i.e., UI's 2015 Milvon Take-Off Structure Replacement Project; FAC-08 Project; 2011 West Haven Train Station Project).[6]

- Decommission and remove the existing 115-kV facilities on the railroad catenary structures. Based on agreement with CT DOT / MNR, the bonnets on some of the southern catenary support structures may remain for MNR's use. Likewise, the UI shield wire may be lowered onto the catenary structures to provide protection from lightning in locations where MNR does not currently have its own shield wire. In such cases, the ownership of the bonnets and shield wire is expected to be transferred to CT DOT.

[5] OPGW is a dual-functioning cable that provides shielding for lightning protection on overhead transmission lines and also contains optical fibers that are used for telecommunication purposes. OPGW, which is placed above the electrical conductors, can be used in lieu of traditional static/shield/earth wires.

[6] After the removal of UI infrastructure, pursuant to an agreement with CT DOT, UI expects to transfer to CT DOT ownership of the structures that are not otherwise removed.

The new double-circuit monopoles will be located north of and parallel to the railroad tracks, mostly on CT DOT property. However, in some locations, because of constraints within the CT DOT corridor (e.g., Corridor width, presence of other facilities such as railroad spurs, terrain), UI will be unable to install and operate the new monopoles entirely within the CT DOT property while adhering to appropriate clearance distances between the 115-kV conductors, the railroad tracks, and the edge of the UI easement.

Further, at specific locations south of the CT DOT railroad corridor (e.g., near UI's substations), new monopoles must be located outside of the CT DOT property. In such areas, UI proposes to acquire new permanent easements[7] from the owners of properties adjacent to the CT DOT railroad corridor.

Based on UI's current Project plans (which reflect the results of engineering and field studies conducted to date), 10 of the new double-circuit monopoles and one new single-circuit monopole will be located on properties adjacent to and north of CT DOT's property. In addition, two new single-circuit monopoles will be located on properties adjacent to and south of CT DOT's railroad corridor. Approximately 16.25 acres of new permanent easements are expected to be required to accommodate these new structures (i.e., provide space for the monopoles; establish and maintain required conductor clearances and access to the permanent easement from adjacent properties).

Similarly, based on current Project plans, UI estimates that an additional approximately 1.25 acres of permanent easements will be required from property owners in order to access the rebuilt UI transmission lines in locations where the new monopoles are installed fully within the existing CT DOT corridor. Such access will be used both during construction and for ingress/egress to the 115-kV lines for long-term operation/maintenance purposes.

To minimize line outages and potential conflicts with railroad operations, UI proposes to rebuild the 115-kV facilities in four segments, extending from substation to substation. Along a segment, the new 115-kV facilities will be installed, connected to the substations on either end, and placed into service. The UI facilities on the northern catenary support columns will be removed in conjunction with this work. After a segment is energized, the existing 115-kV facilities located on the southern catenary support structures along that segment will be taken out of service, decommissioned, and removed.

[7] UI's standard permanent easements, as anticipated to be required for this Project, pertain to the transmission line structures, wire clearances, access, vegetation management, limitations on structures that can be placed on the easement (e.g., buildings, pools,), and protection from excavation, all as needed for UI's installation, maintenance, operation, and repair of the utility infrastructure.

1.3 ORGANIZATION AND PURPOSE OF THE MCF

The proposed Project is subject to the jurisdiction of the Connecticut Siting Council (Council or CSC) and other state and federal regulatory agencies. In the first quarter of 2022, UI plans to submit to the Council the Project's *Application for a Certificate of Environmental Compatibility and Public Need* (*Application*). Prior to the submission of such an application, the Council requires applicants to provide project information, in the form of a Municipal Consultation Filing (MCF), to the potentially affected municipalities.

The MCF is an important mechanism for informing the municipal representatives about a proposed project and for soliciting comments about the project. The comments received during the MCF process then can be addressed in the project's application to the Council.

To provide the municipal representatives with currently available data concerning this Project, the MCF is formatted to include the same types of information that will be presented in the Project's Application. Accordingly, the MCF is organized in two volumes: This Volume 1:

- Describes the need for the proposed Project, as well as the general locations and characteristics of both the existing and proposed rebuilt 115-kV transmission lines (Section 1);
- Provides technical specifications for the proposed rebuilt transmission lines, including structure types and heights, as well as conductor and OPGW specifications and substation connections (Section 2);
- Describes construction and operation / maintenance information for the proposed Project facilities, including the anticipated permanent and temporary land requirements, as well as methods for installing the new monopoles and conductors, modifying related existing 115-kV facilities along the CT DOT corridor, and removing the existing 115-kV facilities from the railroad catenary structures (Section 3);
- Identifies the proposed Project schedule and anticipated construction work hours (Section 4);
- Discusses existing environmental resources in the Project area, including inland and tidal wetlands/watercourses, vegetation, wildlife, and fisheries, land uses, recreational and community facilities, cultural resources, and visual resources (Section 5);
- Describes the Project's potential environmental impacts and reviews measures designed to avoid or mitigate such environmental effects during both the construction and operation / maintenance of the 115-kV facilities (Section 6);
- Provides data concerning electric and magnetic fields (EMF) associated with the Project facilities (Section 7);

- Reviews the permits and approvals required for the Project and summarizes the consultations with federal, state, and local agencies completed to date and expected to be performed in the future for the Project (Section 8);

- Discusses the alternatives analyses that led to the selection of the proposed Project as the preferred solution for upgrading the existing 115-kV facilities (Section 9); and
- Provides acronyms and a glossary of terms used in this MCF (Section 10).

Appendices include supporting information used in the preparation of this MCF, including copies of agency correspondence (Appendix A) and environmental resource and other technical reports (Appendices B-D).

Volume 2 provides detailed 11x17-inch Project maps, plans, and drawings, including:

- A Project location map and key index to the mapping.

- Aerial-based maps, at a scale of both 1"=400' and 1"=100'.

- Cross-sections depicting the proposed typical locations of the new 115-kV double-circuit monopoles and other Project modifications in relation to the CT DOT corridor, railroad facilities, and adjacent properties (e.g., depictions of additional UI permanent easement widths).

- Plan and profile drawings of the proposed 115-kV line alignment.

The aerial-based maps illustrate the locations of the proposed 115-kV facilities, as well as the locations of the railroad catenary structures from which UI's existing 115-kV facilities will be removed and the locations of other existing UI structures along the CT DOT corridor that will be modified or removed as part of the Project. The mapping also identifies the locations where UI will remove legacy CT DOT wood poles located along the north side of the railroad tracks. These 20-to-30-foot tall wood poles, which must be removed to allow construction of the rebuilt 115-kV lines, were historically used to support railroad communications wires that were decommissioned many years ago; since then, the wood poles have been abandoned in place.

Further, the aerial-based maps illustrate the boundaries of the CT DOT railroad corridor property, UI's proposed permanent easement, areas where vegetation (including tree) clearing will be required, and anticipated access roads and work areas. The maps also depict existing land uses and environmental resources, including wetlands and watercourses, floodplains, the coastal boundary, and cultural resources.

2. TECHNICAL SPECIFICATIONS FOR THE PROJECT

The technical Project specifications contained in this section include information concerning:

- UI's proposed transmission line rebuild facilities, by municipality, including new double-circuit and single-circuit monopoles, as well as termination and connection points;
- Land requirements, including proposed permanent and temporary easements;
- Transmission line structure design, appearance, and heights;
- Conductor and OPGW sizes and specifications;
- Design voltages and capacities;
- Substations to which the rebuilt lines will connect, including proposed modifications within the substations; and
- Estimated capital (construction) for the Project.

2.1 PROPOSED 115-KV TRANSMISSION LINE REBUILD FACILITIES

Transmission Lines

Along the approximately 9.5 miles between Milvon Substation and West River Substation, UI's 115-kV facilities are currently supported on 341 bonnets on top of the railroad catenary support structures and, in certain locations where UI previously removed the 115-kV lines from the bonnets, on monopoles, lattice steel towers, and other structures. Table 2-1 summarizes the existing 115-kV line support structures between Milvon and West River substations, by municipality.

Based on current Project plans, UI proposes to remove its existing 115-kV lines from the bonnets on top of both the north and south railroad catenary support columns. The UI-owned bonnets also will be removed from most of the catenary structures.[8] In addition, UI proposes to remove or modify other structures (e.g., monopoles, lattice steel towers) that support the existing 115-kV lines. Table 2-2 summarizes the existing structures to be removed or modified.

[8] Certain bonnets may remain on some of the southern catenary support structures, as requested by CT DOT/MNR. These bonnets may be left in place to support the existing UI shield wire, which may be relocated during the removal of the existing 115-kV conductor. UI anticipates that the ownership of the shield wire, which would be used as lightning protection for the railroad's electrical facilities, would be transferred to CT DOT.

Table 2-1: Summary of Existing 115-kV Line Characteristics by Type of Support Structure

Municipality	Length of Route (Approx. Miles)	Existing Conditions				
		Substation Connections	Bonnets on Top of Catenary Support Structures (No.)*	Monopoles (No.)	Lattice Towers (No.)	Other Structures (No.)**
Milford	5.03	Milvon Woodmont	200	14	0	1
Orange	0.46	-0-	17	0	0	0
West Haven	3.86	Allings Crossing Elmwest	122	13	10	4
New Haven	0.10	West River	2	0	0	0
TOTAL	**9.45**		**341**	**27**	**10**	**5**

Notes: (refer to the Volume 2 maps for specific structure locations)

* Number of catenary support columns on which existing 115-kV lines are located on the north and south bonnets.

** Unique structures comprised of three steel w-flanges exist outside Woodmont, Allings Crossing, and Elmwest substations.

The locations where UI's 115-kV lines are not positioned on the railroad catenary structures are: 3 monopoles outside of Milvon Substation and 2 monopoles outside of Woodmont Substation (90-100 feet tall); 3 steel monopoles at Allings Crossing Substation (60-75 feet tall; poles will be re-used for the Project); West Haven Train Station vicinity (100-140 feet tall); lattice towers (75-120 feet tall); monopoles at various locations along the railroad corridor installed as part of UI's FAC-008 Project range from 75 to 100 feet in height.

Table 2-2: Summary of Existing 115-kV Facilities to be Removed or Modified

Municipality	Length of Route (Approx. Miles)	Removal and Modification of Existing Facilities				
		Bonnets to be Removed from Catenary Support Structures (No.)[a]	Monopoles to be Removed (No.)	Monopoles to be Topped and Capped (No.)[b]	Lattice Towers to be Removed or Modified (No.)[c]	Other Structures to be Removed or Modified (No.)[d]
Milford	5.03	200	3	4	0	1
Orange	0.46	9	0	0	0	0
West Haven	3.86	87	5	2	5	3
New Haven	0.10	2	0	0	0	0
TOTAL	**9.45**	**298**	**8**	**6**	**5**	**4**

Notes: (refer to the Volume 2 maps for specific structure locations)

a) Number of catenary support columns on which the bonnets will be removed. Based on UI's current plans and discussions with CT DOT to date, an estimated 14 bonnets may be replaced with shorter bonnets to support a shield wire to protect the MNR signal and feeder wires and an estimated 43 bonnets are expected to remain to support the existing UI shield wire, the ownership of which will be transferred to CT DOT.

b) Number of existing monopoles on which the top section will be removed, while the bottom section will remain to support the attached MNR signal wires.

c) Three of the existing lattice towers will be removed and two will be modified (the tops of these towers will be removed, while the bottoms will remain to support the attached MNR shield wire and signal / feeder wires). The other five existing lattice towers will remain.

d) Two structures comprised of three steel W-flanges will be removed outside Elmwest Substation. Most of the structure comprised of multiple steel W-flanges located outside Woodmont Substation will be removed; a portion to support the MNR electrical facilities will remain. One structure located outside Allings Crossing Substation on the south side of the railroad tracks will be partially removed, keeping the center flange to support the existing UI shield wire.

The 115-kV lines will be rebuilt, primarily in a double-circuit configuration, on new monopoles proposed for location parallel to and north of the existing railroad tracks, principally within the CT DOT corridor. As summarized in Table 2-3, for the Project, UI will install a total of 143 new double-circuit monopoles and 16 new single-circuit monopoles.

Table 2-3: Summary of Proposed Project 115-kV Structures

Municipality	Project Route (Approximate Miles)	Proposed Conditions		
		Substation Connections	New Double-Circuit Monopole Structures (No.)	New Single-Circuit Monopole Structures (No.)
Milford	5.03	Milvon Woodmont	73	7
Orange	0.46	-0-	8	0
West Haven	3.86	Allings Crossing Elmwest	61	6
New Haven	0.10	West River	1	3
Total	**9.45**	**-**	**143**	**16**

The new monopoles will typically be offset from the northernmost catenary support column by an average of 25 feet. Along most of the approximately 9.5-mile Project route, the new 115-kV structures will be aligned within the CT DOT corridor.

Specifically, 140 new double-circuit monopoles and six new single-circuit monopoles will be located along the northern side of the CT DOT corridor. Three new double-circuit monopoles and 10 new single-circuit monopoles will be located along the southern side of the CT DOT corridor. Of the structures to be located north of the railroad tracks, all will be situated on CT DOT property except for 10 new double-circuit monopoles and one new single-circuit monopole, which must be located on property directly north of the CT DOT corridor. Two new single-circuit monopoles will be located on private property adjacent to the southern CT DOT railroad corridor property boundary.

In the locations where the CT DOT-owned corridor is not sufficiently wide to accommodate the new monopoles, UI proposes to acquire permanent easements on properties located adjacent to the railroad corridor (refer to Section 2.2 and the Volume 2 maps for additional information).

Substations

In addition to Milvon and West River substations, the 115-kV lines currently connect to UI's Woodmont, Allings Crossing, and Elmwest substations. Except for West River (which is a 115-kV switching station), the substations are 115-kV/13.8-kV facilities that step down power delivered from the 115-kV lines to feed UI's local electric distribution system, which serves customers in the Project vicinity.

The rebuilt lines also will connect to these substations. These connections will require the installation of single-circuit monopoles and will require the installation of new monopoles on the south side of the existing railroad tracks to maintain the existing 115-kV line substation entrances and exits. No expansion of the existing substations will be required for the Project.

However, the Project will include hardware modifications and new OPGW splice boxes will be installed at the take-off structures within the switchyards at Milvon, Woodmont, Allings Crossing, and West River substations. Further, at all five substations, new underground fiber optic cable will be installed to connect the fiber at the OPGW splice box (either located within the substation or at a steel monopole outside, but adjacent to, the substation fence) to the control enclosures within the substations. In addition, two monopoles will be installed at West River Substation to support the new OPGW.

2.2 LAND REQUIREMENTS

2.2.1 Route Characteristics

Between Milvon Substation and West River Substation, the CT DOT corridor accommodates the MNR rail tracks[9] and includes 186 catenary structures, which support UI's existing 115-kV lines, as well as infrastructure for the electric train operations. The width of the CT DOT railroad corridor varies substantially, from a minimum width of 90 feet to a maximum width of 260 feet. However, the corridor is generally between 125 and 175 feet wide. Within this corridor, the existing catenary support columns (one north of the railroad tracks and another south of the railroad tracks) are typically separated by approximately 60 feet.

However, because the railroad tracks and catenary structures are not uniformly centered in the middle of the CT DOT corridor, the width of the CT DOT property on either side of the tracks and catenary

[9] From Milvon Substation east to near Old Gate Lane (Milford), the CT DOT corridor includes three railroad tracks. However, extending east from near Old Gate Lane to West River Substation, four railroad tracks are located within the CT DOT corridor. Whereas MNR and Amtrak are the predominant users of these rail lines, providing passenger service, the rails are also used by freight trains, operating under agreements with CT DOT/MNR.

structures varies. Along the northern portion of the corridor, the distance between the northernmost catenary support column and the edge of the CT DOT property ranges from 5 to 145 feet. Along the southern side of the corridor, the distance from the southernmost catenary support column to the edge of the CT DOT property varies from 10 to 105 feet. The Volume 2 maps illustrate the CT DOT property boundaries and the location of the railroad tracks within the CT DOT corridor.

UI proposes to align most of the rebuilt 115-kV facilities north of the railroad tracks because of the availability of undeveloped space within or directly adjacent to the CT DOT corridor, compared to the generally narrower width of CT DOT property along most of the south of the railroad tracks. However, 13 new 115-kV monopole structures (10 single-circuit and3 three double-circuit) and will be located on CT DOT property on the south side of the railroad tracks.

2.2.2 Permanent Easement Requirements

In the areas where the new 115-kV transmission line structures cannot be located on CT DOT property (because the corridor on the north side of the railroad tracks is too narrow, because of conflicting uses such as the presence of connecting rail spurs, or because of topographic constraints), UI proposes to install the new monopoles on properties adjacent to and north the CT DOT corridor. In these areas, UI will acquire permanent easements from the affected landowners. In addition, where the new 115-kV structures will be located within, but near the northern edge of the CT DOT corridor, UI also must acquire additional permanent easements from adjacent property owners. The additional easements will be required to maintain appropriate clearances from the new 115-kV conductors, as required by NERC and UI standards. Further, UI proposes to acquire new permanent easement south of and adjacent to the southern CT DOT property boundary near both Elmwest and West River substations.

To operate and maintain the upgraded 115-kV lines, continuous linear access along the railroad corridor will not be required. UI anticipates that access to the new structures will involve a combination of the use of the public road network, existing "pathways" (defined herein as existing gravel roads, paved roads, or parking areas located on private property), and new permanent access roads extending from the public road network to the CT DOT corridor. In addition, either temporary or permanent access roads will be required within portions of the CT DOT corridor.

Table 2-4 identifies the locations, by municipality and structure number, where UI anticipates that permanent easements will be required to accommodate the rebuilt 115-kV transmission lines. Overall, based on current Project plans, UI proposes to acquire approximately 17.5 acres of permanent

easements (i.e., new right-of-way [ROW]) from property owners abutting the CT DOT railroad corridor property). Of the estimated 17.5 acres of proposed new UI easements:

- Approximately 16.25 acres are expected to be permanent easements (e.g., ROW required to accommodate the new 115-kV structures, wire, blowout, and vegetation removal in accordance with mandated electric transmission clearance standards[10]).
- Approximately 1.25 acres are expected be permanent easements for access across adjacent properties to reach the CT DOT corridor.

The locations of the areas in which additional permanent easements will be required are depicted on the aerial-based maps in Volume 2.

Table 2-4: Proposed Permanent Easement Locations, by Structure and Municipality

Municipality	Structures for which New Permanent Easement Required (By Total Number, Structure Number)		Estimated Permanent Easement (Acres)
	Structures Located on CT DOT Property, but Requiring Easements on Adjacent Properties	Structures Outside of CT DOT Property	
Milford	22 P888S*, P914N, P916N, P918N, P919N, P920N, P921N, P928N, P929N, P931N, P932N, P936N, P937N, P938N, P940N, P942N, P949N, P950N, P953N, P954N, P955N, P956N	7 P915N, P934N, (CT State land) P944N, P946N, P947N, P948N, P952N	9.5 (9 acres = permanent ROW; 0.5 acre = permanent access)
Orange	None	0	0.25 (0.01 acre = permanent ROW; 0.24 acre = permanent access)
West Haven	43 P972N, P973NN, P974N, P975EN, P995N, P996N, P997N, P998N, P999N, P1000N, P1001N, P1002N, P1003N, P1004N, P1005N, P1006N, P1007N, P1008NN, P1009NN, P1009N, P1010N, P1011N, P1012N, P1013N, P1015N, P1017N, P1022N, P1023N, P1023AN, P1026N, P1027N, P1028N, P1028S*, P1030N, P1031N, P1032N, P1033N, P1039N, P1039EN, P1040N, P1043N, P1045N, P1047N	2 P1007EN P1025N	7.25 (6.75 acres = permanent ROW; 0.5 acre = permanent access)
New Haven	None	4 P1049N, P1049EN, P1049S*, P1049ES*	0.50 (all permanent ROW)
TOTAL			**17.5**

*= South side of CT DOT property.

[10] The width of the required permanent easement is pursuant to UI standards for transmission vegetation management.

2.2.3 Temporary Access Road and Work Pad Requirements

In the Project area, the entire CT DOT corridor extends through an urban-suburban area where the transportation network is fully developed. As a result, public roads provide access to the vicinity of the CT DOT corridor; however, direct access to the railroad property is limited as the railroad tracks either span roads or extend beneath road overpasses.

To construct the new 115-kV transmission lines, remove the existing 115-kV lines and facilities from the railroad catenary support columns, and modify certain existing transmission line structures, UI proposes to use a combination of existing public roads, existing pathways, and new temporary or permanent access roads extending from the public road network to the CT DOT corridor. Some of these access roads will be on private property, while others will be within the CT DOT corridor. The Volume 2 maps identify the locations of UI's proposed access roads for the Project.

For construction, access to each new monopole site will be required, as will a work pad from which the installation of the new structure will be performed. To remove the existing 115-kV lines and facilities from the railroad catenary structures, access also will be needed along both the north and the south sides of the CT DOT corridor. Construction access to each site will be from the same side of the CT DOT corridor in which the work will occur. UI does not propose any construction access across the MNR rail lines. Refer to Section 3 for additional details regarding Project construction.

Based on current Project plans, an estimated 20 acres of temporary construction easements from adjacent landowners will be required for the Project. However, this estimate is subject to change as UI continues to refine Project designs and construction plans; the amount of temporary easement needed for construction will be based on not only the final Project plans, but also future consultations with potentially affected property owners. These easements will be for temporary access roads and work pads for Project construction, including for the removals of bonnets and other infrastructure from the south side of the CT DOT corridor.

Access and construction activities within the railroad corridor will be coordinated with CT DOT / MNR. Refer to the Volume 2 maps for the proposed locations of temporary access roads and work pads.

2.3 PROPOSED TRANSMISSION LINE UPGRADE SPECIFICATIONS

2.3.1 Conductor and Cable Size and Specification

The new 115-kV lines will consist of 1590 ACSS "Lapwing" conductors and 0.583-inch 72 count fiber OPGW and shield wires. The new structures will be designed to support 2156 ACSS "Bluebird" conductors and to meet the clearance requirements for such conductors, should such a future conductor upgrade be needed.

2.3.2 Proposed Overhead Line Design, Appearance, and Height

The 115-kV lines will be rebuilt in a double-circuit configuration on galvanized steel monopoles[11]. The conductors will be arranged vertically (refer to the cross-sections in Volume 2). In addition, the new monopole design includes braced post insulators, which will limit conductor movement and blowout. The new double-circuit, galvanized steel monopoles will be offset from the catenary support columns based on clearances. This offset will vary based on location, but on average is 25 feet.

However, some of the new monopoles will be located more than 25 feet from the catenary support columns, such as in areas where railroad spurs, railroad embankments or other existing infrastructure must be avoided. For example, as a result of constructability reviews, the new monopoles will be located on either the top or the bottom of slopes adjacent to the railroad tracks, thereby avoiding the alignment of the new structures in mid-slope areas. The maximum new monopole offset from the catenary structures will be approximately 70 feet; this offset is near the Indian River and allows the new structure to be placed in an upland, rather than within the wetland complex associated with the river.

In some locations, the new structures will be sited in-line (with no offset) from the catenary support columns, as needed to avoid conflicts with adjacent land uses (e.g., buildings). In such locations, the MNR electrical facilities will be transferred from the existing catenary support columns and underbuilt on the new steel monopoles.

The heights of the proposed monopole structures will vary by location, depending on span length. The typical span length between structures ranges from approximately 300 and 400 feet. However, in some locations, longer spans (up to 800 feet) were warranted to minimize impacts to environmental resources (e.g., wetlands, culturally sensitive resources) and to nearby land uses (e.g., parking lots, roadways,

[11] In addition to the double-circuit monopoles, 16 new single-circuit monopoles will be built for the 115-kV lines, as summarized in Table 2-3.

railroad spurs, steep terrain). Based on UI's current Project design information, the proposed pole heights, by segment between substations, are:

- ***Milvon to Woodmont***: 80-145 feet. The tallest structures (>125 feet) will be between the Milford Train Station and the Milford Cemetery. Due to the existing surrounding built environment at the Milford Train Station, proposed development plans near the Milford Train Station, and the presence of unmarked graves and other headstones within 25 feet of the existing catenary support structures at the Milford Cemetery, UI proposes taller structures to allow longer span lengths, thereby minimizing the number of structures near the train station and cemetery.

- ***Woodmont to Allings Crossing***: 75-115 feet.

- ***Allings Crossing to Elmwest***: 70-170 feet. The tallest structures (>120 feet) will be near the West Haven Train Station. At this location, UI's existing 115-kV lines are not located on the railroad catenary structures but rather are supported on single-circuit steel poles (up to 140 feet tall) to maintain electrical clearances over the train station and a proposed parking garage. The existing single-circuit steel poles will be replaced with double-circuit steel poles, which must be taller to maintain electrical phase-to-phase clearances. The span length between proposed pole P1017N and P1018N also will be longer than the standard 300-foot distance (and will be approximately 450 feet) due to constructability considerations along the presence of numerous underground utilities in the area.

- ***Elmwest to West River***: 70-130 feet. The tallest structures (>120 feet) are between 1st Avenue and the I-95 crossing, as required to support the MNR electrical facilities as underbuilds and to allow the rebuilt 115-kV lines to effectively span the two I-95 overpasses in places where I-95 is elevated

2.3.3 Proposed Structure Locations

The anticipated locations of the new structures are illustrated on the maps and Plan and Profile Drawings in Volume 2. In designing the rebuilt 115-kV lines, UI took into consideration the constraints associated with the varying widths of the CT DOT corridor; the need to maintain clearance between the 115-kV conductors and the MNR electrical facilities, as well as between the conductors and vegetation; and the location of the CT DOT corridor adjacent to various existing and planned land uses, including residential, commercial, and industrial developments.

Potential locations for the rebuilt 115-kV structures were initially established using a baseline offset, which positioned the monopoles 25 feet north of the existing catenary support columns and included standard span lengths of approximately 300 feet. Placing the monopoles directly adjacent to the existing catenary support columns would result in the shortest structure heights, and also the shortest span length, but the greatest number of new monopoles. After conducting this baseline structure spotting,

further analyses were performed that resulted in shifts to the initially identified structure sites. In general, proposed structure locations were realigned to:

- Avoid conflicts with the surrounding built environment (i.e., rail spurs, buildings, adjacent electric distribution lines, billboards, and roads).
- Avoid underground utilities identified during due diligence subsurface surveys.
- Eliminate constructability concerns (structures were positioned, where possible, to avoid side-slopes and to accommodate future vehicle access between the new monopoles and the railroad catenary support columns).
- Avoid or minimize impacts to environmental features or sensitive land uses (e.g., monopoles were shifted to provide an 800-foot-long span over the Milford Cemetery; 600-foot spans are proposed to extend over tidal wetlands associated with the Indian and West rivers and to minimize structure conflicts with surrounding land uses.)

Structure locations may be modified as the Project design process advances and UI continues to coordinate with CT DOT and the affected municipalities. For example, each proposed structure location is being further evaluated based on the results of constructability reviews and environmental studies. Future changes could occur based on information obtained from more detailed field studies (e.g., subsurface geotechnical investigations, final engineering and environmental surveys, constructability reviews), as well as input from municipalities, regulatory agencies, and the public.

2.4 ESTIMATED PROJECT COSTS AND FACILITY SERVICE LIFE

The estimated capital cost for the siting, design, and construction of the Project is approximately $230 million.

3. PROPOSED CONSTRUCTION AND OPERATION/MAINTENANCE PROCEDURES

3.1 INTRODUCTION AND OVERVIEW

UI will construct, operate, and maintain the rebuilt 115-kV lines in full compliance with the latest revisions of standards of the NESC, the Institute of Electrical and Electronic Engineers (IEEE) and the American National Standards Institute (ANSI); good utility practice; and UI's technical specifications, final engineering plans, and the conditions of regulatory and siting approvals obtained for the Project. In addition, the Project will be constructed in accordance with the terms of UI's agreement with CT DOT. That agreement specifies certain non-standard construction methods and schedules, including the performance of certain Project tasks to avoid or minimize conflicts with rail operations.

This section describes the procedures and methods that will be used to construct, operate, and maintain the Project facilities, as well as UI's protocols for the reliability, safety, and security of the transmission system. The Project will consist of the following components:

- Rebuild the 115-kV transmission lines, in a double-circuit configuration, on galvanized steel monopoles to be located north of the MNR railroad tracks, primarily within CT DOT property. Install single-circuit and double-circuit monopoles at specific locations along the south side of the railroad tracks.
- Interconnect the rebuilt lines to UI's existing Milvon, Woodmont, Allings Crossing, Elmwest, and West River substations.
- Remove the existing 115-kV facilities and related appurtenances (including most of the bonnets) from the north and south railroad catenary support columns.
- Remove certain existing monopole, lattice tower, and W-flange structures from the CT DOT corridor.
- Restore both the areas affected by construction and access roads to approximate pre-construction conditions, to the extent practical, by regrading and, as appropriate, by seeding and re-vegetating.

In general, UI currently plans to construct the Project in four segments, with each segment rebuilt and placed into service prior to the initiation of most work on the next segment. UI's proposed sequence for segment construction, which reflects coordination with CT DOT[12], is:

- Elmwest Substation to West River Substation (1.25 miles)
- Allings Crossing Substation to Elmwest Substation (1.24 miles)
- Milvon Substation to Woodmont Substation (4.05 miles)
- Woodmont Substation to Allings Crossing Substation (2.91 miles)

Along each segment, UI's existing 115-kV facilities on the northern railroad catenary support columns will be removed in conjunction with the construction of the rebuilt 115-kV lines. However, the majority of the existing 115-kV facilities on the south side of the railroad tracks would not interfere with placing a segment of the rebuilt 115-kV lines into service. As a result, the removal of the existing UI facilities located along the south side of the railroad tracks is expected to be performed as warranted to maximize construction efficiency, potentially at the same time as work on the next segment. Restoration of the areas affected by construction is expected to proceed by segment, after the new 115-kV facilities are installed and the existing facilities are removed.

Sections 3.2 through 3.6 describe the construction procedures that will apply to the overall Project, including both standard methods and protocols to be used to minimize environmental impacts (e.g., wetland and watercourse crossings, soil / groundwater management). Procedures are described for the 115-kV line rebuild work, interconnections of the rebuilt 115-kV lines to UI's five substations, and the removal of the existing 115-kV facilities from the railroad corridor. Operation and maintenance procedures applicable to the 115-kV facilities are described in Section 3.7, while data regarding the Project reliability, safety, and security is included in Section 3.8.

This section describes the construction, operation, and maintenance procedures that UI currently proposes. However, as required by the Council's regulations, prior to the commencement of construction activities, UI will prepare and submit one or more Project-specific Development and Management (D&M) Plans to the Council for review and approval. Project construction will be performed in accordance with the procedures described in the D&M Plans, which will reflect

[12] Segment construction will be sequenced to avoid conflicts with planned CT DOT highway projects (e.g., at the I-95 crossing) and to minimize requirements for both railroad track and 115-kV line outages.

conformance to the conditions of the Council's approval of the Project, as well as compliance with other regulatory requirements and UI technical specifications. UI will monitor and perform inspections of Project construction activities for conformance to these requirements.

3.2 GENERAL CONSTRUCTION SEQUENCE AND SUPPORT AREAS

3.2.1 Typical Construction Sequence

The Project will be constructed in four segments, with work along each segment involving the same general sequence of activities. The Project construction will be staged from one or more laydown/material staging areas/contractor yards; multiple smaller, laydown areas also could be used at points along the 115-kV line route (refer to Section 3.2.2). Table 3-1 summarizes the general sequence of Project construction activities.

Table 3-1: General Project Construction Sequence

TYPICAL PRE-CONSTRUCTION ACTIVITIES BY SEGMENT
• Survey and stake construction work areas, including edge of CT DOT property and UI easement (where different) and proposed structure locations
• Confirm and re-flag environmental resource areas (e.g., wetland and watercourse boundaries) or other sensitive areas to be avoided
• Mark vegetation clearing limits
• Locate and mark utilities
TYPICAL CONSTRUCTION ACTIVITIES BY SEGMENT
• Establish laydown/material staging areas / contractor yard (s) to support the construction effort
• Establish temporary erosion and sedimentation controls as needed
• Remove or mow vegetation, where necessary
• Install temporary matting in wetlands as needed; install temporary bridges to traverse small watercourses
• Establish or upgrade access roads to new monopole sites
• Remove abandoned CT DOT wood pole structures within Project construction areas.
• Create a level work pad at each monopole site, as well as at conductor pulling sites and if necessary, at guard structure sites
• Install new structure foundations and assemble/erect new structures; remove some bonnets and 115-kV facilities from north side catenary structures as necessary
• Install conductors, shield wire, and OPGW
• Install rebuilt 115-kV line connections to UI substations
• Place the rebuilt 115-kV lines in service (by segment)
• Remove the existing 115-kV line facilities from the catenary structures (i.e., existing shield wires, conductors, hardware, steel bonnets). This activity will include establishing temporary construction access and work pads at the locations of the facilities to be removed. Existing access, upgrades to existing access, or new access roads will be required.
• Remove existing monopoles, lattice towers, and w-flange structures that are no longer required
• Remove temporary construction access and work pads along with associated matting and bridges
• Perform final clean-up and restore/stabilize areas affected by construction to pre-construction conditions (e.g., by seeding and re-vegetating as needed).
• Maintain erosion and sedimentation controls until areas affected by construction are stabilized.

Project construction activities are discussed in Sections 3.3 and 3.4. During construction, certain work activities and sequences may vary, based on factors such as final Project design and the conditions of the Council's or other agencies' regulatory approvals. Additional details regarding construction procedures and sequencing will be provided in the Project's D&M Plan(s).

3.2.2 Laydown/Material Staging Area/Contractor Yard(s), including Field Offices

To support the 115-kV line rebuild work, temporary construction laydown. /material staging areas/contractor yards will be required. Typically, such sites are not identified until a few months prior to the start of construction; UI will seek Council approval of these sites prior to use.

A primary laydown/material staging area/contractor yard typically requires approximately 2-5 acres to accommodate space for construction field office trailers and parking, as well as for storing Project materials, staging construction equipment and supplies, fractionization tanks (used for temporarily storing water removed from Project foundation excavations), and temporarily stockpiling materials removed from the old 115-kV facilities (e.g., bonnets, 115-kV conductor, old monopole structures) prior to appropriate off-site reuse or disposal. The laydown/material staging area/contractor yard also will provide a site for marshalling construction crews, holding daily safety meetings, and assigning daily work.

Since the Project will be constructed in segments, UI anticipates that smaller temporary laydown/material staging areas/contractor yards may be established at certain locations along the north and south sides of the CT DOT corridor. These satellite laydown/material staging areas/contractor yards would provide space to store materials, supplies, and equipment needed for the 115-kV rebuild work along specific portions of the Project route.

The preferred location for Project laydown/material staging areas/contractor yards is within or in the general vicinity of the railroad corridor, on UI property, or at existing nearby commercial or industrial sites. Establishing such areas within CT DOT property or otherwise near the railroad corridor will improve construction efficiency and minimize the movement of equipment, manpower, and supplies to and from the railroad corridor along public roads.

3.3 STANDARD OVERHEAD TRANSMISSION LINE CONSTRUCTION PROCEDURES

The Volume 2 maps identify the proposed Project construction areas, illustrating the width of the CT DOT-owned property that constitutes the railroad corridor, locations where UI proposes to acquire additional permanent or temporary easements adjacent to the CT DOT property, areas of planned vegetation clearing, locations of new 115-kV monopoles and the 115-kV facilities to be removed, locations where abandoned CT DOT wood poles will be removed, and the anticipated locations of access roads and work pads. The following subsections describe UI's standard construction procedures for rebuilding the 115-kV lines and removing the existing transmission facilities. This information is based on UI's current Project plans. Detailed construction information will be provided in the Project's D&M Plan(s).

3.3.1 Pre-Construction Survey and Vegetation Removal

Prior to the commencement of construction along a Project segment, UI will perform surveys to mark the boundaries of work areas, including new structure locations, as well as to clearly flag or otherwise demarcate the boundaries of sensitive environmental resources (e.g., wetlands, watercourses). UI also will survey and appropriately mark areas of vegetation to be removed.

Existing vegetation will be removed from construction sites (including access roads and work pads) and as required to provide access for construction equipment and to maintain clearance from the rebuilt 115-kV line conductors. As a result, vegetation clearing will be required along portions of both the north and south sides of the railroad corridor.

The existing vegetation that must be removed for the Project consists of a mix of tall shrubs and mature trees, along with low-growing herbaceous species. Overall, UI estimates that approximately 27 acres of trees[13] will be cleared. (The Volume 2 maps illustrate the areas where forested vegetation removal will be required for the Project.)

In certain areas, "danger trees" or "hazard trees", which are trees deemed a potential risk to the overhead 115-kV lines, also may need to be trimmed or removed.[14] Such danger or hazard trees, which could be

[13] Mature trees are defined herein to consist of tall-growing vegetation typically greater than 6 inches diameter breast height.

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

situated on private property, would typically be identified after the rebuilt lines are installed. If danger or hazard tree trimming or removal is required, UI would coordinate with the affected property owner.

UI has coordinated with CT DOT regarding the vegetation clearing that will be required within the railroad corridor. UI also will consult with the owners of properties in those areas where permanent or temporary easements must be obtained for the construction and operation/maintenance of the 115-kV lines.

Clearing and grubbing will be accomplished by conventional methods, using a combination of chain saws, hand labor, and mechanized equipment. Trees will be directionally felled to minimize impacts.

As currently planned, all vegetative materials cut on CT DOT property will be removed and disposed of properly, outside of the Project area. Similarly, forested and shrub vegetation cut on easement areas outside of the CT DOT corridor would be removed from the Project area, unless another disposition method is requested by the property owner.

Matting, comprised of timber or composite materials, will be used to cross watercourses and to access wetland areas where vegetation clearing is required. The mats will be cleaned prior to use to avoid the spread of invasive wetland species. Cut vegetation will not be felled into watercourses. In wetlands, trees and brush will be cut flush with the ground surface and the stumps will be left in place unless removal is required for Project construction. All other cut vegetation will be removed from wetland areas.

Typically, temporary erosion and sedimentation controls will be installed after initial vegetation removal and in advance of earth disturbance activities, such as grubbing, stump removal, and the establishment of access roads / work pads. All erosion and sedimentation controls will be installed and maintained in accordance with Project-specific and Connecticut requirements, including the *2002 Connecticut Guidelines for Soil Erosion and Sediment Control*; the Connecticut Department of Energy and Environmental Protection (CT DEEP) *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities* (General Permit); and the Stormwater Pollution Control Plan (SWPCP) that UI will prepare for the Project, pursuant to the General

Permit[15]. (Refer also to the discussion regarding Erosion and Sediment Controls in Section 3.4.) Erosion and sedimentation controls will be inspected and repaired or replaced as necessary until the areas affected by the Project are stabilized.

3.3.2 Access Roads and Work Pads

The Volume 2 maps identify the locations of the access roads and work pads that UI proposes for the construction of the Project.

Access Roads

To access Project work sites, UI will use a combination of public roads and proposed or existing access roads within or adjacent to the CT DOT railroad corridor. Access will be required to each new monopole site, as well as to reach the existing 115-kV facilities to be removed from the north and south catenary support structures and other structures (monopoles, lattice towers, W-flange structures) that either will be modified or will no longer be needed (most located south of the railroad tracks). The Volume 2 maps identify UI's proposed Project access roads.

Access roads may be permanent or temporary and will consist of materials appropriate to the different characteristics of the Project areas traversed (e.g., upland, wetlands). To minimize or avoid the potential for soil to be tracked from Project work sites onto public roads, rock "aprons" or equivalent stabilization will be established at the entrances to work sites from public roads.

In wetlands, most access roads will be temporary and will be comprised of timber mats or equivalent. Access roads in uplands typically will consist of gravel. In general, Project access roads will be approximately 16 feet wide. However, in some areas, roads will be wider to accommodate equipment turning and passing or to account for terrain. UI will also use existing access (e.g., paved, or graveled areas), where available. Existing paved access is not expected to require significant upgrades, whereas existing non-paved access may require the addition of gravel or asphalt patch.

[15] 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. Pursuant to the requirements of the General Permit, prior to the start of construction, UI will submit to CT DEEP a Registration Form and will prepare a SWPCP that details stormwater management and erosion/sedimentation control measures for the Project construction.

UI expects that permanent access roads will be required in certain inland wetlands and across some small streams to provide ingress/egress for operations and maintenance work.[16] Similarly, select access roads in uplands will be permanent to facilitate access for the operation and maintenance of the rebuilt 115-kV transmission lines. Permanent access roads typically will consist of gravel and will be approximately 12 to 16 feet wide.

Work Pads

Construction work pads will be required to install the new monopoles, as well as to remove the existing 115-kV facilities from the north and south catenary support structures and the existing structures (monopoles, lattice towers, W-flange structures) that will no longer be needed. Accordingly, along the rebuilt 115-kV line route, work pads will be required at each new structure location, as well as at conductor and OPGW pulling sites, as well as at each location where existing 115-kV facilities will be removed or modified. Work pads will consist of timber construction mats (or equivalent) or gravel.

The size of each work pad will vary based on location and space available within or adjacent to the CT DOT railroad corridor. In general, the typical work pad for installing a new monopole will be approximately 40 feet by 100 feet; however, specific work pad dimensions will vary by location. The work pads will be used to stage structure components for final on-site assembly, to provide a safe, level base for the construction equipment used to install foundations, and to erect the structures. In most areas, minimal grading is expected to be required to establish work pads.

Pads for conductor pulling also will be required at various locations along the 115-kV line route. These pull pads are expected to be approximately 40 feet by 300 feet. The specific dimensions of each work pad and pull pad will be provided in the D&M Plan(s).

Temporary work pads will be required at the catenary structures on both sides of the CT DOT railroad corridor where removals of existing 115-kV facilities will occur. The size of these work pads will vary based on location, topography, and space available within or adjacent to the CT DOT railroad corridor.

In general, the typical work pad for 115-kV facility removals will be approximately 40 feet by 60 feet. The work pads for the removal of the 115-kV facilities and bonnets along the north side of the railroad tracks may be co-located with the work pads required for the installation of the new monopoles.

[16] UI will obtain appropriate federal and state regulatory approvals for permanent access roads that affect water resources.

UI anticipates that in upland areas, portions of the gravel work pads used during Project construction will be left in place to provide a stable base for the performance of transmission line operation and maintenance activities. Such work pads are estimated to be approximately 30 feet by 60 feet but may vary by location.

3.3.3 Foundation and Structure Installation

Foundation Installation

The new monopoles are expected to be installed primarily on drilled pier foundations[17]. Such foundations will average 15-35 feet in depth, although some foundations may be almost 80 feet deep. The depth of the foundations will depend on subsurface conditions and the type of structure. Spoils generated from the drilling process will be managed pursuant to a *Materials Management Plan* that UI will prepare for the Project.

Auger drilling will be used to perform the excavations for the drilled pier foundations. The size of each excavation typically will be 6-10 feet in diameter. Temporary or permanent vibratory casings, or equivalent, may be used to provide soil support as needed to complete the excavation work and place concrete. The temporary casing may be removed from the pier foundations as concrete is placed or soon thereafter. For the installation of the new monopoles near the MNR lines, UI will coordinate with CT DOT / MNR to determine appropriate drilling methods to avoid any potential for impacts to the rail bed.

Once the excavation is complete, steel reinforcing bars and an anchor bolt cage will be placed in the excavation and encased in concrete. The concrete will be conveyed from the mixer to the place of the final deposit by methods that will prevent the separation or loss of material. Any water displaced during the concrete pour will be managed according to the *Materials Management Plan*.

Field tests of the concrete will be conducted regularly. In general, as an indication of other physical properties, the quality of the concrete being produced will be judged by the compressive strength developed within a given period.

[17] Direct embed structures and structures supported by pile type foundations may be installed in certain locations, pending the results of further engineering analyses.

Structure Assembly and Installation

After the structure foundation is in place and the concrete is cured, the steel transmission monopole will be assembled and erected. Structure components will be delivered to work pads and then assembled on site. Structures will not be erected on the concrete piers for a minimum of 28 calendar days after the concrete has been poured and until the compressive strength of the concrete has reached 4,500 pounds per square inch (psi).

The galvanized steel monopole structures may be assembled on the ground and erected as a complete unit or assembled in pieces with a crane. Once a structure is erected and framed with the support insulators and hardware, it will be ready for the installation of the overhead lines. Conductor pulling blocks, which are a required tool to install the new OPGWs, shield wires, and conductor, will also typically be installed at this time.

Structure Grounding

Each transmission line structure will be grounded to provide a path for the energy from lightning discharges to enter the earth and safely dissipate. The foundation of each transmission line structure will provide some natural grounding through contact to the surrounding earth. However, to provide further protection, a minimum of two ground rods, and associated ground conductor, will be buried adjacent to each foundation. Typically, the ground rods will be installed after the completion of the foundation and before the installation of the structure. The need for and location of additional ground rods will be determined by the construction contractor.

In locations where the MNR signal and feeder wires will be underbuilt on the steel monopoles, a copper wire will be installed underground between the ground system of the monopole and the ground system of the nearest existing catenary structure.

3.3.4 Conductor and OPGW Installation

The installation of the overhead line conductors and shield wires will require the use of pulling and tensioning equipment, as well as reels of conductor, which will be positioned at temporary pulling work pads along the transmission line route. Helicopters may be used to install pulling ropes at the commencement of the conductor/OPGW pulling process. To maintain clearance at road crossings during conductor and OPGW installation, temporary guard structures or boom trucks will be positioned

adjacent to the crossings. The proposed locations of temporary pulling work pad and guard structure pads are illustrated on the Volume 2 maps.

The conductors will be pulled under tension to avoid contacting the ground and other objects. The remaining insulators and hardware will then be installed at strain and dead-end structures. Finally, the conductors and shield wires will be pulled to their design tensions and attached to the hardware. Linemen in bucket trucks will perform this operation.

3.3.5 Cleanup and Restoration

Cleanup and restoration activities will include the removal from Project areas of construction debris, signs, flagging, and fencing, as well as temporary (i.e., timber mat or equivalent) work pads and access roads. Areas affected by construction will be restored and stabilized, as appropriate, to approximate pre-construction conditions (e.g., seeded, graveled, repaved as necessary). As discussed in Section 3.3.2, some gravel access roads are expected to remain in place permanently to facilitate future UI operations and maintenance activities (refer to the Volume 2 maps).

All temporary work pads and access roads will be removed from tidal and inland wetlands. Timber mat bridges (or equivalent) used to provide construction access across small streams will similarly be removed. Wetland areas affected by construction will be either allowed to revegetate naturally, reseeded with a temporary annual seed mix (such as annual rye for inland wetlands) that will promote stabilization, or reseeded with wetland seed mixes or in accordance with restoration plans approved for such use by CT DEEP. In areas within the conductor clearance zones, wetland vegetation will be managed to promote low-growing wetland species consistent with the operation of the overhead 115-kV lines.

Materials used in work pad construction, as well as other construction debris, will be removed. Such materials will either be properly disposed of or otherwise re-purposed. In areas subject to erosion, temporary erosion and sedimentation controls will remain in place until permanent stabilization is achieved, pursuant to the requirements of the CT DEEP General Permit and the Project-specific SWPCP.

The existing 115-kV facilities that will be dismantled and removed initially may be stockpiled at Project staging areas, prior to removal for proper disposal or recycling.

3.3.6 Construction Inspection and Post-Construction Monitoring

UI representatives will monitor construction activities for conformance to the conditions of approvals from the CSC, including the D&M Plan(s), and other regulatory agencies, as well as to CT DOT / MNR requirements. Prior to the start of Project construction, UI will prepare and submit to CT DEEP a Project-specific SWPCP, which will require inspections of Project areas both routinely and after heavy rain events.

Pursuant to the SWPCP, monitoring is expected to be performed as required to verify the effectiveness of stabilization measures. Such monitoring is expected to be conducted for one growing season following the completion of stabilization (refer to Section 3.6.1 for additional information regarding erosion and sedimentation control inspections and the SWPCP).

3.4 SUBSTATION CONNECTIONS

The rebuilt 115-kV lines will be connected to UI's Milvon, Woodmont, Allings Crossing, Elmwest, and West River substations. All activities involving the connection of the rebuilt 115-kV lines to the substations will be performed within the existing fenced portion of each station or on the monopoles directly outside of each substation.

The Project will include hardware modifications and new OPGW splice boxes will be installed at the take-off structures within the switchyards at Milvon, Woodmont, Allings Crossing, and West River substations. At all five substations, new underground fiber optic cable will be installed to connect the fiber at the OPGW splice box (either located within the substation or at a steel monopole outside, but adjacent to the substation fence) to the control enclosures. In addition, two monopoles will be installed at West River Substation to support the new OPGW.

3.5 REMOVAL OR MODIFICATION OF EXISTING 115-KV FACILITIES

The existing UI facilities to be removed from the CT DOT corridor or otherwise modified as part of the Project are listed in Table 2-2 and illustrated on the Volume 2 maps[18].

The removal of the existing 115-kV facilities will be coordinated with the installation of the new double-circuit lines, as well as with CT DOT / MNR. This work will typically proceed by substation-to-substation segment, as described in Section 3.1.

[18] The maps also illustrate the locations of the abandoned MNR wood structures (which supported the railroad's communications wires) that will be removed to facilitate Project construction.

The schedule for these removals will depend on the type and location of the facilities. For example, the existing 115-kV facilities located along the north side of the railroad tracks may be removed in parallel with the construction of the new double-circuit monopoles. Certain of the existing 115-kV facilities along the south side of the railroad tracks also may be removed at generally the same time as the new 115-kV lines are built. However, most of the existing 115-kV facilities along the south side of the tracks will be removed after the new lines (by segment) are placed in service.

As illustrated on the Volume 2 maps, access will be required to reach each of the existing 115-kV facilities to be removed or modified. Work pads also will be needed at each of these locations.

The construction activities required to remove the existing 115-kV facilities from the catenary support structures will involve track or signal outages. As a result, UI anticipates that this work will be performed during non-standard construction shifts (e.g., during nighttime, on Sundays, etc.) that correspond to non-peak rail use periods. The work will be closely coordinated with CT DOT / MNR.

In general, the conductors and OPGW will be removed first, followed by the removal of the steel bonnets and other structures. UI expects to recycle all the steel materials and to properly repurpose, recycle, or dispose of other miscellaneous hardware and materials from the existing 115-kV lines and bonnets. Removal activities will typically include dismantling the towers and recycling materials to the extent practical. Materials that cannot be recycled or reused will be disposed of properly.

3.6 SPECIAL CONSTRUCTION AND BEST MANAGEMENT PROCEDURES

UI will implement the procedures described in this section during construction in site-specific locations, as required to respond to constructability issues or to avoid or minimize Project impacts. These procedures may be modified to reflect the conditions of Project-specific approvals that will subsequently be obtained from state and federal regulators. Final procedures will be included in the Project D&M Plan(s).

3.6.1 Erosion/Sedimentation Control and Stormwater Management

UI will install and maintain erosion and sedimentation control measures during the Project construction to avoid or minimize the potential for surface water runoff, erosion, and sedimentation to occur outside of the work limits. These measures will conform to any Project-specific permit conditions from CT DEEP and the U.S. Army Corps of Engineers (USACE), as well as applicable regulations concerning

soil and erosion/sedimentation control and stormwater management, including CT DEEP's General Permit, the *2002 Connecticut Guidelines for Sedimentation and Erosion Control*, and the provisions of the Project-specific SWPCP.

UI also proposes to prepare a *Materials Management Plan* that will provide specifications for the handling of excess soil, spoil, or groundwater generated during Project construction (e.g., from grading, excavations for structure foundations).

3.6.2 Water Resource Crossings

As shown on the Volume 2 maps and summarized below, water resources (inland and tidal wetlands and watercourses) are located in the Project area. Major waterbody crossings include the Wepawaug, Indian, and West rivers. The Project facilities also will extend across 100-year and 500-year floodplains as designated by the Federal Emergency Management Agency (FEMA). All crossings of water resources and other construction activities in wetlands and watercourses will be performed in accordance with the Council's requirements, the conditions of USACE and CT DEEP regulatory approvals, and UI best management practices and technical specifications.

With respect to water resources, based on current construction plans, the Project will:

- Extend across 36 watercourses (13 perennial streams, including the Wepawaug, Indian, and West rivers, and 23 intermittent streams):
  - ✓ No new transmission line structures will be located in any watercourses or in ponds.
  - ✓ During construction, temporary access, involving the installation of timber mats (or equivalent), will be required across nine of these watercourses. In addition, temporary work pads will be installed over 13 freshwater streams; the work pads will be installed to maintain stream flow.
  - ✓ Permanent access roads will extend across three streams, based on current Project plans.
- Require construction within 23 of the 41 wetlands within the Project area. The following work activities will be performed in wetlands:
  - ✓ Forested vegetation will be removed within the rebuilt 115-kV conductor clearance zones and as otherwise required for construction (refer to the vegetation removal limits illustrated on the Volume 2 maps). Danger/hazard trees also will be removed, as necessary. Temporary access routes, which will not necessarily be the same as temporary or permanent access roads used for other aspects of construction, may be required for clearing crews to cross and remove vegetation within wetlands. Approximately 3.1 acres of forested wetlands (2.9 acres of inland wetlands and 0.2 acre of tidal wetland) will be converted to scrub-shrub wetland habitat.
  - ✓ Temporary access roads and work pads, comprised of timber mats, will be located in wetlands where no upland alternatives to reach Project work sites are available.

Approximately 4.5 acres of inland wetlands and 0.27 acre of tidal wetlands will be temporarily affected by such construction activities.

- ✓ Permanent access roads would be located in three inland wetlands (based on current Project plans) to provide access to the new 115-kV transmission line structures. These permanent access roads will result in approximately 0.7 acre of permanent fill in inland wetlands. No permanent access roads will be located in tidal wetland as a result of the Project.
- ✓ A total of 10 new monopoles will be installed in wetlands (four of the new monopoles will be located in wetlands along the route in Milford, while six will be located along the route in West Haven). Cumulatively, the installation of these structures in wetlands will result in approximately 0.01 acre of permanent fill.

Refer to Sections 5.2 and 6.3 for additional information regarding the locations and types of water resources in the Project area and the water resources that will be affected by construction activities.

Watercourse Crossings

The Volume 2 maps identify the locations of watercourse crossings and indicate where temporary mat bridges or equivalent will be installed along access roads and to allow work pads to span streams, as well as the locations where permanent access roads will extend across three watercourses (one stream in Milford and two in Orange).

The construction techniques to be used at each water crossing will be in accordance with the permits obtained for the Project and also will depend on site conditions at the time of construction and whether the crossing is permanent or temporary. Any temporary crossings will be placed or sized to maintain water flows and minimize the potential for flooding. Appropriate erosion control measures will be deployed to avoid and/or minimize impacts at watercourse crossings. The rebuilt 115-kV transmission lines will span all the watercourses along the Project route. UI will install any permanent water crossings pursuant to the conditions of site-specific permits obtained from CT DEEP and/or USACE.

Wetland Crossings

Project construction activities will involve work in both inland and tidal wetlands. UI has designed the Project to avoid or minimize impacts to wetlands. The construction activities that must be performed in wetlands are as follows:

- **"Access Routes" across Wetlands for Vegetation Clearing Equipment Only**. Where needed, temporary access routes across wetlands will be created and used only by the vegetation clearing crews and will be removed as clearing activities advance along the Project route. Clearing crews must be able to access areas where vegetation removal is required not only for construction activities, but also to remove trees within the clearance zones of the rebuilt

115-kV line conductors and, as necessary, to reach danger or hazard trees located within or outside of the CT DOT property / UI easements.

The location and type of access routes used for vegetation clearing within each wetland will be determined at the time of construction (based on site-specific conditions). However, timber, or composite mats will typically be used for access in wetlands. In wetland areas where timber mat access poses a challenge, vegetation clearing may be performed manually.

- **New Temporary Construction Access Roads through Wetlands**. New temporary construction access roads across wetlands will be established using timber or composite mats. The construction access roads, which are illustrated on the Volume 2 maps, may not correspond to the temporary access routes for clearing crews described above. All temporary timber or composite mat access roads in wetlands will be removed in their entirety after construction.

- **Transmission Line Structures in Wetlands**. 10 new monopoles and their associated work pads (i.e., Structures P951N, P952N, P966AN, P968N, P987NN, P988N, P997N, P1043N, P1045N, and P1047N) will be installed in wetlands. To install these structures, timber mats (or equivalent) will be used to create temporary work pads for construction support.

- **Work Pads in Wetlands**. In some locations, work pads (or portions thereof) will be required in wetlands, for structures that will be sited in uplands. In such areas, timber mats (or equivalent) also will be used.

3.6.3 Wetland Invasive Species Control Methods

The inland and tidal wetlands in the Project area are, for the most part, characterized by invasive wetland plant species. To minimize the further spread of such invasive wetland species, UI will require its contractors to implement standard procedures, such as ensuring that timber mats are cleaned prior to being brought to Project work sites or transferred from one Project wetland to another. Details regarding UI's proposed wetland invasive species control methods will be provided in the Project D&M Plan(s).

3.6.4 FEMA Flood Zones

The Project will extend across 100- and 500-year floodplains identified by the Federal Emergency Management Agency (FEMA). Certain new monopoles will be located in these FEMA-designated floodplains. However, no new monopoles are planned for location in FEMA-designated floodways and the rebuilt 115-kV lines will span all major watercourses. Sections 5.2 and 6.3 provide additional information about the Project location in relation to floodplains. Refer also to the Volume 2 maps.

In the locations where structures must unavoidably be located in FEMA-designated floodplains, UI will design and install the new monopoles to withstand any foreseeable major flood events. UI also expects

to coordinate with CT DEEP and the USACE to assure that the installation of the monopoles within the floodplains will have no adverse effects on floodplain storage capacity.

3.6.5 Blasting

In some areas along the Project route, bedrock will be encountered at shallow depths. UI currently expects to use mechanical measures (e.g., hoe ramming, chipping) to remove bedrock as necessary to create level work pads or access. However, based on the depth, extent, and type of bedrock identified during detailed subsurface studies of the Project, it is possible that controlled blasting could be required.

If blasting is necessary, UI will retain a licensed blasting contractor to develop a site-specific blasting plan for the Project. The resulting blasting plan, which will be provided to the municipal fire marshal, will comply with state and local regulations, and will take into consideration the site's geologic conditions, as well as the locations of nearby utilities and land uses. The blasting plan typically will contain information about the blasting work to be performed, schedule, safety, noise and vibration monitoring, pre- and post-blast inspections, and traffic control measures, as warranted. Detailed information regarding the contents of a blasting plan, if required, will be included in the Project's D&M Plan(s). If the need for blasting is determined after the submission of the D&M Plan(s), UI will provide the blasting plan separately to the Council for approval.

3.6.6 Soils and Groundwater Testing and Management

As part of the Project planning process, UI performed geotechnical and environmental characterization studies to characterize soils along the 115-kV rebuild route. The objectives of these studies were to assess subsurface conditions, not only for structure foundation design purposes, but also to determine the appropriate methods for managing excavated soils during construction.

Materials excavated during the Project construction process will be managed in accordance with Connecticut Guidelines for Solid Waste Management and the numeric criteria in the Connecticut Remediation Standard Regulations. Based on the results of the Project-specific studies, UI anticipates that most excavated materials will be loaded directly into dump trucks and then transported for disposal or management at an approved off-site location.

Topsoil or spoils (if any) that will be temporarily stockpiled at work sites will be contained within appropriate erosion and sediment controls (e.g., straw bales, silt fence) and may be covered with poly/plastic, pending off-site disposal. In areas where the characterization studies indicate that topsoil

or spoil materials may be re-spread over work sites as part of restoration, stockpiles will be protected with temporary erosion and sediment controls and as appropriate, reseeded for temporary stabilization with an annual seed mix (e.g., annual rye or equivalent).

3.7 OPERATION AND MAINTENANCE PROCEDURES

UI will operate, monitor, and maintain the rebuilt 115-kV facilities in accordance with standard Company procedures, required industry standards, and good utility practice.

In general, the location of the upgraded 115-kV facilities on the new galvanized steel monopoles, rather than atop the railroad catenary structures will facilitate UI inspection and maintenance activities by avoiding potential conflicts with railroad operations. For maintenance on the existing 115-kV facilities atop the catenary structures, UI must coordinate extensively with CT DOT / MNR to schedule the work, which requires MNR feeder and/or signal track outages.

In contrast, UI anticipates that the typical maintenance of the rebuilt lines, where the 115-kV monopoles are offset from the catenary structures, will not require MNR feeder or signal track outages.

3.8 PROJECT FACILITIES RELIABILITY, SAFETY AND SECURITY INFORMATION

The Project will be designed in accordance with sound engineering practices and constructed in compliance with the standards of the NESC and good utility practice. The majority of the rebuilt 115-kV lines will be situated within the CT DOT corridor, where access is already limited to prevent unauthorized entry to the rail lines.

The Project design includes protective relaying equipment to automatically detect abnormal system conditions and to send a protective trip signal to circuit breakers to isolate the faulted section of the transmission system. The fiber optic cable installed on the rebuilt overhead transmission lines will provide a robust and reliable communications path for the protective relaying systems. The protective relaying and associated equipment, along with a SCADA system for 24/7 remote control and equipment monitoring, will be housed at UI's System Operations Center.

4. CONSTRUCTION SCHEDULE AND WORK HOURS

4.1 CONSTRUCTION SCHEDULE

UI has designed and planned the Project over several years, with initial engineering assessments of the condition of the portion of the Milvon-West River railroad catenary structures that support UI infrastructure performed in 2018, followed by comprehensive analyses to define the preferred Project design, categorize environmental and land use resources, and identify measures to avoid or mitigate impacts. After the receipt of regulatory approvals, UI plans to construct the Project in stages, over multiple years.

Construction activities are expected to be organized into four segments (segments are comprised of the areas between and connecting to substations), with most construction[19] on one segment completed prior to commencing rebuild construction on the next segment. As currently planned, the sequence of segment construction will be:

Stage 1: Elmwest Substation to West River Substation

Stage 2: Allings Crossing Substation to Elmwest Substation

Stage 3: Milvon Substation to Woodmont Substation

Stage 4: Woodmont Substation to Allings Crossing Substation.

UI has planned the segment sequencing to avoid or minimize conflicts between the 115-kV transmission line rebuild activities with planned CT DOT projects along I-95 or the railroad corridor. UI also expects to schedule construction activities in conformance with regulatory approvals and permit conditions (such as to avoid or minimize conflicts with wildlife designated by Federal or State authorities).

In general, along each segment, the construction of the new 115-kV lines will proceed in a linear fashion and will include separate work crews to perform vegetation removal, access roads/work pad installation, structure foundation work, and structure/conductor/OPGW installation. Work will be

[19] Some existing 115-kV facility removal work and restoration tasks on one segment may be performed when construction of the new 115-kV lines commences on the next segment.

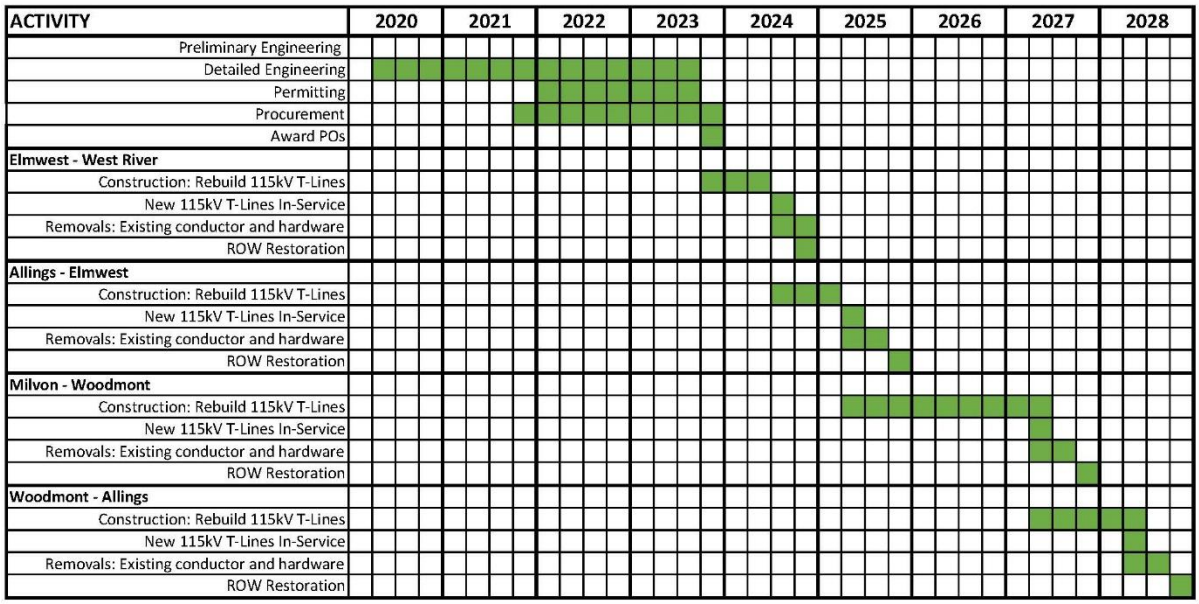
performed to install both the new 115-kV double-circuit monopoles north of the railroad tracks, as well as the new monopole structures required at specific locations south of the railroad tracks.

Concurrent with the installation of the new 115-kV lines, work crews will remove the existing UI facilities from the northern catenary structure support columns. The removal of the UI facilities along the south side of the railroad corridor will be performed separately.

Figure 4-1 illustrates UI's anticipated schedule for the Project. All approximately 9.5 miles of the rebuilt 115-kV lines are expected be in service in the third quarter 2028. At that time, the existing 115-kV facilities also are expected to be removed from the catenary structure bonnets.

Full restoration of areas disturbed by construction activities (e.g., temporary access roads and work pads, laydown/staging yards) will extend beyond the third quarter 2028 in-service date. Such final restoration will include site stabilization, reseeding, and, as appropriate, landscaping.

Figure 4-1: Project Schedule



**Note: The Project schedule is subject to change based on the receipt of regulatory approvals or other factors. More details regarding the schedule will be included in the Project D&M Plan(s).*

4.2 CONSTRUCTION WORK HOURS

The work hours for the construction of the Project will reflect the results of UI's coordination with CT DOT and MNR, including transmission line and rail outage considerations. Work involving activities within the CT DOT rail corridor, particularly the removal of the existing 115-kV lines and bonnets

from the catenary structures, will be scheduled to avoid or minimize conflicts with rail operations. Further, Project work hours will vary based on the location and type of construction activity being performed. Specific work hours will be defined in the Project D&M Plan(s).

However, based on the results of consultations to date with CT DOT and MNR, UI anticipates that Project construction hours will be similar to the following:

1. **Hours for the Performance of Construction Work Offset from the Railroad Tracks and at Laydown/Material Staging Areas/Contractor Yards**. Typical work hours for the new 115-kV line construction will be from 7 AM to 7 PM, Monday through Saturday. These work hours will apply to locations where the new 115-kV structures will be offset from the railroad tracks, as well as to the laydown/material staging areas/contractor yards (including areas where temporary Project office trailers are established) that are required to support the construction. Construction personnel may arrive and leave Project laydown/material storage areas and contractor yards outside of these hours as need to prepare for construction (e.g., for meetings in office trailers, holding safety tailboards).

2. **Hours for the Construction of New Structures that Require Railroad Track Outages**. Where the new 115-kV lines are planned for location in-line with the catenary structures, close to the railroad tracks, track outages will be required. Such outages, which will be defined based on further consultations with CT DOT and MNR, typically will be during non-peak rail use times. As a result, in these areas, 115-kV line construction is expected to be limited to weekend or overnight periods. The same hours will apply to work at the laydown/material staging areas/contractor yards required to support these activities.

3. **Tasks Requiring 24/7 Work**. Certain construction tasks will require work on Sundays or beyond standard daily or nighttime work shifts, particularly when outages are required. For example, to connect the rebuilt 115-kV lines to the Milvon, Woodmont, Allings Crossing, Elmwest, and West River substations, certain transmission and/or distribution equipment will have to be taken temporarily out of service. UI will coordinate this work with the Connecticut Valley Exchange (CONVEX) to obtain specific outage times. To complete such tasks as efficiently as possible with minimal service disruptions, work may have to be performed continuously (24 hours per day, for the number of days required).

4. **Non-Standard Work Hours at Laydown/Material Staging Areas/Contractor Yards**. The laydown/material storage area/contractor yards are required to support construction activities. As a result, yard work hours will be a function of the required work hours for different construction activities. For example, laydown/material staging areas/contractor yards must be available to support night-time removal of the 115-kV facilities and bonnets from the catenary structures, as well as day-time construction activities that involve standard work hours. As a result, depending on the specific construction tasks ongoing at a particular time, the Project laydown/material staging areas/contractor yards may operate on a 24 hours per day, 7 day per week basis.

5. **Hours for Work to Remove the Existing 115-kV Lines and Bonnets from Railroad Catenary Structures**. Work on the railroad catenary structures will involve track outages and will require specific work hours and restrictions, as defined by CT DOT / MNR. Such work,

which will be subject to MNR conditions, may have to be performed seven days/week. The specific work hours that are expected to apply to activities on the CT DOT property involve night-time construction, as follows:

- Any work requiring MNR distribution outages will typically be performed between 9:30 AM and 3:30 PM or between 10:00 PM and 4:00 AM.

- Any work requiring high rail access will typically be performed between 9:00 PM and 7:00 AM.

- Work requiring the crossing of all railroad tracks will typically be performed between 10:00 PM and 5:00 AM, Friday through Sunday (actual working time is typically 2:00 AM to 4:00 AM).

5. EXISTING ENVIRONMENTAL CONDITIONS

This section describes the existing environmental, land use, and cultural resources in the Project area[20], including along the proposed route of the rebuilt 115-kV lines along the north side of the railroad tracks, at UI's five existing substations, and to the south of the railroad tracks, where certain other Project construction activities will be performed (e.g., the removal of UI's existing 115-kV facilities [e.g., bonnets, wires] from the southern MNR catenary supports, modifications or removals of certain other existing structures, installation of new structures for substation connections). Environmental features, land uses, and cultural resources also are described for the portions of Milford, Orange, West Haven, and New Haven in the vicinity of the Project area.

This information was compiled from environmental, cultural, and land use data maintained by federal, state, and local governments, as well as field investigations of the Project area commissioned by UI and completed to date. As part of the Project planning process, UI also consulted with the affected municipalities and various agencies concerning environmental resources in the Project area and vicinity. UI will continue such consultations, as the Project planning process evolves.

In addition to the information in this section, Appendix A includes correspondence between UI and federal/state agencies regarding the Project, while Appendices B through D contain the technical reports commissioned by UI to characterize the Project's ecological resources, visual resources, and cultural resources. The aerial-based maps in Volume 2 illustrate the existing environmental conditions and land use features in the Project area, including, but not limited to:

- CT DOT railroad corridor property (including CT DOT's property boundaries, the locations of MNR rail lines, existing catenary structures and the Milford and West Haven train stations, and existing and proposed UI 115-kV structures)
- UI fee-owned property, including the Milvon, Woodmont, Allings Crossing, Elmwest, and West River substations

[20] For the purposes of the environmental analyses, the "Project area" generally refers to the CT DOT corridor within which most of the proposed 115-kV transmission line rebuild work will be performed, as well as the additional areas outside the CT DOT property where UI proposes to acquire new permanent easement, temporary easement, and/or is relevant as a sensitive area of concern.

- Locations of UI's proposed permanent easement, adjacent to the northern CT DOT property boundary
- Municipal boundaries and zoning classifications
- Topography
- Water resources, including federal and state jurisdictional freshwater and tidal wetlands and watercourses, as well as ponds/lakes
- Special flood hazard areas, including floodplains, as designated by FEMA
- Areas generally identified by the CT DEEP Natural Diversity Data Base (NDDB) as potential habitat for federal- and state-listed (protected) species
- Land uses, zoning, and coastal zone boundaries
- Designated public recreational areas
- Schools and community facilities
- Areas listed on the National or State Registers of Historic Places (NRHP, SRHP)
- Interstate and state highways, as well as local roads

5.1 TOPOGRAPHY, GEOLOGY, AND SOILS

Topography

The Project is located within the southern portion of the Western Upland and the Coastal Lowlands physiographic provinces. The general terrain in this region is characterized by low ridges, beaches, and harbors along and in the vicinity of Long Island Sound. In general, topography in the region exhibits slopes of less than 8%. Topography along the proposed transmission line route within and adjacent to the CT DOT corridor in general ranges from 5 to 85 feet above sea level (asl) in North American Vertical Datum of 1988 (NAVD88). In areas of wetlands or other waterbodies (e.g., river crossings), the ground typically slopes away from the railroad corridor to a lower elevation. The Volume 2 maps illustrate the topography in the Project area (the maps identify topographic contours at 2-foot intervals).

Overall, the topography in the Project area (i.e., within and adjacent to the CT DOT corridor) has been influenced by both the development of the rail lines and nearby urban/suburban uses. The existing surface conditions along the proposed 115-kV transmission line route north of the railroad tracks (and all other areas adjacent to the railroad tracks where construction activities will be performed) are generally level and characterized by minimal topographic variation, with the exception of localized areas near water crossings,

and unique geological features, all of which are spanned by the railroad tracks, and road crossings, which the railroad either extends beneath road overpasses or spans over via bridges.

In the immediate vicinity of the CT DOT corridor, the topography also varies, likely in part a reflection of the original construction of the rail bed. For example, in some locations along the linear railroad corridor, the topography slopes toward the railroad tracks, while in others it slopes away from the tracks . The topography also is more pronounced near the Allings Crossing Road railroad overpass (in Orange), near the Cove River crossing (in West Haven), and the 1st Avenue and I-95 crossing overpasses (in West Haven).

Bedrock and Surficial Geology

Bedrock in the Project area generally consists of metamorphic rocks, such as schists, and sedimentary rock, including New Haven arkose, locally known as brownstone . According to the USGS Bedrock Geological Map of Connecticut (December 2010), the surficial geology in the Project area generally consists of glacial meltwater deposits, including thin till (10-15 feet thick), thick till (greater than 10-15 feet thick), and drumlins (where till depths can exceed 100 feet); tidal marsh deposits; and sand/gravel overlying other surficial deposits. In general, the surficial materials in the Project area also have been modified by the historical construction of the railroad corridor and other land use developments, resulting in the presence of materials that are not native.

To assess subsurface conditions along the proposed route for the rebuilt 115-kV transmission lines, UI commissioned geotechnical analyses, including test borings.[21] The results of these geotechnical studies confirmed the published data regarding general bedrock and surficial conditions in the Project area. Specifically, the test borings identified bedrock at varying depths, ranging from 2 feet below ground surface to 34.5 feet below ground surface. Bedrock was generally described as highly weathered schist and siltstone.

The test borings completed during the geotechnical studies confirmed that surficial materials had been affected by historical developments along the railroad corridor. Specifically, the presence of fill materials was documented in the majority of borings along the proposed transmission line route. In general, fill material was observed at depths between 1.3 feet and 17 feet below ground surface. In most of the borings, the fill was characterized as silty sand and poorly- graded sand, with varying amounts of silt and gravel. However, organics and swamp deposits were observed in the area around the wetland feature associated

[21] Approximately 130 test borings have been conducted to date; additional borings are scheduled to be performed prior to the end of the year (2021).

with West River at depths down to 30 feet below the ground surface. The swamp deposits are described as silt, elastic silt with organics, and silt sand, with varying amounts of clays.

Glaciodeltaic and/or glacial till deposits and were observed throughout most of the test borings at varying depths. Glaciodeltaic deposits are primarily described as silt sand, poorly graded sand with varying amounts of silt, and sandy silt whereas the till encountered was primarily described as silt sand, poorly- graded sand, clayey sand, well graded sand with varying amount of silt. Glaciolacustrine deposits also were observed in Milford at depths of approximately 2 to 36 feet below ground surface. These materials are primarily described as clayey silt with sand, and silt with varying amount of sand.

Soils

The CT DOT rail corridor and most of the uplands immediately adjacent to it have been subject to various land use developments, including the creation and maintenance of the MNR railbed using crushed rock for ballast. As a result, the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) identifies most soils along the CT DOT rail corridor as in the Urban Land or Udorthents-Urban land complexes. Udorthents is a miscellaneous upland type used to denote moderately well to excessively drained earthen material that has been so disturbed by cutting, filling, or grading that the original soil profile can no longer be discerned.

The native soils remain intact in certain portions of the Project area, including areas mostly near freshwater or tidal wetlands, watercourses (such as the Wepawaug, Indian, and West rivers), or areas of higher elevation. In these areas, upland soil types include both glaciofluvial soil types (e.g., the Agawam and Haven series) within areas derived from outwash surficial material along with glacial till derived soils of the Canton and Charlton complex and Paxton and Montauk complex along till ridges and hills which characterize the local elevation variances in the Project area and are not characteristic of the scenic ridgelines that might be considered in a viewshed analysis. Many of the remaining wetland soil areas are organic soils that are difficult to fill and develop. These include the Catden and Freetown complex, and the Timakwa and Natchaug complex. Wetland soils influenced tidally consist of Westbrook mucky peat, derived from shallow organic material associated within tidal wetlands. Non-tidally influenced wetland soils were found to be Udorthent Urban land complex, derived primarily from urban influenced parent material.

The Project area encompasses certain areas mapped as Prime Farmland or Statewide Important Farmland soils. However, these soils are not presently used for agricultural purposes. Similarly, portions of the

Project area include soils classified as erodible, although there are no soils classified as most susceptible (highly) erodible soils.

5.2 WATER RESOURCES AND WATER QUALITY

Water resources within and in the vicinity of the CT DOT corridor include freshwater and tidal wetlands, freshwater and tidal watercourses, waterbodies (ponds), floodplains, and groundwater resources, including public water supplies. The CT DOT corridor extends through southern New Haven County, generally paralleling the coast approximately 1 mile inland from Long Island Sound. As a result, the CT DOT corridor, including UI's existing 115-kV transmission lines, span both tidal and freshwater water resources, including areas near Milford Harbor and New Haven Harbor.

UI conducted both baseline research to define designated water resources (e.g., floodplains, drinking water supply sources) and field investigations to delineate State and Federal jurisdictional water resources (e.g., freshwater/tidal wetlands and watercourses, lakes and ponds) in the Project area. The field investigations were conducted within the CT DOT railroad corridor, as well as in adjacent areas where UI proposes to acquire easements for the Project.

5.2.1 Drainage Basins and CT DEEP Water Quality Classifications

The Project area is located within the southern portion of two of Connecticut's eight major drainage basins. The western portion of the Project area in Milford lies within the Housatonic Drainage Basin, while the remainder of the Project is within the South Central Coast Drainage Basin. Both basins discharge to Long Island Sound. Within these two major drainage basins, the Project area crosses five CT DEEP sub-regional basins: the Housatonic River sub-regional basin, the South Central Shoreline sub-regional basin, the Wepawaug River sub-regional basin, the Indian River sub-regional basin, and the West River sub-regional basin.

For each Connecticut drainage basin, CT DEEP maintains extensive water resource information and promotes watershed management with the goal of improving water quality by protecting surface and ground waters from degradation; restoring degraded surface waters to conditions suitable for fishing and swimming; restoring degraded groundwater to protect existing and designated uses; and defining priorities for pollution abatement. Accordingly, as summarized in Tables 5-1 and 5-2, CT DEEP established Water Quality Standards and Classifications, for both groundwater and surface water, that identify the water quality management objectives for each waterbody.

Table 5-1: Summary of Connecticut Ground Water Use Goals

Groundwater Resource Class	Designated Use Description
GAA	Existing or potential public supply of water suitable for drinking without treatment; baseflow for hydraulically connected surface water bodies.
GAAs	Ground water that is tributary to a public water supply reservoir.
GA	Existing private and potential public or private supplies of water suitable for drinking without treatment; baseflow for hydraulically connected surface water bodies.
GB	Presumed not suitable for human consumption without treatment; industrial process water and cooling waters; baseflow for hydraulically connected surface water bodies;
GC	Assimilation of permitted discharges. Example: a lined landfill for disposal of ash residue from a resource recovery facility. The GC hydrogeology and hydrologic setting provides the best safeguard to adjacent resources.

Source: R.C.S.A, Section 22a-426-7.

Table 5-2: Summary of Connecticut Surface Water Use Goals

Surface Water Resource Class	Designated Use Description
Freshwater	
AA	Existing or proposed drinking water supply, fish and wildlife habitat, recreation, water supply for industry and agriculture
A	Potential drinking water supply, fish and wildlife habitat, recreation, navigation, industrial and agricultural water supply.
B	Fish and wildlife habitat, recreation, industrial and agricultural water supply, navigation
Coastal Marine	
SA	Habitat for marine fish, other aquatic life, and wildlife; recreation, industrial water supply, direct shellfish consumption, navigation
SB	Habitat for marine fish, other aquatic life, and wildlife; recreation, industrial water supply, navigation. Commercial shellfish harvesting.

Source: R.C.S.A, Section 22a-426-4.

In most of the Project area, the CT DEEP classifies groundwater as GB, although areas classified as GA are located along the route in western Milford, as well as in the eastern portions of Milford and in Orange. The area in the immediate vicinity of Phipps Lake (West Haven) is classified as GA, potentially not meeting current GAA standards.

A GA classification denotes groundwater that is "within the area of existing private water supply wells or an area with the potential to provide water to public or private water supply wells." In addition, a GA

groundwater classification is presumed suitable for direct human consumption without treatment. A GB classification denotes groundwater that is "located within highly urbanized areas of intense industrialization and where public water supply is available." In addition, as GB groundwater classification is presumed not suitable for direct human consumption without treatment. However, the areas in the vicinity of the Project are served by public water, provided by the South Central Connecticut Regional Water Authority.

Surface waters in the Project area are classified as SB for the tidally-influenced portions of the Wepawaug, Indian, and West rivers), and A for freshwater watercourses traversed.

5.2.2 Surface Water Resources (Freshwater and Tidal)

The CT DOT corridor encompasses or extends across various freshwater and tidal surface water resources (e.g., wetlands and watercourses, as well as ponds and lakes). The Project area's water resources were identified based on the results of desktop studies and research, followed by field surveys (conducted in 2018 to 2021[22]) to delineate water resources that meet federal and state jurisdictional criteria.

The methods used to field-delineate federal and state jurisdictional water resources are summarized in the *Ecological Assessment Report* and in the *Wetland Identification and Delineation Reports* (presented by Project segment), all included in Appendix B. As noted in the Appendix B reports, state jurisdictional wetlands and waterbodies are defined solely on the presence of poorly drained, very poorly drained, alluvial, or floodplain soils and submerged land. Watercourses are defined as rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent, public or private, which are contained within, flow through or border upon the state or any portion thereof.

Federal jurisdiction of wetlands and waterbodies are established as "Waters of the United States", which includes lakes, rivers, and streams, as well as vegetated wetlands. In the Project area, federal jurisdictional waters and wetlands, which are regulated by the U.S. Army Corps of Engineers (USACE), were delineated in accordance with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual Northcentral and Northeast Region* ([*Manual*], Version 2.0, January 2012). To qualify as a Federal jurisdictional wetland, three parameters must be present: dominant hydrophytic vegetation, hydric soils, and hydrological conditions. The Volume 2 maps identify the

[22] Water resource field surveys were performed by a Professional Wetlands Scientist (PWS) and a Certified Professional Soil Scientist (CPSS).

specific locations of both freshwater and tidal water resources in the Project area. This section summarizes the results of the water resource studies and is shown in Table 5-3.

Table 5-3: Wetlands and Watercourse Classification Key

National Wetlands Inventory (NWI) Classification of Wetlands and Deepwater Habitats Classification Key	
Classification Designation	Classification Description
E1UBL	estuarine, subtidal unconsolidated bottom subtidal
E1UBL3	estuarine, subtidal unconsolidated bottom subtidal mixohaline (brackish)
E2EM1Pd	estuarine, intertidal emergent persistent irregularly flooded, partly drained/ditched
E2EM5	estuarine intertidal emergent *Phragmites australis*
E2SS1P	estuarine intertidal scrub-shrub broad-leaved deciduous irregularly flooded
PEM	palustrine emergent
PEM1/SS1E	palustrine emergent persistent and scrub-shrub broad-leaved deciduous seasonally flooded/saturated
PEM5E	palustrine emergent *Phragmites australis* seasonally flooded/saturated
PFO	palustrine forested
PFO1E	palustrine forested broad-leaved deciduous seasonally flooded/saturated
PSS	palustrine scrub-shrub
PSS1C	palustrine scrub-shrub, broad-leaved deciduous, seasonally flooded
PSS1E	palustrine scrub-shrub broad-leaved deciduous seasonally flooded/saturated
PSS1Eh	palustrine scrub-shrub broad-leaved deciduous seasonally flooded/saturated diked/impounded
PUBHx	palustrine unconsolidated bottom permanently flooded excavated
R4SBC	riverine, intermittent streambed seasonally flooded
R4SBCh	riverine, intermittent streambed seasonally flooded diked/impounded
R4SBE1	riverine, intermittent seasonally flooded/saturated streambed watercourse
R4UBC	riverine, intermittent unconsolidated bottom seasonally flooded
R4UBCh	riverine, intermittent unconsolidated bottom seasonally flooded diked/impounded
R5UBH	riverine, unknown perennial unconsolidated bottom permanently flooded
R5UBh	riverine, unknown perennial unconsolidated bottom diked/impounded
R5UBh1	riverine, unknown perennial unconsolidated bottom diked/impounded, cobble-gravel

As illustrated on the Volume 2 aerial-based maps and referred to in this section, delineated wetlands and watercourses along the proposed transmission line rebuild route are identified sequentially, from southwest to northeast, by municipality. For ease of reference, each water resource was assigned a Project-specific alpha-numeric label. For example, watercourse M-WC4 is the third watercourse along the route in Milford; wetland WH-W11 is the eleventh wetland delineated along the proposed transmission line route in West Haven. Tidal wetlands and watercourses are demarcated by a "T" in this classification system. On the facing

page text associated with the 1" = 400' maps in Volume 2, wetlands and watercourses are listed by NWI classification and type (inland, tidal); these aerial maps also generally illustrate the locations of the water resources. The 1"=100' maps in Volume 2 provide a clearer view of each wetland and watercourse, by Project-specific number.

Watercourses and Waterbodies

The Project area extends across 36 watercourses, including 13 perennial and 23 intermittent streams. Of these watercourses, five, including the Wepawaug, Indian, and West rivers are tidally influenced. In addition, one waterbody – Phipps Lake – is located directly south of the CT DOT corridor in West Haven. Table 5-4 summarizes the major characteristics of these water resources from the Connecticut Environmental Conditions Online (CT ECO) *Water Quality Classifications* database.

The majority (28) of these watercourses are minor streams that parallel the railroad and are the result of the historic development and elevation of the railroad, they serve as important storm drainage but do not provide robust biodiversity function. However, eight of the watercourses including the Wepawaug, Indian, Oyster, Cove, and West rivers, are traversed by the railroad corridor.

With the exception of the Wepawaug, Indian, and West rivers, all of the watercourses in the Project area are generally less than 50 feet wide. In contrast, the Wepawaug River is approximately 70 feet wide, the Indian River is approximately 150 feet wide, and the West River is approximately 170 feet wide. The existing 115-kV lines (and the railroad tracks) currently span all watercourses along the route from Milvon Substation to West River Substation.

Neither the U.S. Department of the Interior National Park Service nor the National Wild and Scenic Rivers System designate any of the watercourses in the Project as state or federal scenic rivers.

Only one pond – Phipps Lake – is directly adjacent to the CT DOT corridor between Milvon Substation and West River Substation. Phipps Lake, a 26-acre reservoir, is located south of the railroad corridor in West Haven. The lake is surrounded by single-family residential development and is separated from the CT DOT railroad corridor by an approximately 100 to 400-foot-wide vegetated buffer.

Table 5-4: Watercourses and Waterbodies along the Proposed Transmission Line Route

Municipality / Volume 2, 100 / 400-Scale Mapsheet Nos.	Watercourse / Waterbody Name (Number)*	Flow Type Intermittent (I) or Perennial (P)	Freshwater (F) or Tidal (T)	Water Quality Classification within Project Area**
Milford				
1/1	M-WC1	I	F	A/AA
1/1	M-WC2	I	F	A
6/2	Wepawaug River	P	T	A/SB
10/3	Indian River	P	T	SB
10/3	M-TWC2	P	T	SA
10/3	M-TWC3	P	T	SA
13/4	M-WC4	I	F	A
13/4	M-WC5	P	F	A
15/4	M-WC6	I	F	A
16/5	M-WC7	P	F	SA
16/5	M-WC8	P	F	A/AA
18/5	M-WC9	I	F	A/AA
18/5	M-WC10	I	F	A/AA
Orange				
19/5	O-WC1	I	F	A/AA
20/5	O-WC2	I	F	A/AA
20/5	O-WC3	I	F	A/AA
20/6	Oyster River	P	F	A
West Haven				
20/6	WH-WC1	I	F	A
21/6	WH-WC2	I	F	A
21/6	WH-WC3	I	F	A
21/6	WH-WC4	I	F	A
22/6	WH-WC5	P	F	A
22/6-7	WH-WC6	I	F	A
22/6	WH-WC7	P	F	A/AA
25/7	WH-WC8	I	F	A/AA
25/7	WH-WC9	P	F	A/AA
25/7	WH-WC10	I	F	A/AA
25/7	WH-WC11	I	F	A/AA
25/7	WH-WC12	I	F	A/AA
25/7	WH-WC14	I	F	A/AA
25/7	WH-WC15	I	F	A/AA
25/7	WH-WC16	I	F	A/AA
26/7	WH-WC17	I	F	A/AA
27/7	WH-WC18	I	F	A/AA
27/7	Cove River	P	F	SA
West Haven/New Haven				
34/9	West River	P	T	SB

*Refers to Project-specific number given to the water resource during field investigations and shown on the Volume 2 aerial-based maps.
**Watercourses not specifically classified are considered as Class A or Class AA, per Connecticut's Water Quality Standards.
Shading indicates tidal watercourse.

Wetlands

A total of 41 wetlands were delineated within and adjacent to the CT DOT corridor. Of these, nine are tidal. These tidal wetlands are located along the proposed transmission line route adjacent to the Indian and West rivers. Table 5-5 lists the delineated wetlands, identifying each wetland based on the National Wetland Inventory (NWI) classification regarding habitat type.[23]

Table 5-5: Wetlands along the Proposed Transmission Line Route

Municipality / Project 100/400 Scale Mapsheet Nos. (Volume 2)	Wetland Number*	NWI Classification	Inland (I) or Tidal (T)
Milford			
1/1	M-W1	PFO	I
1/1	M-W2	PFO	I
2/1	M-W3	PEM	I
7/2	M-W4	PSS1C	I
9/3	M-W5	PFO	I
9/3	M-W6	PFO	I
10/3	M-TW1	E2EM1Pd	T
10/3	M-TW2	E2EM1Pd	T
10/3	M-TW3	E2EM1Pd	T
12/3-4	M-W7	PEM	I
13-14/4	M-W8	PSS	I
13-14/4	M-W9	PFO	I
15/4	M-W10	PEM	I
16/5	M-W11	PSS	I
16/5	M-W12	PFO	I
16-17/5	M-W13	PSS	I
17/5	M-W14	PFO	I
17/5	M-W15	PEM1/SS1E	I
18/5	M-W16	PSS1E	I
18/5	M-W17	PSS	I
Orange			
20/6	O-W1	PEM	I
20/6	O-W2	PFO	I
West Haven			
21-22/6	WH-W1	PEM	I
23/6	WH-W2	PSS	I
24/7	WH-W3	PEM	I
25/7	WH-W4	PEM	I

[23] The Volume 2 maps (Section V2.1) provide a full key to NWI classifications. The principal classifications are: PFO = palustrine forested; PSS = palustrine scrub-shrub; PEM = palustrine emergent march; PUBHx = palustrine unconsolidated bottom permanently flooded excavated; E1UBL = estuarine, subtidal, unconsolidated bottom subtidal.

Municipality / Project 100/400 Scale Mapsheet Nos. (Volume 2)	Wetland Number*	NWI Classification	Inland (I) or Tidal (T)
25/7	WH-W5	PSS1E	I
26/7	WH-W6	PSS1E	I
26/7	WH-W7	PFO1E	I
27/7	WH-W8	PSS1Eh	I
27/7	WH-W9	PFO1E	I
29/8	WH-W10	PUBHx	I
32/9	WH-W11	PEM5E	I
32-33/9	WH-W12	E2EM5/SS1P	I
32-33/9	WH-W13	E2EM5/SS1P	I
33-34/9	WH-TW1	E2EM5/E2SS1P	T/I
33-34/9	WH-TW2	E2EM5/E2SS1P	T
33-34/9	WH-TW3	E2EM5/E2SS1P	T
33-34/9	WH-TW4	E2EM5/E2SS1P	T/I
New Haven			
34/9	NH-TW1	E1UBL	T
34/9	NH-TW2	E1UBL	T

*Refers to Project-specific number given to the water resource during field investigations and shown on the Volume 2 aerial-based maps.

Shading indicates a tidal wetland.

5.2.3 Flood Zones

Subsequent to Hurricanes Irene (2011) and Sandy (2012) and similar storm events in 2020-2021, coastal Connecticut communities, including the municipalities in the Project area, have become increasingly aware of the heightened potential for more frequent and more severe flooding. After Hurricane Irene and Storm Sandy, the FEMA reclassified flood zones in much of the state's coastal area.

FEMA classifies Special Flood Hazard Areas for insurance and floodplain management purposes and has prepared maps designating certain areas according to the frequency of flooding. An area mapped within the 100-year flood designation has a 1% chance of flooding each year or is expected to flood at least once every 100 years. Areas designated "AE" indicate a base floodplain where base flood elevations have been determined by FEMA. An area within the 500-year FEMA-designated flood zone has a 0.2% chance of flooding each year. Such areas (between the 100-year and 500-year flood zones) are considered to have a moderate flood hazard; a Zone "X" on FEMA mapping refers to these areas.

FEMA defines a "regulatory floodway" as a "channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water

surface elevation more than a designated height". Specifically, the existing railroad corridor spans floodways at Beaver Brook (encompasses watercourse M-WC1), Wepawaug River, and Indian River in Milford; Oyster River in Orange/West Haven; streams WH-WC5, WH-WC6, and WH-WC7, and Cove River in West Haven; and the West River in West Haven/New Haven.

FEMA defines a "floodplain" as "any land area susceptible to being inundated by floodwaters from any source". In other words, a floodplain is the area that includes the floodway, as defined above, and the floodway fringes which are the remaining areas on either side of the floodway that comprise of the floodplain. FEMA and state regulations allow communities to allow the floodway fringes to be modified and developed if certain requirements are met.

The CT DOT railroad corridor is located in the very southernmost portions of the Housatonic and South Central Coast major drainage basins. Sub-regionally, the aforementioned floodways fall within the southernmost portions of the South Central Shoreline, Wepawaug River, Indian River, and West River basins. Thus, the Project area, including floodway conditions, is in close proximity to and drains to the Long Island Sound.

As illustrated on the Volume 2 maps, the CT DOT corridor traverses several FEMA-designated 100-year and 500-year flood zones in all four municipalities along the 9.5-mile route between Milvon and West River substation. The railroad corridor also spans several FEMA-designated floodways. In these FEMA-designated flood zones, the existing 115-kV lines are located on top of the MNR catenary structures. Except for Milvon Substation, none of UI's other existing facilities in the Project area are located within floodplains. Milvon Substation and the adjacent monopoles that support the connections to the 115-kV lines located within the railroad corridor are within the 100-year floodplain associated with the Beaver Brook.

Overall, within the Project area, the potential for flooding is a concern. For example, as a coastal community, Milford's Hazard Mitigation Plan identifies flooding as the city's primary natural hazard. Furthermore, the work of Connecticut Institute for Resiliency and Climate Adaptation (CIRCA) has specified likely projected sea level rise which must be accounted for given the location of the Project. Based on a review of the FEMA Flood Insurance Rate Maps and the FEMA National Flood Hazard Layer Viewer for the Project area, the proposed rebuilt transmission lines will extend across FEMA-designated 100 and 500-year flood zones as listed above.

5.2.4 Groundwater Resources, Public Water Supply, and Aquifer Protection Areas

As part of the subsurface investigations of the proposed 115-kV rebuilt transmission line route, UI also compiled information regarding depth to groundwater. Based on the results of that testing, the depth to groundwater in the Project area is estimated to range from approximately 2 feet to 20 feet or more below grade. Groundwater was not encountered in all test borings. Further, groundwater levels can be expected to fluctuate seasonally.

As noted in Section 5.2.1, based on CT DEEP's *Water Quality Classification*s map data (October 2018), most groundwater in the Project area is classified as GB or GA. GA classified waters, which are found near the railroad corridor in eastern Milford and Orange, are designated as suitable for drinking without treatment. GB-designated groundwater is found beneath other portions of the Project area in Milford and West Haven, as well as in New Haven. Water with a GB classification includes industrial process and cooling waters and base flow for hydraulically connected water bodies. Such water is presumed not suitable for human consumption without treatment. However, adjacent to Phipps Lake, which abuts the southern boundary of the railroad corridor in West Haven, groundwater is classified as "GA, GAA may not meet current standards".

According to CT DEEP data, no designated Aquifer Protection Areas are located near the Project area.

5.3 BIOLOGICAL RESOURCES

5.3.1 Vegetation

Vegetative communities in the general vicinity of the Project area are characteristic of the southern New England urban/suburban region. Typical vegetative habitats found in the vicinity of the Project area include suburban lawns, trees, and landscaping; narrow buffer strips of vegetation; and freshwater and tidal wetlands.

Within the CT DOT corridor, vegetation is generally sparse immediately adjacent to the railroad tracks and overall is dominated by non-native invasive species, as well as escaped ornamental vegetation associated with residential landscaping. Scattered areas of shrubs and mature trees characterize portions of the CT DOT property farther from the railroad tracks. In addition, in a limited number of locations, mature trees characterize areas adjacent to the CT DOT property boundary.

Trees, which are found along the boundaries of the CT DOT property, are primarily deciduous hardwoods common to Connecticut, including oak (*Quercus var.*), red maple (*Acer rubrum*), black cherry (*Prunus*

serotina), and quaking aspen (*Populus tremuloides*). Due to the historical development and maintenance activities within the railroad corridor, disturbed areas also include a complex of common introduced native species and many invasives, such as Autumn olive (*Elaeagnus umbellata*), Tree-of-Heaven (*Ailanthus altissima*) and Asiatic bittersweet (*Celastrus orbiculatus*).

In the Project area, the Indian River and West River wetland systems are exceptions to the non-native vegetative communities that dominate other wetlands in the Project vicinity. For example, the Indian River wetland is largely dominated by native tidal marsh vegetation (i.e., *Spartina alterniflora and Spartina patens*). The tidal wetland complex that borders the West River also is characterized by tidal vegetation including smooth cordgrass (*Spartina alterniflora)*, hightide bush (*Iva frutescens)*, and sea lavender (*Limonium nashi)* found at or below the Connecticut coastal jurisdictional line (CJL)[24] elevation, with common reed (*Phragmites australis)* and hightide bush *(Iva frutescens)* found in the wetland areas above the CJL elevation.

With the exception of these two tidal riverine habitats, wetlands within the Project area are typically characterized as of low quality and disturbed, often dominated by invasive species, including common reed (*Phragmites australis* var. *australis)* and Purple Loosestrife (*Lythrum salicaria L.)*.

5.3.2 Wildlife

The wildlife that may inhabit the Project area can be expected to be typical of that found near residential/commercial/industrial developments in coastal areas. The Project area supports wildlife associated with urbanized environs. Such habitats are of low significance in the State of Connecticut (the State), as they tend to support disturbance-dependent wildlife, which are often species subsidized by human activities (e.g., rats, skunks, racoons).

The Project area is situated within a densely developed landscape with high traffic roadways and railways that present significant barriers to the movement of terrestrial wildlife, including mammals, amphibians, and reptiles. For the same reasons, the Project area provides limited habitat for birds. In some locations, near the CT DOT railroad corridor, small remnant habitat "islands" may provide support for migratory birds passing through during seasonal movements along the Connecticut coastline. However, there are no areas

[24] Connecticut's Coastal Jurisdiction Line refers to the location of the topographical elevation of the highest predicted tide referenced to the most recent National Tidal Datum Epoch as published by the National Oceanic and Atmospheric Administration and described in terms of feet of elevation above the North American Vertical Datum of 1988.

of large core forests of greater than 250 acres in the vicinity and thus long-term habitat for birds along the CT DOT corridor is restricted to disturbance-tolerant species.

During UI's biological field investigations of the Project area, an osprey (*Pandion haliaetus*) nest was observed on a catenary structure near the Indian Rivers. In Connecticut, osprey return from southern wintering grounds in late March, with eggs laid in April and the young typically making a fledgling flight 60 days after hatching (typically August). Osprey readily use a variety of available sites for nesting, including utility poles. For the 2021 survey work along the CT DOT corridor, UI consulted with CT DEEP regarding the osprey nest. Depending on the status of this or other osprey nests that may be established along the CT DOT corridor in the future, UI expects coordinate further with CT DEEP regarding this species and proposed Project activities.

5.3.3 Vernal Pools

UI conducted field surveys of the Project area to determine if vernal pools were present. The vernal pool surveys were performed in early spring of 2021, the optimum time-of-year to identify vernal pool species, while water levels are high and signs of amphibian breeding visibly evident.

Although a preliminary wetlands review conducted in the Spring 2018 identified one location as a *potential* vernal pool, additional field studies were conducted in Spring 2021 and this area was determined not to contain any of the obligate species that characterize vernal pool habitat. These investigations found no vernal pool habitat within or proximate to the Project. The lack of vernal pools in the Project area is not unexpected given that amphibian species dependent on vernal pools rely on upland forest surrounding the breeding pools for primary habitat during the non-breeding season. Upland forest is lacking in the Project area, which is characterized by infrastructure and dense urban/suburban development. Furthermore, observed hydroperiods[25] for wetlands in the Project area were generally found to be inappropriate for vernal pool amphibians. Specifically, most wetlands were either saturated or permanently flooded, and few possessed the seasonal flooding required by vernal pool indicator species.

5.3.4 Fisheries

The Project area traverses various perennial watercourses that are either known to support or have the potential to support warm water and other fisheries habitats. These include but are not limited to the

[25] The period in which a soil area is waterlogged. Hydroperiod determines not only the length of time that amphibian larvae have for developing to the point where they can leave the water for land, but also the number and types of predators to which they are exposed.

Wepawaug, Indian, Oyster, Cove, and West rivers. Warm-water fisheries are generally less sensitive than cold-water, and more tolerant of habitat disturbance and modifications to water quality.

Certain cold-water species (trout) have been stocked in the past in some of the Project area watercourses; however, none of the reaches of these watercourses along the railroad corridor support self-sustaining trout populations. Similarly, no state-designated or wild trout management areas are located in the vicinity of the CT DOT railroad corridor.

The American eel, the only catadromous fish[26] in Connecticut, is found in all waterbodies in the state. North of the Project area, West River Memorial Park in New Haven provides access for crabbing opportunities.

The Project area also is near areas that support anadromous fish (i.e., fish species that spend most of their adult lives at sea but return to freshwaters to spawn). Indian River, Wepawaug River, and Quirks Pond Creek in Milford and the Oyster River in Milford/West Haven support alewife anadromous fish runs, while the West River supports alewife and sea lamprey. These anadromous species migrate to the first barrier on each waterway.[27] Striped bass and gizzard shad, also anadromous species, also feed in many coastal rivers in Connecticut and may periodically be found in the larger watercourses in the Project area.

5.3.5 Federal and State-Listed Threatened, Endangered, or Special Concern Species

To evaluate the potential for federal or state-listed species to occur in the Project area, UI conducted research, evaluated potential habitats during field investigations of the Project area, and consulted with representatives of both the U.S. Fish and Wildlife Service (USFWS) and the CT DEEP NDDB program.

Federally-Listed Species

To determine whether the Project area coincides with the known habitat of species identified by the Federal government as threatened, endangered or species of concern, UI also consulted with the USFWS's New England Ecological Services Field Office using the online Information for Planning and Consultation (iPaC). The iPaC system identified two species, each listed as "threatened", as potentially occurring within the Project Area. (Refer to Appendix A for the USFWS's iPaC review, data September 14, 2021).

- Northern long-eared bat ([NLEB]; *Myotis septentrionalis*): No critical habitat has been designated by the USFWS for this species. The Project area is not located within 150 feet of a known occupied maternity roost tree or within 0.25 mile of a known NLEB hibernaculum. There are currently no

[26] According to CT DEEP, catadromous fish live most of their adult lives in freshwater but must return to saltwater to spawn.
[27] https://portal.ct.gov/-/media/DEEP/fishing/fisheries_management/Migratory-Fish-Runs.pdf

documented NLEB maternity roost trees in Connecticut. The nearest NLEB habitat resource to the proposed Project is located in North Branford, over 6 miles from the eastern end of the Project area.

- Red knot (*Calidris canutus rufa*): The red knot is a shorebird typically found along the Connecticut coastline during northbound and southbound migration. These birds spend most of their time foraging along the waterline within the intertidal zone. The proposed Project is within highly developed areas that provide no suitable foraging habitat for red knot. The only intertidal habitats in the Project area are the West River and Indian River tidal embankments. However, both locations are inland tidal habitats (rather than coastal), and both lack broad intertidal flats that could support feeding. Elevation changes along both rivers are abrupt, resulting in only a narrow exposed intertidal zone (consisting of fine sand and organic Westbrook mucky peat material) before transitioning to the bordering tidal marsh habitat. Based on these factors, UI does not anticipate construction activities associated with the Project would have any effect on red knot habitat.

- Monarch Butterfly (*Danaus plexipus*): The Monarch Butterfly is Federally listed as a candidate but not yet listed or proposed for listing. No critical habitat has been designated for this species.

State-Listed Species

The CT DEEP NDDB performs hundreds of environmental reviews each year to determine the impact of proposed development projects on state listed species and to help landowners conserve the state's biodiversity. In furtherance of this endeavor, the DEEP also developed maps to serve as a pre-screening tool to help determine if there is the potential for project-related impact to state-listed species.

The NDDB maps represent approximate locations of (i) endangered, threatened and special concern species and, (ii) significant natural communities in Connecticut. The locations of species and natural communities depicted on the maps are based on data collected over the years by CT DEEP staff, scientists, conservation groups, and landowners. In some cases, an occurrence represents a location derived from literature, museum records and/or specimens. These data are compiled and maintained in the NDDB. The general locations of species and communities are symbolized as shaded (or cross-hatched) polygons on the maps. Exact locations have been masked to protect sensitive species from collection and disturbance and to protect landowner's rights whenever species occur on private property.

A review of CT DEEP NDDB mapping revealed that NDDB polygons are present along and adjacent to the CT DOT corridor. As a result, UI initiated consultation with NDDB in 2017 and requested a preliminary assessment review in order to gain an early understanding of what State-listed species may be present in the Project vicinity.

The NDDB determined that there are known extant populations of one endangered, one threatened, and five special concern species potentially present in the vicinity of the Project, including:

- Endangered *Eriocaulon parkeri* (Parker's pipewort)
- Threatened *Ammodramus maritimus* (seaside sparrow)
- Special Concern *Ammodramus caudacutus* (saltmarsh sharp-tailed sparrow)
- Special Concern *Rana pipiens* (northern leopard frog)
- Special Concern *Terrapene carolina* (eastern box turtle)
- Special Concern *Malaclemys terrapin* (northern diamondback terrapin)
- Special Concern *Bolboschoenus novae-angliae* (Salt marsh bulrush)

As Project plans evolved, UI reached out to NDDB again in 2020. The NDDB's most recent determination letter ("Determination" No. 2020073487, dated December 27, 2020) confirmed that no additional species had been added to its initial listing and provided recommendations both for pre-construction surveys and for protective measures to be implemented during construction (refer to Appendix A: NDDB Determination Letter). The Determination is valid for two years. If the Project scope of work changes or work is not initiated by December 27, 2022, UI will submit a new request to CT DEEP NDDB. UI will maintain a valid NDDB determination through the full duration of the Project.

A summary of the listed species identified by NDDB is provided below. Detailed information regarding these species and their habitat preferences is provided in the ***Ecological Assessment Report*** (refer to Appendix B).

- ***State Endangered Plant Species – Parker's pipewort – and State Special Concern Plant – Salt marsh bulrush:*** As its common name suggests, salt marsh bulrush grows in tidally influenced salt marshes. Parker's pipewort grows in freshwater habitats. Botanists familiar with these species conducted preliminary field surveys in September 2020 and 2021, when both plants were identifiable. The timing of the surveys coincided with end of the flowering period of Parker's Pipewort and the fruiting period of New England tuber-bulrush. The September 2020 survey was completed when Project plans were in a preliminary design stage with the intent of inspecting these habitats to document the vegetative conditions during the late summer season and determine if suitable tidal wetlands habitat is present within proposed construction areas that can support Parker's pipewort and saltmarsh bulrush. In September 2020, neither species were observed. Follow-up botanical surveys were conducted in September of 2021 at these confirmed tidal wetland locations. Consistent with the prior surveys, no target species are present.

- ***State Threatened - Seaside sparrow and State Special Concern - Saltmarsh sharp-tailed sparrow***: These two tidal wetland dependent bird species nest in salt marshes and are most susceptible to human disturbance during the breeding season (approximately April through August). CT DEEP records indicate the presence of these birds in the salt marshes surrounding the Indian River in Milford. CT DEEP recommends protective measures during Project construction to avoid unintended encounters and mitigate potential adverse effects.

- ***State Special Concern - Eastern box turtle*:** Eastern box turtles can be found near ponds, fields, meadows, and woodlands throughout Connecticut. UI has received information from the City of

Milford's Inland Wetlands Compliance Officer regarding known areas where eastern box turtles have been found to be active.

- ***State Special Concern Northern Diamondback Terrapin*:** The Northern diamondback terrapin inhabits salt marshes and associated salt or brackish tidal creeks and ditches. They can also be found in mud flats, shallow bays, coves, and tidal estuaries. Adjacent sandy dry upland areas are required for nesting, which takes place in June and July on salt marshes and adjacent beach areas. Peak hatching periods can occur between April and June and September and November. This species overwinters in depressions in the bottom of estuaries, creeks, and salt marsh channels. CT DEEP maintains records of this turtle in Gulf Pond and Indian River in Milford.

- ***State Special Concern northern leopard frog*:** The northern leopard frog prefers open, grassy habitats either along the floodplain of a large stream or river, in wetlands around the margins of large lakes, or in meadows adjoining tidal wetlands. Leopard frogs are active from late March to mid-October. Historic records of leopard frog from the New Haven and East Haven represent populations now believed to be extirpated. Furthermore, these records are believed to represent the newly discovered Atlantic coast leopard frog (*Rana kauffeldi*).

5.4 COASTAL RESOURCES

Connecticut's Coastal Management Act is administered by CT DEEP and approved by the National Oceanic and Atmospheric Administration (NOAA) pursuant to the Federal Coastal Zone Management Act. Connecticut's Coastal Management Program is designed to ensure "balanced growth along the coast, restore coastal habitats, improve public access, protect water-dependent uses, public trust waters and submerged lands, and promote harbor management", according to CT DEEP.

Except for the crossings of tidally-influenced water resources, the CT DOT corridor does not traverse coastal water resources. The railroad corridor is located inland, parallel to and generally approximately 1 mile north of the Long Island Sound coast. The closest coastal access points (as identified by CT DEEP) to the Project area are the Milford Landing Marina, located at the head of Milford Harbor approximately 0.23 miles south of the railroad span of Indian River and Wilcox Park, a Milford park situated on the opposite side of Milford Harbor from the marina. State Route 162 spans the river/harbor between these coastal access points and the railroad crossing.

However, a total of approximately 2.52 miles of the Project area along the CT DOT corridor extends across the designated coastal boundary, including in Milford (1.8 miles), West Haven (0.61 mile), and New Haven (0.11 mile). Within these coastal boundary areas, the railroad corridor traverses mostly upland areas, except for tidal wetlands and waterbodies associated with the Indian River and West River (refer to the Volume 2 maps for the location of the Project area in relation to the coastal boundary).

The CCMA includes both coastal resource policies, which pertain to all uses occurring in or affecting any resource category identified in the CCMA, and coastal use policies, which apply to major uses and activities

subject to the coastal management program. Coastal resources identified by the CCMA include the following:

Beaches and Dunes	Bluffs and Escarpments
Coastal Hazards*	Coastal Waters and Estuarine Embayments*
Developed Shorefronts	Intertidal Flats*
Island	Rocky Shorefronts
Shellfish Concentration Areas	Submerged Aquatic Vegetation
Tidal Wetlands*	Landscape Protection and Visual Impacts
Shorelands*	

**Applicable to the Project area.*

In addition to policies regarding the identified coastal resources, the CCMA also includes coastal use policies pertaining to a range of activities, including general development, transportation, energy facilities, and water dependent uses, among others.

The CT DOT corridor spans tidal wetlands, intertidal flats, and estuarine embayments associated with tidal watercourses and wetlands, such as the Indian River and West River. Most of the Project areas within the coastal boundary are considered "shorelands", defined as those areas, exclusive of coastal hazard areas, that are not subject to dynamic coastal process and that consist of typical upland features. Generally, these areas contain no tidal wetlands, FEMA flood or erosion hazard areas, or other sensitive resources.

In addition, the CT DOT corridor crosses designated "Coastal 'Flood' Hazard Areas". As defined in the CCMA, such areas are lands inundated during coastal storm events or subject to erosion induced by such events, including flood hazard areas as defined and determined by the National Flood Insurance Act and all erosion hazard areas as determined by the Commissioner of the CT DEEP. Initiatives are to be taken to address the requirements of Public Act 12-101, which apply "in the planning process the potential impact of a rise in sea level, coastal flooding and erosion patterns on coastal developments so as to minimize damage to the destruction of life and property and minimize the necessity of public expenditure and shoreline armoring to protect future new developments from such hazards (CGS Section 11a-92(a)(5))."

Pursuant to the CCMA, projects proposed in the coastal boundary are to be designed to avoid, or if unavoidable, minimize adverse impacts to coastal resources and future water-dependent development opportunities and activities. Specifically defined in the CCMA are eight adverse impacts to coastal resources, which are as follows.

- Degrading water quality through the significant introduction into either coastal waters or groundwater supplies of suspended solids, nutrients, toxics, heavy metals or pathogens, or through the significant alteration of temperature, pH, dissolved oxygen or salinity.

- Degrading existing circulation patterns of coastal waters through the significant patterns of tidal exchange or flushing rates, freshwater input, or existing basin characteristics and channel contours,

- Degrading natural erosion patterns through the significant alteration of littoral transport or sediments in terms of deposition or source reduction.

- Degrading natural or existing drainage patterns through the significant alteration of groundwater flow and recharge and volume of runoff.

- Increasing the hazard of coastal flooding through significant alteration of shoreline configurations or bathymetry, particularly within high velocity flood zones.

- Degrading visual quality through significant alteration of the natural features of vistas and viewpoints.

- Degrading or destroying essential wildlife, finfish or shellfish habitat through significant alteration of the composition, migration patterns, distribution, breeding or other population characteristics of the natural species or significant alteration of the natural components of the habitat.

- Degrading tidal wetlands, beaches and dunes, rocky shorefronts, and bluffs and escarpments through significant alteration of their natural characteristics or function.

Additionally, the CCMA includes adverse impacts on future water-dependent development opportunities and activities, which are as follows.

- Locating a non-water-dependent use at a site that (i) is physically suited for a water-dependent use for which there is a reasonable demand, or (ii) has been identified for a water-dependent use in the plan of development of the municipality or the zoning regulations.

- Replacement of a water-dependent use with a non-water-dependent use.

- Siting of a non-water-dependent use which could substantially reduce or inhibit existing public access to marine or tidal waters.

The closest known shellfish resources to the Project are near the Indian and West Rivers in Milford and West Haven/New Haven respectively. At the Indian River, the closest shellfish area is approximately 600 feet south of the New Haven Avenue bridge crossing. At the West River, the closest shellfish area is approximately 2,500 feet south of the railroad bridge crossing of the river.

5.5 LAND USE, RECREATION, AND COMMUNITY FACILITIES

5.5.1 Existing Land Uses and Zoning

The Project area is characterized by lands zoned and used for various residential, recreational, commercial, and industrial purposes, as well as transportation and utility corridors . The Volume 2 maps illustrate the dominant land uses in the general vicinity of and adjacent to the Project area. Mileages along different Project segments (between substations) and typical land use features are summarized in Table 5-6.

Table 5-6: Summary of Land Use Features

Feature	Municipality			
	Milford	**Orange**	**West Haven**	**New Haven**
Miles (Total)	5.03	0.46	3.86	0.10
Substations	Milvon Substation Woodmont Substation	None	Allings Crossing Substation Elmwest Substation	West River Substation
Miles (By Segment, between Substations)	• 4.05 miles (Milvon-Woodmont substations) • 0.98 mile (Woodmont to Allings Crossing substations)	0.46 (Woodmont-Allings Crossing substations)	• 1.47 miles (Woodmont-Allings Crossing substations) • 1.24 miles (Allings Crossing – Elmwest substations) • 1.15 miles (Elmwest-West River substations)	0.10 (Elmwest -West River substations)
Nearby Environmental & Other Features	Beaver Brook wetlands and trails Milford Harbor Indian River/Gulf Pond (tidal wetlands) Milford Train Station	Oyster River Yale University West Campus	Phipps Lake Yale University West Campus West Haven Train Station West River (boundary with New Haven, tidal wetland)	West River (boundary with West Haven, tidal wetland)

5.5.2 Open Space and Recreational Areas

The Project does not cross and is not located in the immediate vicinity of any national wildlife refuges or parks, or state parks, forests, wildlife management areas or state greenways.

The Project also will not traverse any municipal open space or designated public hiking trails. However, several municipal recreational areas (parks, open space, trails, and recreational areas) are in the vicinity of the CT DOT corridor. These municipal open space and recreational areas are illustrated on the Volume 2 maps and described below. In addition to municipal specific open space and recreational areas, the Project as a whole does not feature any CFPA "Blue-Blazed Hiking Trails" within vicinity of the Project area.

The major watercourses traversed by the railroad corridor generally support recreation. For example, Beaver Brook, Wepawaug River, Indian River, Oyster River, Cove River, and West River are all designated as supporting recreational purposes such as fishing, swimming, boating, and aesthetic appreciation.

The following summarizes primary recreational use areas, by municipality (refer to Table 5-7 for a list of recreational areas and the distance from the proposed Project area to each):

- **Milford.** According to the *City of Milford Plan of Conservation and Development 2012*, approximately 12.43% of land area is designated as miscellaneous open space or public park. These areas generally surround significant waterbodies, forming corridors like the Beaver Brook, Wepawaug River, and Stubby Plain Brook/Indian River Open Space Corridors. Recreational areas and parks found within Milford and within 2,000 feet of the proposed Project area include Beaver Brook Trails, Washington Field/Alexander Jordan Jamieson Memorial Skate Park, Playground/Park (located at 1-11 Hill Street), Milford Green, James Park, Wasson Field, Wilcox Park, McCann Natatorium/Athletic Fields, and Richard Conklin Field.

- **Orange.** According to the *Town of Orange Plan of Conservation and Development 2015*, approximately 21% of land area is designated open space. However, there are no existing recreational areas, parks, or open spaces within vicinity of the proposed Project.

- **West Haven**. According to the *City of West Haven Plan of Conservation and Development 2004*, approximately 12.6% of land area is designated open space. The only recreational area or park found within West Haven and within 2,000 feet of the proposed Project area is Shingle Hill Park.

- **New Haven**. According to the *City of New Haven Plan of Conservation and Development 2015*, approximately 15% of land area is designated as park or open space. The large majority of open space is comprised of Edgerton Park, Lighthouse Point, Edgewood, West Rock Nature Center, and East Rock. Recreational areas and parks found within New Haven and within 2,000 feet of the proposed Project area include Kimberly Field, Washington Playground, and Galvin Playground.

5.5.3 State, Regional, and Local Land Use Plans

To evaluate the consistency of the proposed Project with State, regional, and local land use plans, UI reviewed published information available from each of the four municipalities in the Project area, as well as regional policy documents and the State's *Conservation and Development Policies: The Plan for Connecticut* (C&D Plan).

State and Regional Plans

The goal of Connecticut's C&D Plan is to guide and balance response to human, environmental, and economic needs in a manner that best suits the state's future, taking into account risks associated with

increased coastal erosion, anticipated due to sea level changes. The current C&D Plan (2018-2023) remains in draft form, pending legislative approval. However, based on a review of the draft C&D Plan, the Project is consistent with the Plan's overall objectives and is particularly relevant to the Plan's Growth Management Principle #1: Redevelop and Revitalize Regional Centers with Existing or Currently Planned Physical Infrastructure. The Project will serve a public need by ensuring that the existing 115-kV lines are rebuilt to continue to provide reliable electric service to the region. Moreover, the Project will conform to the C&D Plan's recommendation to "ensure the safety and integrity of existing infrastructure over its useful life through the timely planning and budgeting for maintenance, repairs, and upgrades".

The four municipalities in the Project area are among the 15 communities that form the South Central Region of Connecticut (SCRCOG), which "brings together local governments to coordinate land use and transportation planning" on a regional basis. SCRCOG has published a *Plan of Conservation and Development 2018-2028* (POCD) as a guidance document for regional policies regarding a range of land use, housing, natural resource preservation, coastal resilience, transportation, and other policies, including the goal of focusing future development in existing corridors that provide transportation and utility infrastructure. The proposed Project will be consistent with these policies, particularly because it will be co-located within the CT DOT corridor, which has historically been used for both transportation and electricity transmission purposes.

Local Land Use Plans

To evaluate the consistency of the proposed Project with municipal land management objectives, various local plans and land use information were reviewed. All of the municipalities in the Project area have published Plans of Conservation and Development (POCDs). Generally, the plans anticipate that the railroad corridor and adjacent, already developed land use patterns, will remain in the future. None of the plans identify local land use policies that would be inconsistent with the proposed Project. The following summarizes the land use plans reviewed, by municipality.

Milford

Based on its POCD (issued December 2012), land use throughout Milford is diverse. Industrial and manufacturing areas are primarily located along the interstate highway, rail lines, U.S. Route 1 and the Housatonic River. Retail, medical and civic land use is centered in Downtown Milford but has spread along the length of Boston Post Road (U.S. Route 1). A mix of industrial, retail and manufacturing facilities have also grown between U.S. Route 1 and Interstate 95. Utility generation and distribution facilities are located in the western area of the city, along the Housatonic River.

The area along the Project is densely urbanized, following the path of the rail corridor. Historic buildings and train stations are found within this area, and the City recognizes the importance and heavy use of the rail.

The Milford POCD emphasizes and takes pride in the fact that the City is a host of major utility facilities. The City recognizes that these utility companies have become "good industrial neighbors", as their facilities typically feature low traffic generation and are clean, well run industries. Milford plans to provide continuing support to the utility corridor that has developed, and to support future developments of the utility facilities.

Throughout the city are city owned parks and open spaces. There are both city and state owned beaches.

Orange

According to the Orange 2015 POCD, Orange contains approximately 11,190 acres of land. Approximately 83% is developed or committed to a specific use, including open space or agriculture. The town foresees the remaining 1,900 acres of land may be used in the future for residential, business, institutional or open space use.

The area surrounding the Project is primarily used as industrial and community facilities. Transit-Oriented development is also being encouraged by the Town. A small Transit Oriented District is zoned to the north of the Project, extending to the south of Interstate 95. This includes investigation by the Connecticut Department of Transportation regarding the establishment of a train station in the town along the existing Metro-North rail line. The idea of a high density, mixed use development was proposed in 2009, however it was firmly tied to the construction of this proposed train station.

The Town underlines the importance of the availability of utility infrastructure, and the significant influence on overall public health, safety, welfare, and quality of life that it provides. Thus, the Town plans to continue the protection of existing utility infrastructure, including electric transmission lines, and the development of utilities to ensure adequate provisions for community needs.

Orange will continue to promote development along Route 1, located to the north of the Project.

West Haven

Per the 2017 West Haven POCD, parts of West Haven were developed before the existence of zoning and some of these patterns are still apparent today. Commercial land use is most densely located in the downtown area near the Green and follow old streetcar routes along Campbell Avenue and Elm Street. Industrial facilities are located along rail lines. Residential areas are between these spaces, with duplexed and multi-family homes concentrated in the southeast portion of the City.

West Haven recognizes community facilities and utilities as an important component to the conservation and development of the City. Specifically, the need to have reliable distribution, availability, condition, and capacity to utilities; the ability to develop infrastructure to align with the projected and desired growth of the City.

West Haven's Train Station, which was developed in 2013 and is located on the MNR line, has made West Haven a more desired place to live and work, and as such Transit-Oriented Development zoning regulations have been implemented. These include promoting adaptive reuse of existing structures and mixed-use development. A controlled amount of commercial and civic uses is also located in this area. The City plans to continue working on improving connections between this area and the Downtown neighborhood. The zoning in this area was expanded in 2018 to create a more walkable village-like environment.

New Haven

Based on the New Haven Vision 2025, A Plan for a Sustainable, Healthy and Vibrant City**,** New Haven is a densely populated city, however single family homes make up 18% of the City's land area, and parks and open spaces account for another 15%. Yale and Southern Connecticut State University account for 10% of the land area. Commercial and industrial uses occupy only a small percentage of the land but are generally concentrated to certain neighborhoods. Only 484 acres of vacant land are within the City, and 111 acres of that is considered undevelopable. Some of these are under-utilized and/or contaminated brownfields. With minimal land available for development and a large share of tax-exempt properties, infill development and high density developments are a priority.

Continued protection for open spaces and parks is planned. Land clearing and development within the floodplain will continue to be restricted to address soil erosion, sediment control and wetland ordinances. Some sites are prone to repetitive flooding and funds at the state or federal level may be available for flood mitigation measures. Bulkheads and seawalls should be repaired or rebuilt. These measures also include items like salt marsh restoration. Protection of salt marshes, tidal wetlands, inland wetlands and other riparian assets will continue to be protected from development.

5.5.4 Community Facilities

The CSC defines community facilities as public and private schools, licensed daycare centers, licensed youth camps, public playgrounds, hospitals, group homes, and recreational areas. The community facilities within 2,000 feet of the Project area are listed in Table 5-7 and shown on the Volume 2 maps.

Table 5-7: List of Community Facilities within 2,000 Feet (0.38 mile) of the Project Area

Community Facility Type/Name	Address	Distance from Proposed Project Area (miles, direction)
Medical Facilities		
Milford Hospital	2037 Bridgeport Ave, Milford	0.08, South
Daycare Facilities		
Great Beginnings Preschool	100 Washington St, Milford	0.07, North
Duck Pond Day Care Preschool	132 New Haven Ave, Milford	0.05, South
Gingerbread House of Milford	61 River St, Milford	0.03, North
Sand Castle Learning Center	301A Brewster Rd, Milford	0.12, South
Bright Horizons at Yale West Campus	230 West Campus Dr, Orange	0.30, North
Day Care	37 George St, West Haven	0.05, South
West Haven Community House	227 Elm St, West Haven	0.19, South
Trusted Care	215 York St, West Haven	0.21, North
Discovery Family Daycare	104 Wood St, West Haven	0.05, South
Natalie's Daycare	585 1st Ave, West Haven	0.07, South
WeEduCare	562 1st Ave, West Haven	0.11, South
Small Beginnings Daycare, LLC	101 Spring St, West Haven	0.31, North
Butterfly Child Care	64 Plymouth St, New Haven	0.11, West
Recreational Areas/Parks		

Community Facility Type/Name	Address	Distance from Proposed Project Area (miles, direction)
Beaver Brook Trails	631 West Ave, Milford	0.05, North
Washington Field/Alexander Jordan Jamieson Memorial Skate Park	53 Washington St, Milford	0.20, North
Playground/Park	1-11 Hill St, Milford	0.08, North
Milford Green	Broad St, (generally bounded by Factory Ln and Greens End Pl), Milford	0.08, South
James Park	5 Edgewood Ave, Milford	0.13, South
Wasson Field	116 W Main St, Milford	0.25, North
Wilcox Park	1-5 Shipyard Ln, Milford	0.15, South
McCann Natatorium / Athletic Fields	70 Park Circle, Milford	0.19, South
Richard Conklin Field	1-13 Columbia Dr, Milford	0.17, South
Shingle Hill Park	36 Allings Crossing Rd, West Haven	0.14, South
Kimberly Field	150 Kimberly Ave, New Haven	0.24, South
Washington Playground	745 Washington Ave, New Haven	0.16, North
Galvin Playground	426 Greenwich Ave, New Haven	0.19, East
Schools		
J F Kennedy School	436 West Ave, Milford	0.32, West
Meadowside School	98 Seemans Ln, Milford	0.28, South
Harborside Middle School	175 High St, Milford	0.11, North
Milford Public School	140 Gulf St, Milford	0.07, South
Saint Mary's School	72 Gulf St, Milford	0.09, North
Academy of Our Lady of Mercy, Lauralton Hall	200 High St, Milford	0.16, North
Harry M Bailey Middle School	156 Morgan Ln, West Haven	0.38, South
Clarence E Thompson School	165 Richards St, West Haven	0.14, North
Edgar C Stiles School	567 Main St, West Haven	0.16, South
Truman School	114 Truman St, New Haven	0.29, South
Betsy Ross Arts Magnet	150 Kimberly Ave, New Haven	0.24, South
Group Homes		
Marrakech	7 Lyda Dr, Milford	0.22, South
Kennedy Center	11 Wayne Rd, Milford	0.29, South
West Haven Community House	228 Elm St, West Haven	0.19, South
Youth Camps		
Milford Arts Council	40 Railroad Ave, Milford	0.01, South

5.6 VISUAL AND AESTHETIC CHARACTERISTICS

Established in the 1940s, and upgraded several times since, the UI transmission lines and supporting infrastructure occupy areas along both the north and south sides of the railroad corridor. The shared railroad and electrical corridor are visually distinctive as a result of the catenary structures and UI's bonnets and existing 115-kV lines that are supported on top of the catenary structures and, in several areas, on free-standing lattice structures and monopoles. The visual environment adjacent to the railroad corridor varies but is generally characterized by a mix of industrial and commercial areas. Some areas along the railroad corridor within Milford and West Haven also include single-family residences and town house developments.

In general, views of UI's infrastructure along the CT DOT corridor consist of extensions to the railroad's catenaries and, in some locations, independent steel monopoles. Existing structures along the railroad corridor range in height from approximately 55-60 feet agl – for the UI transmission lines/bonnets on top of the catenary structures - to approximately 140 feet agl – for monopole structures located adjacent to the West Haven Train Station.

For the majority of the Project area, the current visibility of the UI infrastructure (including the catenary extensions, bonnets, independent poles and wires) extends to areas within approximately 0.5 mile of the railroad corridor, with the primary features being the taller support structures used to span existing overpasses. The existing viewshed is governed by the combination of relatively level topography throughout the Project area and dense, urban development. The few exceptions to this are in areas adjacent to waterbodies and open marsh, where direct views can be achieved up to 1 mile or more away.

The five UI substations in the Project area, all abutting the railroad corridor, also contribute to the existing visual environment. All the substations are well-established with significant visible electrical infrastructure, including steel monopoles that interconnect to the 115-kV transmission system along the railroad.

Appendix C provides additional information about the visual analyses conducted of the Project area, including representative views of the existing visual character near the Project area. These views are illustrative of the position of the UI facilities on both the north and south MNR catenary structures.

The Project is not near any designated national scenic areas, National Heritage Corridors, or state heritage areas, as designated in July 2009 pursuant to Connecticut Public Act No. 09-221 (CGS § 23-81). Federal and state heritage areas are places where historic, recreational, cultural, natural, and scenic resources

combine to form landscapes that are recognized as important, either from a national or Connecticut perspective.

Similarly, no CT DOT Scenic Land Strips are located near the Project area.[28]

5.7 CULTURAL (ARCHAEOLOGICAL AND HISTORIC) RESOURCES

To evaluate archaeological and historic resources in and near the Project area, UI commissioned Heritage Consultants LLC (Heritage) to perform a *Phase 1A Cultural Resources Assessment Survey*. The objectives of this survey were to:

- Gather and present data regarding previously identified cultural resources in the vicinity of the Project;
- Investigate the Project area in terms of natural and historic characteristics; and
- Evaluate the need for additional cultural resource investigations, based on the potential archaeological or historic sensitivities of the area.

Accordingly, Heritage researched existing information related to the Project and its immediate surroundings, including historical mapping, aerial imagery, soils data, railroad history, and published literature regarding the locations of historic and archaeological resources. In addition, Heritage performed a field (pedestrian) survey of the Project area, focusing in particular on areas where proposed construction activities would occur (i.e., locations where – based on current plans – UI proposes to install the new 115-kV transmission structures and to create access roads and work pads to support other Project work, such as the removal of the bonnets and existing 115-kV lines along both sides of the railroad tracks). Appendix C includes Heritage's complete report; key findings of the report are summarized as follows.

Research shows that the Project area has a long history of development, with Milford, West Haven, and New Haven all settled in the mid-1600s; Orange was originally part of Milford and New Haven. The following reviews the results of Heritage's findings regarding the history of the railroad corridor, archaeological resources, and historic resources in the Project area.

[28] CT DOT Scenic Land Strips are roadside properties, located primarily outside of highway ROWs, that were purchased by CT DOT pursuant to a program under the 1965 Federal Highway Beautification Act. The purpose of this program was to control the proliferation of billboards and other unsightly views along federally designated highways. In Connecticut, there are 33 such parcels located along seven highways in eight towns; however, none are in the Project area.

Railroad History. In addition, the CTDOT railroad corridor has a historic context. The railroad history in Fairfield and New Haven counties, including the CT DOT corridor along which the Project is proposed, dates to the 1840s, when Connecticut's third railroad, the New York & New Haven Railroad, was incorporated. The NY&NH rail line extended from New Haven west into New York State. In 1872, the NY& NH Railroad merged with the Hartford & New Haven Railroad to become Connecticut's largest transportation company, renamed as the New York, New Haven & Hartford Railroad (NYNH&HRR). The NYNH&HRR owned electric generation facilities and in 1907 began to use alternating current (AC) electricity to power a segment of the railroad between New York and Stamford. Between 1911 and 1914, the entire rail corridor east to New Haven was converted to run on electricity. At that time, the transmission of electricity to the railroad using the catenaries and wires was developed; electric signaling, and communications were added later. This basic system has remained in place and in operation for more than 100 years and thus lends to the current MNR railroad and associated infrastructure an historical context related to railroad history, transportation, and the 19th/20th century development of the Connecticut shoreline.

Archaeological Resources. To assess the archaeological sensitivity of the Project area, Heritage reviewed previously recorded archaeological sites on file with the Connecticut State Historic Preservation Office (SHPO). This review revealed that four previously recorded archaeological sites are located within 500 feet of the proposed centerline of the rebuilt 115-kV transmission line structures.

However, three of these sites are situated in areas that would not be directly impacted by the Project. The remaining archaeological site borders a proposed Project access road. This site was identified by Archaeological and Historical Services, Inc. (AHS) in 2010 during a Phase 1B cultural resources reconnaissance survey related to the then-proposed upgrade of the Orange Train Station. Despite a small amount of data recovered during the survey, AHS suggested that the site may have been eligible for listing on the National/State Registered Historical Places (NRHP). To eliminate the potential for impacts to this site, Heritage recommends that UI implement mitigation measures during Project construction to avoid any potential ground disturbance in the site vicinity.

Other archaeological and environmental data demonstrates the remainder of the Project area along the railroad corridor appears to have been largely disturbed. As a result, the area retains little, if any, potential to contain intact archaeological deposits.

Historic Resources (NRHP/SRHP). Data on file with the SHPO determined that five NRHP properties/districts, all in Milford, are located in the vicinity of the CT DOT corridor. No NRHP properties are located adjacent to the portions of the Project area in Orange, West Haven, or New Haven. The five identified NRHP-listed resources in Milford are discussed below and illustrated on the Volume 2 maps:

- **The Academy of Our Lady of Mercy – Lauralton Hall** is a 30-acre independent high school that is situated at 200 High Street, one block northwest of the CT DOT corridor (0.16 miles North to Lauralton Hall; 0.09 miles North to closest boundary of property). The Academy, which was added to the NRHP in 2011, is considered significant in the areas of architecture, education, and social history for the period of significance between 1864 and 1960.

- **River Park Historic District**, which was listed on the NRHP in 1986, encompasses the residential and municipal center of Milford, south of the MNR railroad lines. The district is located between Boston Post Road to the north and Milford Harbor to the south and is situated adjacent to the railroad corridor at Prospect Street (0.00 miles North to the closest point of the district; 0.25 miles North to approximate center of the district). The district includes 192 buildings and sites (including municipal open space comprised of three parks, four bridges, and two dams), of which168 are considered contributing elements to the historic district.

- **U.S. Post Office – Milford Main** is located at 6 West River Street and was listed on the NRHP in 1986. The historic building was built in 1931 and is situated one block north of the Project corridor (0.12 miles North to the Post Office). The Post Office is considered significant in the areas of architecture and community planning.

- **St. Peter's Episcopal Church** is a Gothic Revival church located at 61, 71, and 81 River Street. Added to the NRHP in 1979, the church was constructed between 1850 and 1851 and is located near the Post Office discussed above. The church is situated one block north of the Project corridor (0.12 miles North to the Church), and embodies the distinctive characteristics of a type, period, or method of construction, and represents the work of a master.

- **Taylor Memorial Library** is a historical building located at 5 Broad Street. The library, which was constructed in 1894-1895, is considered significant historically due to its architect, distinctive architecture, and association with the prominent citizen (H.A. Taylor, a railroad executive) who funded its construction. The building, which was added to the NRHP in 1979, is located one block south of the Project corridor (0.04 miles South to the Library).

5.8 TRANSPORTATION, UTILITIES, AND ENERGY FACILITIES

5.8.1 General Transportation and Utility Network

The Project area is characterized by a well-developed transportation network, consisting of local roads, state/interstate highways (e.g., I-95, U.S. Route 1, State Routes 162, 44, and 122), and the CT DOT corridor containing the railroad lines. In the Project area, the CT DOT corridor includes three-four rail tracks, as well as railroad stations at Milford and West Haven. The Project area also is served by a full complement of utilities (electric, natural gas, sewers, public water, telephone, cable). In addition, Milford, West Haven,

and New Haven border Long Island Sound and include harbors that provide marine transportation access for a variety of watercraft.

Entities operating within the CT DOT corridor include MNR, Amtrak, and the Shore Line East rail lines. The MNR-operated New Haven Line extends between New Haven and Grand Central Terminal in New York City and includes interconnecting rail lines to other areas in Connecticut (via the New Canaan, Danbury, and Waterbury Branch Lines). MNR, Amtrak, and Shore Line East operate daily rail passenger service within the Project rail corridor, including weekends and holidays.

According to the *New Haven Line Capacity and Speed Analysis* conducted by the CT DOT, the New Haven Line has a peak ridership period between the 6:00 AM and 10:00 AM. During this time, MNR operates a total of 53 westbound trains and 12 commuter trains, in addition to 32 eastbound trains and 15 commuter trains. During the same period, Amtrak operates three westbound and four eastbound trains. This combined total of 119 trains during the four-hour peak period is matched by only a few locations globally. The cumulative result of the rail traffic is that scheduling track or signal outage events requires intricate construction scheduling, often preferentially placed in off-peak nighttime hours.

Within the railroad corridor, UI's existing 115-kV transmission lines span all local, state, and interstate highways, as well as rivers that provide opportunities for marine transportation or use (e.g., recreational boating, other). The Volume 2 maps illustrate the transportation network in the Project area.

No airports are in the immediate Project area. The nearest airports are Tweed New Haven Airport, which is in New Haven approximately 3.2 miles southeast of West River Substation and Sikorsky Airport, a general aviation facility that is situated along Long Island Sound in the Town of Stratford, approximately 4 miles southwest of Milvon Substation.

5.8.2 Description of the CT DOT Railroad Corridor

As summarized in Section 5.7 and described further in the *Cultural Resources Assessment Report* (Appendix D), the CT DOT / MNR railroad corridor, referred to as the New Haven Line, dates to the mid-1800s. The New Haven Line extends from the City of New Haven, through southern New Haven and Fairfield counties, to the New York border, where ownership of the rail line transitions to the Metropolitan Transit Authority (MTA).

CT DOT owns the tracks and stations along the New Haven Line and its branch lines to New Canaan, Danbury, and Waterbury, while MNR operates the rail system. In addition to the MNR trains, Amtrak's Northeast Regional and Acela Express use the tracks between New Haven and New York. The New Haven Line is part of the electrified Northeast Corridor rail system, which is among the busiest commuter lines in North America in terms of ridership and service frequency.

CT DOT is in the process of performing ROW/track improvements along the New Haven Line. These improvements include upgrading the power supply system to meet future electrified rail system demands (for both MNR and Amtrak), replacing main line bridges, and buttressing the catenary system.

In the Project area, the western 2.8 miles of the rail corridor (all in Milford) includes three tracks, whereas the eastern 6.7 miles (in Orange, West Haven, and New Haven) encompasses four tracks. Two train stations are located along the rail corridor in the Project area: Milford and West Haven (refer to the Volume 2 maps). Both stations include associated parking areas.

5.8.3 Energy Facilities

Pursuant to RCSA §16-50j(59)(15), energy facilities within a 5 mile radius of the Project area that are owned or operated by a public service company are listed in Table 5-8. Energy facilities in the immediate vicinity of the Project area (including UI's five substations) are visible on the Volume 2 maps.

Table 5-8: Energy Facilities within 5-Mile Radius of Transmission Line Route

Facility Name	Address	Facility Type	Distance & Direction from Project Route
Milford Power Company LLC	55 Shelland Street, Milford	Natural Gas Power Plant	1.1 miles NW
Bloom Energy/Digital Fairfield	80 Nutmeg Boulevard, Trumbull	Natural Gas Power Plant	3.9 miles NW
Sikorsky Aircraft CHP	6900 Main Street, Stratford	Natural Gas Power Plant	2.7 miles N
UI RCP New Haven Fuel Cell	481 East Shore Parkway, New Haven	Natural Gas Power Plant	2.1 miles E
New Haven Harbor	600 Connecticut Avenue, New Haven	Natural Gas Power Plant	2 miles E
Devon Power LLC	700 Naugatuck Avenue, Milford	Petroleum Power Plant	1.25 miles W
GenConn Devon LLC	700 Naugatuck Avenue, Milford	Petroleum Power Plant	1.25 miles W
West River	255 Ella Grasso Blvd, New Haven	Substation	0.1 miles E
Allings Crossing	260 Frontage Road, West Haven	Substation	0.1 miles N
Woodmont	324 Woodmont Ave, Milford	Substation	0.1 miles N
Elmwest	329 Elm Street, West Haven	Substation	0.1 miles S
Milvon	772 Bridgeport Avenue, Milford	Substation	0.1 miles S
East Devon	0 Shelland Street, Milford	Substation	1 mile NW

Facility Name	Address	Facility Type	Distance & Direction from Project Route
Milford Power	55 Shelland Street, Milford	Substation	1 mile NW
Devon Power	700 Naugatuck Ave, Milford	Substation	1.25 miles W
New Haven Harbor	Waterfront St, New Haven	Substation	1.8 miles E
Grand Ave	520 Grand Ave, New Haven	Substation	2.0 miles NE
Water St	520 Grand Ave, New Haven	Substation	2.0 miles NE
Baird	Barnum Ave Cut-Off, Stratford	Substation	2.1 miles W
June St	4 Hazel Terrace, Woodbridge	Substation	2.5 miles N
Congress St	1770 Stratford Ave, Stratford	Substation	3.7 miles W
Quinnipiac	1100 Quinniapac Ave, New Haven	Substation	3.8 miles NE
Trap Falls	102 Armstrong Road, Shelton	Substation	4.2 miles N
Trumbull	7 Wildflower Lane, Trumbull	Substation	4.2 miles NW
Branford RR	100 Hosley Ave, Branford	Substation	4.8 miles E
Transmission Line	Scovill Rock substation to New Haven Harbor substation	Electric Transmission Line >=345 kV	1.8 miles E
Transmission Line	Unknown133278 substation to New Haven Harbor substation	Electric Transmission Line >=345 kV	1.8 miles E
Transmission Line	Water St substation to West River substation	Electric Transmission Line <345 kV	0.1 miles E
Transmission Line	West River substation to Elm West substation	Electric Transmission Line <345 kV	0.1 miles E
Transmission Line	West River substation to Elmwest substation	Electric Transmission Line <345 kV	0.1 miles E
Transmission Line	Allings Crossing substation to Elmwest substation	Electric Transmission Line <345 kV	0.1 miles N
Transmission Line	Woodmont substation to Allings Crossing substation	Electric Transmission Line <345 kV	0.1 miles N
Transmission Line	Milvon substation to Woodmont substation	Electric Transmission Line <345 kV	0.1 miles S
Transmission Line	Devon substation to East Devon substation	Electric Transmission Line <345 kV	1 mile NW
Transmission Line	Devon substation to Milford Power substation	Electric Transmission Line <345 kV	1 mile NW
Transmission Line	Milford Power substation to Congress St substation	Electric Transmission Line <345 kV	1 mile NW
Transmission Line	Milford Power substation to Milvon substation	Electric Transmission Line <345 kV	1 mile NW
Transmission Line	No. Wall substation to East Devon substation	Electric Transmission Line <345 kV	1 mile NW
Transmission Line	Unknown140857 substation to East Devon substation	Electric Transmission Line <345 kV	1 mile NW
Transmission Line	Unknown140857 substation to Milford Power substation	Electric Transmission Line <345 kV	1 mile NW
Transmission Line	Devon substation to Devon Power LLC substation	Electric Transmission Line <345 kV	1.25 miles W
Transmission Line	Devon substation to Devon Power LLC substation	Electric Transmission Line <345 kV	1.25 miles W
Transmission Line	June St substation to Devon substation	Electric Transmission Line <345 kV	1.25 miles W
Transmission Line	New Haven Harbor substation to Water St substation	Electric Transmission Line <345 kV	1.8 miles E
Transmission Line	Shoreham Power Station substation to New Haven Harbor substation	Electric Transmission Line <345 kV	1.8 miles E

Facility Name	Address	Facility Type	Distance & Direction from Project Route
Transmission Line	Grand Ave substation to Quinnipiac substation	Electric Transmission Line <345 kV	2.0 miles NE
Transmission Line	Grand Ave substation to Water St substation	Electric Transmission Line <345 kV	2.0 miles NE
Transmission Line	Sackett substation to Water St substation	Electric Transmission Line <345 kV	2.0 miles NE
Transmission Line	Water St substation to Sackett substation	Electric Transmission Line <345 kV	2.0 miles NE
Transmission Line	Bridgeport Energy substation to Congress St substation	Electric Transmission Line <345 kV	3.7 miles W
Transmission Line	Bridgeport Energy substation to Congress St substation	Electric Transmission Line <345 kV	3.7 miles W
Transmission Line	North Haven substation to Quinnipiac substation	Electric Transmission Line <345 kV	3.8 miles NE

5.9 SOIL AND GROUNDWATER AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

The Project will be situated along and adjacent to the CT DOT corridor, through certain areas that have historically been developed for railroad and other commercial and industrial purposes. As a result, UI conducted research and field investigations concerning potential areas of environmental concern with respect to the presence of soil and groundwater contamination. Results from field studies and online environmental database queries suggest soil and groundwater conditions are typical of a highly developed urban/suburban development with a mixture of commercial, industrial, and waste management. Additionally, UI expects to sample the soil for disposal characterization at every monopole location. The soil and groundwater handled during the Project construction will be managed in accordance with UI's Project-specific *Materials Management Plan.*

As described in Section 5.1, the geotechnical investigations conducted thus far of the proposed Project route determined that fill materials are located at most of the planned new 115-kV transmission structure sites. Samples of the fill materials were collected, analyzed, and found to contain elevated concentrations of petroleum and select heavy metals. The substances detected in soil at concentrations above the applicable Connecticut Remediation Standard Regulations (RSR) criteria were also attributed to the regional presence of polluted fill material in many locations near the Project area, which CT DEEP recognizes as generally a widespread condition near coastal Connecticut.

Based on the analytical results of soil samples collected during the geotechnical studies, the soils along the Project route were characterized into one of the following four categories: clean, polluted, contaminated, and potentially hazardous. A classification of "clean" refers to soil in which the analytical constituents are

not detected above laboratory reporting limits or that the concentrations of the detected constituents are indicative of background conditions. Clean soil is available for unrestricted reuse. If the clean material is not reused onsite, the material will need to be transported to an approved reuse and/or disposal facility.

A classification of "polluted" refers to soil that may contain detected constituents above background concentrations, but below the baseline CT DEEP RSR soil standards. Background conditions are defined as naturally occurring constituents that have been detected at similar concentrations throughout the proposed alignment. Polluted soil may be reused onsite at the work location from which it was generated. Otherwise, the material will be transported to an approved reuse and/or disposal facility.

A classification of "contaminated" refers to soils that have an exceedance of the baseline CT DEEP RSR soil criteria. Contaminated soil will need to be disposed of at a licensed disposal facility.

A classification of "potentially hazardous" includes soils that have an exceedance of the Resource Conservation and Recovery Act (RCRA) hazardous soil standards, possibly meeting the definition of hazardous waste.

During the geotechnical investigation conducted of the Project area, groundwater was encountered and measured in 99 of the approximately 130 borings completed to date at depths ranging from less than 1 foot below the ground surface to 22 feet below ground surface. Based on analytical results of the samples collected during the geotechnical investigations, heavy metals and petroleum were detected above background concentrations in many of the groundwater samples. Settleable solids will be managed at locations where dewatering is required.

5.10 AIR QUALITY, NOISE, AND LIGHTING

5.10.1 Air Quality

Ambient air quality is affected by emissions from mobile sources (e.g., vehicles) and stationary sources (e.g., manufacturing facilities, gasoline stations, power plants). Naturally occurring pollutants, such as radon gas, also affect air quality. Ambient air quality in Connecticut is monitored by CT DEEP and air quality conditions are assessed based on compliance with the National Ambient Air Quality Standards (NAAQS) for six criteria pollutants (sulfur dioxide, carbon monoxide, nitrogen dioxide, particulate matter, lead, and ozone).

The state is in attainment for all criteria pollutants except ozone. CT DEEP data shows that measured ozone levels in southern Connecticut (including in New Haven County) exceed the NAAQS on several days each summer, depending on weather conditions. Ambient air quality in the Project area can generally be expected to mirror these conditions in the state.

The U.S. Environmental Protection Agency (EPA) has determined that carbon dioxide (CO_2) is a pollutant and has included CO_2 in its list of criteria pollutants. Areas of non-attainment have not yet been established for CO_2 or other greenhouse gases.

In an effort to reduce particulate emissions, the CT DEEP has promulgated regulations (RCSA § 22a-174-18) that prohibit unnecessary idling for more than 3 minutes. Exceptions are made for weather extremes and certain service vehicles.

5.10.2 Noise

Existing noise levels in the Project area are representative of a developed urban/suburban setting and are dominated by train movements along the railroad corridor and I-95, as well as by commercial uses. Table 5-9 lists the typical sound levels associated with different types of land use conditions and activities, as defined by sound pressure level (decibels on the A-weight scale [dbA] – an expression of the relative loudness of sounds in air as perceived by the human ear).

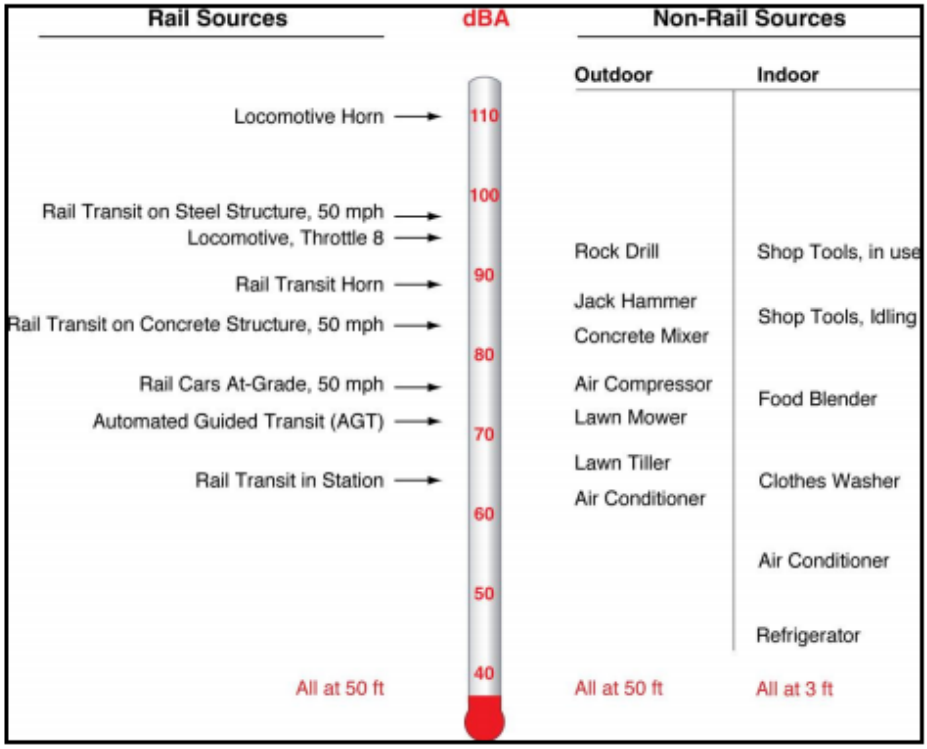
Prominent sources of existing noise in the Project limits include rail, vehicular, aviation, residential, commercial, and industrial noise, and seasonally includes natural sources such as insect and bird noise. Of these sources, the most dominant noise is related to the rail, including rail car transit and horn noises. Typical rail-related noise levels are shown in Figure 5-1. As this figure illustrates, the noise from certain rail-related activities is comparatively higher than sound levels associated with various activities typical of urban/suburban areas, including from construction.

Table 5-9: Typical Noise Levels Associated with Different Indoor and Outdoor Activities

SOUND PRESSURE LEVEL, dBA	SUBJECTIVE EVALUATION	COMMON OUTDOOR ENVIRONMENT OR SOURCE	COMMON INDOOR ENVIRONMENT OR SOURCE
140	Deafening	Jet aircraft at 75 ft	
130	Threshold of pain	Jet aircraft during takeoff at a distance of 300 ft	
120	Threshold of feeling	Elevated train	Hard rock band
110	Extremely loud	Jet flyover at 1000 ft	Inside propeller plane
100	Very loud	Power mower, motorcycle at 25 ft, auto horn at 10 ft	
90	Very loud	Propeller plane flyover at 1000 ft, noisy urban street	Full symphony or band, food blender, noisy factory
80	Moderately loud	Diesel truck (40 mph) at 50 ft	Inside auto at high speed, garbage disposal, dishwasher
70	Loud	B-757 cabin during flight	Close conversation, vacuum cleaner, electric typewriter
60	Moderate	Air-conditioner condenser at 15 ft, near highway traffic	General office
50	Quiet		Private office
40	Quiet	Farm field with light breeze, birdcalls	Soft stereo music in residence
30	Very quiet	Quiet residential neighborhood	Bedroom, average residence (without TV and stereo)
20	Just audible		Human breathing
10	Threshold of hearing		
0			

Source: Adapted by Black & Veatch from *Architectural Acoustics*, by David M. Egan (1988) and *Architectural Graphic Standards*, by Ramsey and Sleeper (1994).

Figure 5-1: Typical Noise Levels Associated with Railroad and Other Activities



Source: Danbury Branch Improvement Program Task 5: Section 2: Noise and Vibration (https://www.dotdata.ct.gov/DanburyBranchStudy/documents/Impact%20Reports/02%20Noise%20and%20Vibration%20Impact%20Report_FINAL.pdf)

Roads local to the corridor feature typical noise due to vehicle traffic that is variable throughout the day. The nature and frequency of town and city emergency responses (i.e., police, fire, ambulance) can periodically have a localized impact on sound conditions in the corridor. The CT DOT railroad corridor generally parallels I-95; vehicular movements on this highway will have a greater effect on noise levels in the Project area in locations where the interstate is closer to the railroad corridor.

Residential areas include seasonal noise from outdoor power equipment (including lawn equipment, snow blowers, etc.) and outdoor activities. Typical noise levels associated with commercial and industrial uses are related to vehicle movements and equipment operations, depending on the type of facility. The majority of the Project area is adjacent to commercial buildings, with comparably fewer adjacent industrial and residential areas. The ambient noise environmental also will vary based on time-of-year. For example, portions of the Project traverse wetland and tidal areas, where insects and birds may be the primary sources of ambient noise during the spring-fall months.

Noise Ordinances: State and Local

The State noise regulations (RCSA §§ 22a-69-1 to 22a-69-7.4, 2015) prescribe the A-weighted maximum sound pressure levels, based on land use at the noise emitter and receptor. These regulations define daytime vs. nighttime noise periods, classify noise zones based on land uses, and identify noise standards for each zone, specifying that noise emitters must not cause the emission of excessive noise beyond the boundaries of their noise zone so as to exceed the allowable noise levels on a receptor's land.

Table 5-10 lists the Connecticut noise zone standards, by emitter (source) and receptor (receiver) noise classification.

Table 5-10: State of Connecticut: Maximum Sound Pressure Level Noise-Control Levels (By Emitter and Receptor Land Use)

Noise Emitter Land Use	Noise Receptor Land Use			
	Industrial	Commercial	Residential (Day)	Residential (Night)
Residential	62 dBA	55 dBA	55 dBA	45 dBA
Commercial	62 dBA	62 dBA	55 dBA	45 dBA
Industrial	70 dBA	66 dBA	61 dBA	51 dBA

Notes:
The State of Connecticut defines "day" as the hours from 7:00 AM to 10:00 PM, and night from 10:00 PM to 7:00 AM all days of the week.

In accordance with CGS Section 22a-73, municipalities also may adopt noise control ordinances, which must be approved by the Commission of the CT DEEP and be consistent with the state noise regulations. Orange, West Haven, and New Haven have enacted noise ordinances that mirror those of the state (i.e., with the same A-weighted maximum sound pressure levels, based on land use at the noise emitter and receptor). Milford does not have a specific noise ordinance; accordingly, the state noise ordinance applies.

The State and municipal ordinances all exempt construction related noise from the regulations during specified daytime hours, defined as follows:

- State of Connecticut (and Milford) daytime hours are 7:00 AM to 9:00 PM Monday through Saturday, and 9:00 AM to 9:00 PM Sunday;
- Orange defines daytime hours as 7:00 AM to 9:00 PM Monday through Saturday, and 9:00 AM to 9:00 PM on Sunday;
- West Haven defines daytime hours as 7:00 AM to 10:00 PM Monday through Sunday; and
- New Haven defines daytime hours as 7:00 AM to 10:00 PM Monday through Saturday, and 9:00 AM to 9:00 PM Sunday.

Construction activities are permitted under both State and local noise ordinances. The areas surrounding the project corridor consist mostly of commercial and industrial zones where existing ambient noise levels include traffic, office, industries, and rail related noise.

5.10.3 Lighting

The CT DOT corridor traverses well-developed urban/suburban areas that are typically well-lit from a variety of sources, including public street lighting as well as lighting on individual buildings and commercial/retain signs. Lighting levels vary based on the types of land uses found along the railroad corridor. Industrial and commercial land uses will typically feature higher levels of light, as such facilities commonly include building and parking lot lighting.

6. POTENTIAL ENVIRONMENTAL EFFECTS AND MITIGATION MEASURES

The Project, which will continue the long-established co-location of the 115-kV transmission lines along the CT DOT railroad corridor, will have a positive long-term effect on the reliability of the electric system in the southern New Haven County area and in the region. Specifically, the Project will improve the reliability of the electric grid by upgrading the 115-kV lines to current electrical industry standards and by designing the new structures to address resiliency challenges associated with climate change. The rebuilt 115-kV structures will also be built to accommodate, as needed, future increased demand for electricity from clean energy sources, such as the wind farms presently being planned in the Atlantic Ocean off southern New England.

Because the Project activities will be predominantly within previously disturbed areas within or directly adjacent to the railroad corridor, overall environmental effects are expected to be minor and highly localized to the Project vicinity. Moreover, most effects will be short-term, lasting only during the Project construction phase.

UI has designed the Project to avoid or minimize adverse impacts to the extent practical. The Company also will mitigate impacts by coordinating closely with CT DOT and MNR railroad operations, performing specialized construction procedures for work along the railroad corridor, implementing standard construction best management practices, and conforming to the conditions of Project permits and approvals from state and federal agencies, including the CSC, CT DEEP, and USACE.

The anticipated impacts and proposed mitigation measures identified in this section are based on UI's historical experience in constructing/rebuilding, operating, and maintaining electric transmission lines (including those along this and other segments of the CT DOT railroad corridor in New Haven and Fairfield counties), as well as on the results of the Project-specific environmental and cultural resource studies, visual impact analyses, EMF evaluations, engineering, geotechnical, and constructability reviews, and agency consultations conducted to date. Additional measures to avoid or minimize environmental effects may be identified as the Project's engineering design is finalized and further constructability and environmental investigations are performed.

Further, the Project plans will be refined as appropriate based on the input provided during the MCF process; the CSC's application review; further consultations with regulatory agencies, stakeholders, and the general public; and the conditions of Project-specific regulatory and siting approvals. UI will incorporate such mitigation measures in the final Project design and in the Project D&M Plan(s).

6.1 TOPOGRAPHY AND GEOLOGY

The construction of the Project will have minimal adverse effects on topography and geology. In general, limited grading is expected to be required to establish construction access roads and work pads. At locations where grading is required, temporary soil erosion controls will be installed as necessary to avoid or minimize the potential for off-site erosion.

The Project will be constructed in accordance with the conditions contained in the CT DEEP *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities* and the Project-specific SWPCP. In most wetlands, construction matting is expected to be used to avoid the need for topographic modifications. As the final phase of Project construction, temporary matting will be removed and, in most areas where grading was required, the topography will be returned to the extent practical to approximate pre-construction conditions.

Based on the results of the geotechnical investigations conducted by UI along the transmission line route, bedrock is likely to be encountered during excavations for certain structure foundations. Rock is expected to be removed using mechanical methods (such as excavators, drilling, or pneumatic hammers). Rock removal activities will generate dust and vibration / noise temporarily in the immediate vicinity of work sites. Given the proximity of the Project facilities to the CTDOT/MNR infrastructure, in certain locations, UI may require that Project activities causing vibration to be closely monitored to avoid potential impacts to the railroad. UI expected to coordinate the methods used for rock removal at structure foundations near the railroad tracks with CT DOT.

Blasting is not expected to be required to remove rock. However, if blasting is required, UI would develop a *Blasting Control Plan* in compliance with industry, State, and UI procedures. The plan would be provided to the CSC for approval, as well as to the appropriate fire marshal(s).

Any excess soils or rock generated by from grading or structure foundation excavation activities will be either temporarily stockpiled at construction work sites or loaded directly into dump trucks for off-site disposal or management in accordance with applicable regulations. These materials will be managed in

accordance with UI's Project-specific *Materials Management Plan* and the SWPCP, both of which will be prepared as part of the D&M Plan phase of the Project.

6.2 SOILS, GROUNDWATER, AND STORMWATER MANAGEMENT

The construction of the Project will result in localized and minor impacts to soils as a result of activities such as grading (to be performed as needed to establish work pads and access roads) and excavations for new structure foundations. In addition, minor impacts to soils could potentially occur at laydown/material staging sites and contractor yards, if these temporary work areas are not located on paved or graveled properties

UI recognizes that soils disturbed by construction activities could be subject to erosion from stormwater, and thus will prepare and implement a Project-specific SWPCP, pursuant to the CT DEEP's General Permit. The SWPCP will be implemented by UI and its construction contractor(s) to avoid, minimize, or eliminate potential adverse environmental effects during transmission line construction, and will identify measures to reduce the likelihood of sediment migration from construction sites. After the completion of the 115-kV line work, the sites affected by Project activities will be restored and permanently stabilized. As a result, the operation of the rebuilt 115-kV lines will not result in long-term adverse effects to soils.

Similarly, neither the construction nor the operation of the Project facilities will adversely affect any groundwater resources (e.g., Aquifer Protection Areas, public water supplies, private groundwater wells). In the Project area, groundwater is not used for direct potable water supply. However, based on the results of test borings conducted along the proposed route of the rebuilt 115-kV lines, groundwater will be encountered during the excavation of the transmission structure foundations.

The following subsections describe UI's approach for appropriately managing soils, groundwater, and stormwater during Project construction.

6.2.1 Soil Erosion Control

At Project work sites where soils will be disturbed and construction activities could potentially lead to erosion or sedimentation (as a result of mechanized vegetation clearing equipment, grading, excavation for structure foundation, general soil / spoils stockpiling), temporary erosion controls will be installed and maintained as needed. Such controls will be deployed in accordance with the procedures defined in the SWPCP and UI best management practices. The types of erosion controls used will be appropriate to the urban/suburban areas and environmental resources in the Project area, and may include hay/straw bales,

coir logs, catch basin protection, silt fence, or equivalent. In addition, UI will prepare a detailed SWPCP, pursuant to the CTDEEP General Permit for Stormwater from Construction Activities, and in accordance with the General Permit will require weekly and other inspections by an independent inspector.

Temporary erosion controls will remain in place and will be maintained, as necessary, throughout the period of active Project construction until disturbed sites are appropriately restored, using stabilization methods to match existing conditions along the CT DOT corridor and as required on UI's new permanent easement. Soils will be pre-characterized and subsequently managed in accordance with CT DEEP remediation standard regulations, solid waste regulations, and (where applicable) hazardous waste regulations. The Project-specific *Materials Management Plan* will describe soil and groundwater management procedures applicable to Project work sites.

Based on the results of the analyses conducted to date, UI has grouped soils along the proposed 115-kV transmission line route into four categories: clean soil, polluted soil, contaminated soil, and potentially hazardous soil. The category of soil at each work site will determine the applicable soil management approach. For example, except for soils categorized as clean, UI anticipates that soils excavated during Project construction will be loaded directly into dump trucks and transported to pre-determined and approved off-site disposal facilities. Appropriate disposal facilities will be identified based on the soil designation from the pre-characterization; the handling, manifesting, transport, and ultimate disposal of the soil material will be in accordance with the regulatory requirements governing the soil characteristics.

Project construction is expected to generate only limited (if any) amounts of excess soil that can be reused during restoration. However, any such soils will be temporarily stockpiled in areas within UI's Project work sites, away from water resources. The soil stockpiles will be appropriately protected from wind and stormwater erosion and temporarily stabilized (e.g., by seeding, mulching), in accordance with UI's best management practices and the procedures defined in the Project-specific SWPCP.

6.2.2 Dust Control

Fugitive dust may be generated from Project construction activities such as vegetation removal, construction vehicle and equipment movements on non-paved access roads and work pads, and structure foundation excavation. Dirt from unpaved access roads also may be tracked onto adjacent paved surfaces. To minimize the amount of dust generated by Project construction, standard dust minimization practices will be implemented. For example, access roads may be sprayed with water to minimize dust. Paved road surfaces affected by construction will be regularly inspected and swept as necessary by UI's contractors to

remove excess accumulations of dirt. Crushed stone (or equivalent) anti-tracking pads also will be installed, as necessary, where unpaved Project access roads intersect with paved public roads.

6.2.3 Groundwater

UI collected and analyzed groundwater samples at locations where groundwater was encountered during Project geotechnical investigations. Based on the results of this sampling and analysis process, UI characterized the groundwater along the Project route into one of the following two categories: (1) treatment not required; or (2) containment, treatment, and/or disposal required.

In general, groundwater encountered during Project construction will be dewatered in accordance with the Project-specific SWPCP and *Materials Management Plan*. Proposed management activities for groundwater dewatered during the Project may include but will not be limited to the use of vacuum trucks and off-site management at an approved facility, temporary storage at Project work sites in fractionization (frac) tanks prior to off-site disposal, and/or discharge to sanitary sewers and/or surface waters. All dewatering activities will be conducted in accordance with applicable local and/or state permitting requirements.

Sediment and erosion controls will be deployed during the Project, as needed, and typically will include hay/straw bales, silt fence, straw wattles, coir logs, diversion swales, track pads, hay bale corrals for management of spoils or concrete washout areas, and erosion control blankets. UI will routinely perform monitoring and inspections to verify the effectiveness of the erosion and sedimentation controls and will modify such measures as required during different construction phases.

6.3 WATER RESOURCES AND WATER QUALITY

The Project will involve both temporary and permanent impacts to water resources (wetlands and watercourses). However, these impacts will be limited and localized to the Project area. The Project will not affect vernal pools and will not result in adverse effects to Connecticut's water quality goals. Similarly, the Project will not affect Phipps Lake, although some vegetation along the CT DOT corridor adjacent to the lake will be removed to provide access for construction equipment to remove UI's existing 115-kV facilities from the southern MNR catenary support structures.

The Project will require the installation of some new monopoles in 100- and 500-year floodplains. However, the addition of these structures will have a negligible, if any, adverse effect on floodplain storage capacity. Through Project design and construction planning, UI has and will continue to attempt to avoid

or minimize the potential for adverse direct and indirect effects to water resources. For effects that are unavoidable, UI will implement mitigation measures, including the performance of construction and restoration in accordance with the conditions of approvals received from the CSC, CT DEEP, and USACE, as well as in accordance with the Project SWPCP and UI best management practices.

The following sections summarize the Project's anticipated impacts to water resources. These impacts are estimated based on UI's current engineering design and construction plans for the Project. As the Project engineering design and planning process continues and federal / state regulatory reviews proceed, UI anticipates that Project plans would be refined to further minimize impacts to water resources. The Project D&M Plans and other construction specifications will incorporate the conditions of permits received from the USACE and the CT DEEP relating to the protection of water resources.

6.3.1 Watercourses

The Project extends across 36 watercourses. However, the Project will span the Wepawaug, Indian, and West rivers. Smaller watercourses, including the narrow streams that parallel the railroad tracks within the CT DOT corridor, will be crossed using temporary construction mats or equivalent. Construction equipment will be prohibited from directly fording through streams.

Watercourses adjacent to the Project area will be protected using various best management practices. None of the proposed new 115-kV transmission line structures will be located in a watercourse. Erosion and sedimentation controls (e.g., silt fence, straw wattles, straw/hay bales) will be installed around work sites (e.g., access roads and work pads) as appropriate to limit the potential for erosion and sedimentation outside designated construction work areas, thereby avoiding siltation and turbidity into watercourses. These measures and controls will be installed and inspected regularly pursuant to the Project SWPCP and the conditions of the *General Permit.* Anti-tracking pads at the intersections of Project access roads and public roads, as well as the use of dust control measures (such as applying water to exposed soils/gravel areas) also will serve to minimize the potential for the deposition of soils disturbed by Project activities into nearby waterbodies.

Table 6-1 summarizes the anticipated Project impacts to watercourses, by municipality and watercourse designation. These estimated impacts are based on UI's current Project plans. The Project will not affect any tidal watercourses, all of which will be spanned by the new 115-kV overhead wires.

Table 6-1: Summary of Estimated Project Impacts to Inland Watercourses

Volume 2 Mapsheet No. (100/400 scale)	Watercourse No. & Flow Type Intermittent (I) or Perennial (P)	Estimated Project Impact, by Type (Acres)		
		Temporary Impacts		Permanent Access Road Impacts
		Access Roads	Work Pads	
City of Milford				
1/1	M-WC2 (I)	0.02	0.03	-
13/4	M-WC4 (I)	0.01	0.01	-
13/4	M-WC5 (P)	0.01	-	-
15/4	M-WC6 (I)	-	0.01	-
16/5	M-WC7 (P)	-	0.02	-
16/5	M-WC8 (P)	0.01	0.01	-
18/5	M-WC9 (I)	-	0.01	0.01
18/5	M-WC10 (I)	0.01	-	-
	Subtotal Impacts	0.06	0.09	0.01
Town of Orange				
19/5	O-WC1 (I)	-	0.02	0.01
20/5	O-WC2 (I)	-	-	0.01
	Subtotal Impacts	-	0.02	0.02
City of West Haven				
21/6	WH-WC2 (I)	0.01	0.01	-
21/6	WH-WC3 (I)	0.01	0.01	-
21/6	WH-WC4 (I)	-	0.01	-
22/6-7	WH-WC6 (I)	0.01	0.01	-
25/7	WH-WC9 (P)	-	0.01	-
25/7	WH-WC10 (I)	0.01	-	-
25/7	WH-WC11 (I)	-	0.01	-
25/7	WH-WC14 (I)	-	0.04	-
	Subtotal Impacts	0.04	0.10	-
	Total Impacts	0.10	0.21	0.03

Note: All numbers rounded for preliminary impact estimation purposes. The Project will not affect any watercourses in New Haven.

To minimize the potential effects of Project construction on water resources, UI anticipates that the following types of measures (or equivalent) will be implemented:

- Small streams will be spanned with timber matts or equivalent to maintain water flows.
- Concrete (used for structure foundations) will be mixed, placed, and disposed of to avoid or minimize the risk of concrete materials entering a watercourse.
- Installation of new culverts, if required, will be in accordance with the measures recommended in the CT DEEP *Stream Crossing Guidelines* as appropriate.

- Existing riparian vegetation within 25 feet of watercourse banks would be maintained or cut selectively, to the extent practical.

6.3.2 Wetlands

The Project will involve both short- and long-term impacts to tidal and freshwater wetlands. As summarized in Table 6-2, the Project will cause temporary impacts to 28 of the 41 wetlands in the Project area. Short-term impacts will result from the installation of temporary construction access roads and work pads, while permanent impacts will stem from the unavoidable placement of certain monopoles and permanent access roads in wetlands. Further, vegetation in forested wetlands will be removed during Project construction and thereafter managed in low-growth species, consistent with the operation of overhead transmission lines. This will change the wetland vegetation type but will not cause a loss of wetland acreage.

During Project construction, UI will implement measures to protect wetlands. Accordingly, UI will install erosion and sediment controls and will perform environmental inspections, pursuant to the SWPCP and the General Permit. The following types of wetland mitigation measures are expected to be used during the Project work:

- Conform to the requirements of USACE and CT DEEP permits and Council conditions concerning work in wetlands.
- Install appropriate erosion controls as needed to prevent or minimize the potential for sedimentation into wetlands. Use straw bales instead of hay bales to prevent the spread of seeds.
- Implement procedures for petroleum product management to avoid or minimize the potential for spills into wetlands (e.g., to the extent possible, store petroleum products in uplands more than 25 feet from wetlands, refuel construction equipment, except for equipment that cannot be practically moved, in upland areas only).
- Cut forested wetland vegetation without removing stumps except over the cable trench or in areas where the intact stumps pose a concern for the installation of timber mat access/workspace and the safety of construction personnel.
- Install timber construction mats (or equivalent) for access and work pads in wetlands.
- Stabilize affected wetland areas with temporary seeding or an appropriate wetland seed mix. Do not apply woodchip mulch and fertilizer within wetlands. Use straw as mulch for stabilization near wetlands, as necessary.

Additional wetland mitigation measures may be identified as UI continues to perform engineering analyses, constructability reviews, and environmental studies of the proposed Project, as well as during the regulatory review of the Project by the CSC and other agencies.

Table 6-2: Summary of Estimated Project Impacts to Wetlands

Shading = Tidal Wetland

Volume 2 Mapsheet No. (100/400 scale)	Wetland No.	Estimated Project Impact, by Type (Acres)			
		Temporary Impacts		Permanent Impacts	Wetland Vegetation Clearing*
		Access Roads	Work Pads		
City of Milford					
1/1	Wetland M-W2	-	0.11	-	-
7/2	Wetland M-W4	-	0.07	-	0.09
9/3	Wetland M-W6	-	0.28	-	0.45
10/3	Tidal Wetland M-TW1	-	0.01	-	0.01
10/3	Tidal Wetland M-TW2	-	0.01	-	0.01
10/3	Tidal Wetland M-TW3	0.13	0.10	-	0.14
13-14/4	Wetland M-W8	0.62	0.28	-	0.32
13-14/4	Wetland M-W9	0.18	0.26	0.002 (pole foundation) & 0.25 (access road)	0.21
15/4	Wetland M-W10	-	0.02	-	0.01
16/5	Wetland M-W12	-	0.03	-	0.02
16-17/5	Wetland M-W13	0.09	0.43	0.002 (pole foundation)	0.76
17/5	Wetland M-W14	-	0.02	-	0.01
18/5	Wetland M-W16	0.02	0.03	-	-
18/5	Wetland M-W17	-	0.01	-	0.12
Subtotal Inland Wetland Impacts		0.91	1.54	0.254	1.99
Subtotal Tidal Wetland Impacts		0.13	0.12	-	0.16
Town of Orange					
20/6	Wetland O-W1	0.01	-	-	0.01
Subtotal Inland Wetland Impacts		0.01	-	-	0.01
City of West Haven					
21-22/6	Wetland WH-W1	0.19	0.47	0.002 (pole foundation)	0.61
23/6	Wetland WH-W2	0.01	0.11	0.001 (pole foundation)	0.09
24/7	Wetland WH-W3	0.02	0.02	0.03 (access road)	0.08
25/7	Wetland WH-W4	-	0.08	-	-
25/7	Wetland WH-W5	-	0.01	-	-
29/8	Wetland WH-W10	-	-	-	0.06
32/9	Wetland WH-W11	0.02	-	-	-

Volume 2 Mapsheet No. (100/400 scale)	Wetland No.	Estimated Project Impact, by Type (Acres)			
		Temporary Impacts		Permanent Impacts	Wetland Vegetation Clearing*
		Access Roads	Work Pads		
32-33/9	Wetland WH-W12	0.36	0.26	-	0.03
32-33/9	Wetland WH-W13	0.06	0.41	0.003 (pole foundation) & 0.41 (access road)	0.05
33-34/9	Tidal Wetland WH-TW1	-	0.01	-	-
Subtotal Inland Wetland Impacts		0.66	1.35	0.45	0.92
Subtotal Tidal Wetland Impacts		-	0.01	-	-
Total Inland Wetland Impacts		**1.58**	**2.89**	**0.704**	**2.92**
Total Tidal Wetland Impacts		**0.14**	**0.13**	**-**	**0.17**

*Refers to long-term change in wetland vegetation type (e.g., forested to shrub-scrub), but not a net reduction in wetland function or size.
**There are no tidal wetlands within the Project limits in the Town of Orange. The Project will not affect any wetlands in the City of New Haven.
Note: Numbers rounded for preliminary impact estimation purposes.

6.3.3 Flood Zones

The proposed rebuilt 115-kV transmission lines will extend across FEMA-designated 100 and 500-year flood zones. As illustrated on the Volume 2 maps, these zones are associated with Beaver Brook (encompasses watercourse M-WC1), the Wepawaug River, and the Indian River in Milford; Oyster River in Orange/West Haven; watercourses WH-WC5, WH-WC6, and WH-WC7 and the Cove River in West Haven; and the West River in West Haven/New Haven. In total, 10 new monopoles will be located in 100-year floodplains and an additional 6 new monopoles will be located in FEMA-designated 500 year floodplains. The location of the new monopoles within these floodplains cannot be avoided, due to the extent of each floodplain along the CT DOT corridor.

Table 6-3 identifies the new monopoles that must be located in floodplains, by structure number and municipality. The table also estimates the anticipated (negligible) impact, in terms of square-foot loss of flood storage capacity, due to the installation of the monopoles.

During construction, access roads will be required to reach the monopoles within these floodplains and a work pad will be needed at each structure site. Some access roads may have to be permanent.

Table 6-3: Project Monopoles within FEMA-Designated 100- and 500-Year Flood Zones

Volume 2 Mapsheet No. (100/400 scale)	Floodplain	Proposed Structure Number	Within 100-year or 500-year Flood Zone	Estimated Impact Area (SF)*
Milford				
1/1	Beaver Brook (encompasses M-WC1)	P888S	100-year	79
6/2	Wepawaug River	P914N	100-year	51
6/2	Wepawaug River	P915N	100-year	51
10/3	Indian River	P934N	100-year	39
17/5	Un-named Tributary	P968N	500-year	79
17/5	Un-named Tributary	P969N	500-year	79
West Haven				
22/6	Un-named Tributary	P993N	500-year	39
22/6	Un-named Tributary	P994N	500-year	39
22/6	Un-named Tributary	P996N	500-year	39
27/7	Cove River	P1017N	500-year	51
32/9	West River	P1042N	100-year	39
32-33/9	West River	P1043N	100-year	64
33/9	West River	P1045N	100-year	39
33/9	West River	P1047N	100-year	39
New Haven				
34/9	West River	P1049N	100-year	79
34/9	West River	P1049S	100-year	51

*Impact area pending final engineering design of structure foundations. Additional impacts will occur if permanent access roads are required in these floodplains; such potential access road impacts are not included in this table.

The anticipated impact of the installation of the new monopoles in the floodplains was estimated based on the following structure design information. Specifically, each monopole in a flood zone is expected to have a foundation base that ranges in diameter from approximately 7 to 10 feet (with some exceptions). Consequently, the installation of the monopoles in the floodplains will permanently remove only the small amount of flood storage capacity associated with the structure foundation. Based on the structure foundation dimensions, the potential impacts to the floodplains, per monopole foundation, will range from approximately 39 square-feet to 79 square-feet.

The anticipated permanent impacts to each floodplain as a result of the monopole installations are estimated as follows:

- Beaver Brook Floodplain: 79 square feet (SF) total impact
- Wepawaug River Floodplain: 102 SF total impact

- Indian River Floodplain: 39 SF total impact
- Un-named Milford Tributary Floodplain: 158 SF total impact
- Un-named West Haven Tributary Floodplain: 117 SF total impact
- Cove River Floodplain: 51 SF total impact
- West River Floodplain: 311 SF total impact

Overall, the loss of flood storage capacity in these floodplains will be negligible, compared to the total flood storage capacity of each drainage basin. As a result, UI does not anticipate that the Project will have any adverse effects on flood dynamics and will not alter the floodplains or chances for flooding. UI will coordinate with CT DEEP regarding any further analyses of the Project's potential effects on floodplains, as well as the need for mitigation (if any) to compensate for the small amount of flood storage capacity impact in each floodplain.

Existing roads or temporary construction matting (or equivalent) are expected to be used for construction access in floodplains. Temporary matting (or equivalent) also is generally expected to be used for work pads, as needed, in floodplains. If appropriate, such temporary matting may be secured to avoid movement in the event of flooding. After Project work activities are completed, temporary work pads and access roads will be removed, and the affected areas returned to approximate pre-construction grade. Permanent access, as required, will remain; UI will coordinate with CT DEEP to assess the impacts of permanent access roads in the floodplains.

6.3.4 Groundwater Resources and Public Water Supplies

Groundwater within the Project area is not used for direct potable water supply. Neither the construction nor the operation of the Project will adversely affect groundwater resources (e.g., Aquifer Protection Areas, public water supplies, private groundwater wells).

6.4 BIOLOGICAL RESOURCES

The Project will extend along the CT DOT railroad corridor, adjacent to densely developed urban/suburban areas. As a result, neither the construction nor the operation of the Project is expected to result in significant adverse effects to vegetation, wildlife, or fisheries resources. No vernal pool species habitat will be affected by the Project.

However, the Project will require vegetation removal within and adjacent to the CT DOT corridor, including within the areas that UI proposes for new permanent easement and as necessary to maintain appropriate

clearance between the rebuilt 115-kV conductors and vegetation. The need to maintain low-growing vegetation near the rebuilt 115-kV lines will, in certain areas, represent a long-term change in vegetative community type.

6.4.1 Vegetation

The construction of the Project will result in both short- and long-term, but minor effects on vegetation, including mature trees, narrow strips of primarily non-native, shrub/scrub species, and plants common to freshwater and tidal wetlands. Based on current Project plans, UI identified the areas where vegetation removal will be required on CT DOT property, within the new UI permanent easement, and/or along access roads leading to work sites. Likewise, UI determined the extent of clearing to be required in both wetland and upland habitats.

Vegetation in some areas (e.g., where clearing is required for the removal of the 115-kV lines from the southern catenary structures) will be removed during construction, but subsequently will be allowed to completely revegetate. However, in areas along the rebuilt 115-kV transmission line route, vegetation will be permanently managed to promote low-growing species consistent with the operation of the overhead transmission lines, pursuant to industry and UI standards for conductor clearance.

The Volume 2 maps identify the Project areas where upland and wetland vegetation will be removed. As summarized in Table 6-4, approximately 5.3 acres of vegetation will be removed and then allowed to revegetate naturally, while approximately 22 acres of vegetation will be removed and then permanently managed in low-growth species. UI is committed to minimizing clearing to ensure only trees that present a realistic threat to the resiliency of the system post-construction are removed.

Table 6-4: Vegetation Removal, by Municipality

Municipality	Temporary Vegetation Removal* (Ac)	Permanent Vegetation Removal** (Ac)
Milford	2.63	12.55
Orange	0.44	2.15
West Haven	2.17	6.87
New Haven	0	0.02
TOTAL	**5.24**	**21.58**

*Temporary vegetation removal includes clearing necessary for temporary off-CT DOT corridor access roads and work pads; and clearing associated with Project activities on the south side of the railroad tracks (e.g., work pads and access roads required for the removal of the southern catenary structures on the south side of the railroad tracks).

**Permanent vegetation removal refers to areas where vegetation will be cleared during construction (i.e., within CT DOT property and on UI's new UI permanent easement areas) and subsequently managed, during the operation of the 115-kV lines, in low-growing species.

Converting forest to shrubland, open field, or old field vegetation along the rebuilt 115-kV lines will modify habitat, representing a long-term, but not a necessarily adverse, affect. The creation of additional shrubland and early successional habitat (and the preservation of such existing habitat) may represent a long-term benefit for many species because shrubland habitat is otherwise declining in New England. This decline is a result of various factors (e.g., conversion of farms, suburban / urban development, ecological succession, absence of fires). In Connecticut, transmission line ROWs are a major source of shrubland habitat, providing early successional habitats characterized by a mixture of grasses, flowering plants, shrubs, and saplings. Such communities within ROWs provide a variety of wildlife habitat functions (e.g., food, cover and nesting habitat for birds and small mammals).

6.4.2 Wildlife, including Birds

The construction of the Project will result in temporary impacts to the wildlife species found in the Project area's urban/suburban environment along the CT DOT corridor. Some habitats will be permanently lost as a result of the removal of both upland and wetland vegetation within the Project area along and adjacent to the railroad corridor. However, most of this existing habitat supports generalist species and similar conditions exist in nearby areas. Because wildlife can be expected to avoid construction zones, negligible direct impacts to wildlife are expected to occur as a result of Project activities. Further, UI expects to minimize impacts to certain species, such as box turtle and osprey (which currently have a nest on a railroad catenary structure), by timing construction to the extent possible to avoid critical periods (e.g., nesting, fledgling of young birds) in the species' lifecycles.

After the completion of construction, temporary work areas on CT DOT property will be allowed to revegetate in accordance with CT DOT specifications. To the extent that CT DOT allows revegetation, wildlife species can be expected to repopulate such habitats. Similarly, within UI's new permanent easements where vegetative regrowth will be managed pursuant to the Company's ROW standards, wildlife using those vegetative communities can be expected to repopulate the easement areas over time.

6.4.3 Fisheries

The Project will not affect either freshwater or marine fisheries because the rebuilt transmission lines will span all watercourses that have been identified as potential fisheries habitat.

To the extent possible, existing riparian vegetation at stream crossings along the Project route will be maintained. Riparian zones are conducive to fish habitats, as these zones preserve shaded areas along waterbodies, reduce stream bank erosion during flood events, and act as natural filters to nutrients,

pollutants, and sediments. In areas where riparian vegetation must be removed, UI will implement erosion and sedimentation control procedures to avoid the potential for sedimentation; such procedures will be defined in the SWPCP. These controls will prevent disturbances to existing fisheries within waterbodies along the Project. Furthermore, these controls will be maintained throughout construction and will remain in place until the areas are revegetated and stabilized. Inspections will be performed pursuant to the Project SWPCP to verify the protection of water quality and fisheries.

6.4.4 State-Listed Threatened, Endangered, or Special Concern Species

UI will implement appropriate measures to protect the species identified by the CT DEEP NDDB and the USFWS as potentially inhabiting the Project site. Appropriate protection plans for those species determined to be present in the Project area will be defined in conjunction with CT DEEP.

UI performed field investigations to assess the presence of two state-listed plants identified by NDDB as potentially inhabiting the Project area. However, neither of the two state-listed, tidal wetland-dependent plant species - Parker's pipewort and saltmarsh bulrush - were found to be present within the Project area. As a result, UI does not anticipate a requirement for protective measures for these species during construction.

CT DEEP records indicate the presence of two tidal wetland dependent bird species in the salt marshes surrounding the Indian River in Milford. These species are most susceptible to human disturbance during the breeding season (approximately April through August). Provided Project construction occurs outside of the breeding season, either prior to May 1st or after August 31st, CT DEEP indicated that active nests would be avoided, and no additional precautions would be required. This includes preventing the introduction of any new excessive noise between April 15th and August 15th. If construction activities must occur during these periods, UI will perform surveys to determine if active nests are present that could be impacted by the Project work. If a nest is discovered, construction activities in the immediate vicinity would be postponed until after August 31st.

In the Project area, CT DEEP recommended the implementation of certain best management practices to protect the eastern box turtle (refer to the NDDB correspondence in Appendix A). These measures include avoiding the use of crushed stone to the extent practicable (and installing temporary matting in its place) and the use of wood chips in upland habitat. Although potential impacts from the Project on box turtle habitat is not anticipated to be significant given the work locations immediately adjacent to the rail lines,

UI will adhere to the agency's recommendations during construction. Similar avoidance/protection measures will be employed for the Northern Diamondback Terrapin.

For work within or near leopard frog habitat, UI also will adhere to the NDDB recommendations for protection as detailed in its December 27, 2020 correspondence (refer to Appendix A).

To avoid potential impacts to bats, UI will attempt to limit tree removal for the Project during the NLEB maternity roosting season, which is from June 1 to July 31. In some cases, UI may utilize a trained specialist to identify trees with the bark suitable for roosting as a means to ensure trees with active roosts are not disturbed.

6.5 COASTAL RESOURCES

Approximately 2.52 miles of the Project extends through the designated coastal boundary in Milford, West Haven, and New Haven. However, within the coastal boundary, the rebuilt 115-kV transmission lines will continue to be aligned along the railroad corridor, maintaining the decades-long co-location of transportation and energy infrastructure. Based on the CT DEEP's Connecticut Coastal Management Manual and the Coastal Site Plan Review Checklist, the Project will not adversely affect any designated coastal resources or uses.

Specifically, the Project will not adversely affect beaches and dunes, rocky shorefronts, coastal bluffs and escarpments, or coastal waters, and will not result in any changes in the circulation of coastal waters. Sediment and erosion best management practices will be implemented to avoid the potential for degradation of existing drainage patterns and shoreline erosion, and to protect existing wildlife, finfish, and shellfish. No existing or proposed waterfront coastal uses or recreational areas will be affected by the Project.

UI's current Project plans reflect the use of taller new structures, allowing longer conductor span lengths, to minimize the number of rebuilt 115-kV line structures in coastal resource areas. For example, UI has designed longer span lengths to extend across the Indian River, as well as to minimize the number of structures in the vicinity of the West River.

6.6 LAND USE, RECREATION, AND COMMUNITY FACILITIES

The proposed rebuilt 115-kV transmission lines will continue to be collocated within or directly adjacent to the long-established CT DOT corridor, which has been dedicated to both transportation and electric transmission use for approximately 100 years. The Project will improve the reliability of the 115-kV lines

and will be consistent with various state, regional, and local land use plans. As a result, except for the areas where UI must acquire new easement to accommodate the rebuilt transmission lines, the Project will result in generally limited and temporary impacts on land uses, mostly during the construction phase.

Based on its existing Project plans, UI proposes to acquire approximately 17.5 acres of new permanent easements from the owners of properties located directly adjacent to the CT DOT property boundary (refer to Table 2-4 for a list of locations where permanent easement is expected to be required, as well as to the Volume 2 maps). Most of the required new permanent easements will be adjacent to the northern CT DOT property boundary. Of the estimated 17.5 acres of proposed new UI easements:

- 16.25 acres will be permanent easements (e.g., for the ROW required to accommodate the new 115-kV structures, wire, blowout, and vegetation removal in accordance with electric transmission clearances).
- 1.25 acres will be permanent easements for access across private properties to reach the rebuilt 115-kV lines within the CT DOT corridor.

All the areas in which UI proposes to acquire new easement either adjoin or provide access to the CT DOT railroad corridor. In some of the areas where UI proposes to acquire new easement, existing sheds and debris, etc. will have to be removed for the construction of the Project. Future land uses within the new easements will be restricted to those compatible with overhead transmission line operation. In general, UI's easement will prohibit the construction of buildings, pools, and structures.

In addition, in some locations on CT DOT property, existing encroachments (e.g., sheds, debris) are within the Project area and will have to be removed prior to Project construction. UI will coordinate with CT DOT / MNR regarding these encroachments and the plans for removal.

The Project is consistent with the overall state, regional, and local objectives for continuing to provide a reliable resilient electrical transmission system to assist in serving existing customers and promoting economic growth. All four municipalities traversed by the Proposed Route have published POCDs. In general, these plans indicate that the linear CT DOT corridor would continue as a transportation/infrastructure asset and that land uses in the areas near the railroad corridor in the future will reflect the current well-established pattern of land uses (e.g., railroad stations, commercial / industrial development, residential areas). None of the plans identify local land use policies that would be inconsistent with the Project.

The Project is located near but would not traverse any designated recreational areas (refer to Table 5-7). The Beaver Brook Trail system, located in Milford near Milvon Substation, extends to within approximately 260 feet of the northern CT DOT corridor boundary and is the closest recreational area to the Project. No designated scenic areas are located in the Project vicinity. As a result, neither the construction nor the operation of the proposed transmission line would have adverse effects on the recreational uses or scenic areas.

The Project area extends through a well-developed urban/suburban area that includes a variety of community facilities, such as daycare centers, schools, group homes, and youth camps (refer to Table 5-6). The closest such facility to the Project is the Milford Arts Council, located in the Milford Train Station, which borders the south side of the MNR lines. Other community facilities within 500 feet of the Project area include Milford Hospital, three preschools in Milford and three preschools in West Haven, and St. Mary's School and a public school in Milford. None of these facilities will be directly affected by the Project.

6.7 VISUAL AND AESTHETIC CHARACTERISTICS

To evaluate views of the Project from nearby locations, UI completed a *Preliminary Visibility Assessment*, which is provided in Appendix C. This analysis incorporated a combination of three-dimensional computer modeling and field evaluations to predict the extent of visibility and present representations of the character of those views. The assessment includes viewshed analysis mapping, select photographs of existing conditions and corresponding photo-simulations that portray scaled renderings of the Project structures.

The proposed 115-kV transmission line structures will be aligned primarily on CT DOT property, north of and adjacent to the long-established railroad corridor, eliminating most of UI's southernmost infrastructure. Similar to current conditions, the heights of the proposed monopoles vary throughout the Project corridor but will generally be taller than the existing catenary structures but not create a substantial change in the visual and aesthetic characteristics of the Project area. The new structures will range in heights from 70 feet 170 feet above ground level.

The viewshed maps in Appendix C demonstrate that the zone of visibility associated with the Project will not expand significantly. Although some locations will experience changes from existing conditions due to the relocation and modified heights of new structures, Project visual effects may be balanced by the removal of bonnets and other supporting infrastructure, particularly along the southern side of the CT DOT corridor.

The corridor has historically been, and continues to be, an unmistakable landmark throughout the Project area. The proposed modifications may alter the character of several existing near views, but as is the case today, at distances of approximately 0.75 mile and beyond, the tops of the new structures and transmission circuits will not be prominent features, particularly with the amount of intervening existing infrastructure common to the area. One change from existing to proposed structure heights will occur at the West River crossing, where four 120-foot-tall monopoles will be required to replace the 89-foot-tall catenary bonnets, which will then be removed.

Historic resources are limited to the western portion of the Project area, within the City of Milford. Due to their proximity to the existing railroad and electrical corridor, the rebuilt monopoles will have a visual effect on these resources, albeit to varying degrees. The potential indirect visual effects to historic resources are discussed in Section 6.8.

Photographic locations 1 through 8 in Appendix C provide views of existing and proposed conditions along the Project corridor. The photo-simulations depict visual representations of the rebuilt 115-kV lines from vantage points near the railroad corridor, including the train stations in Milford and West Haven, and the West River crossing. The simulations depict the proposed replacement monopoles and circuits, and the removal of MNR catenary structures, existing UI bonnets, and 115-kV facilities.

6.8 CULTURAL (ARCHAEOLOGICAL AND HISTORIC) RESOURCES

As described in the *Phase 1A Cultural Resources Assessment Survey* (Appendix D) prepared by Heritage, the Project is not expected to adversely affect archaeological resources (based on the use of recommended mitigation measures described below) or to directly impact standing historic structures. However, because the rebuilt electric transmission line structures will be taller than those now aligned on the railroad catenary structures, Heritage determined that the Project would have indirect (visual) impacts to NRHP/SRHP-listed districts / structures located in Milford.

Heritage also concluded that the CTDOT railroad facilities are themselves historic and relevant to railroad history. However, the removal of the 115-kV facilities from the catenary structures will have no adverse effects (direct or visual) to the character-defining features of the railroad or its infrastructure.

As described in Heritage's cultural resources assessment survey, the Project is located near one documented archaeological site and five historic structures/districts listed on the NRHP/SRHP.[29] The five NRHP/SRHP sites are The Academy of Our Lady of Mercy (Lauralton Hall), River Park Historic District, U.S. Post Office – Milford Main, St. Peter's Episcopal Church, and Taylor Memorial Library. Heritage's cultural resources report was submitted to the SHPO on September 10, 2021. UI expects to coordinate with the SHPO and Heritage to minimize the Project's potential effects on cultural resources, as described below.

Preliminary Viewshed Analysis and NRHP/SRHP Properties

Based on a preliminary viewshed analysis of the Project components, Heritage determined that the Project – specifically views of the monopole structures for the rebuilt 115-kV lines – will result in indirect visual effects on the context of the NRHP/SRHP properties. Specifically, to support the rebuilt 115-kV lines, monopoles in the viewsheds of the NRHP/SRHP structures are proposed be approximately 125 to 140 feet tall.

However, the indirect visual effect will differ for each of the historic properties. For example, of the five locations, Heritage estimated that the Project's visual effect to The Academy of Our Lady of Mercy (Lauralton Hall) will be the least noticeable. Because this NRHP property is largely screened from the existing CT DOT corridor by intervening vegetation and buildings, the visual effect of the taller monopole structures will be limited to less than half of The Academy of Our Lady of Mercy—Lauralton Hall property; specifically, the structures will be most visible from the open athletic fields in the eastern portion of the property. Similarly, the Project's visual effect to the River Park Historic District is also expected to be partial, limited to the southern portion of the historic district that encompasses the municipal center of Milford. The remaining three NRHP/SRPH resources (U.S. Post Office – Milford Main, St. Peter's Episcopal Church, and Taylor Memorial Library) are anticipated to have year-round views of the Project's monopole structures.

UI has designed the Project to minimize overall environmental and social impacts, while targeting the overarching objective of improving the reliability of the electric system. UI's engineers have determined that the monopoles are necessary for engineering and public safety reasons, with the proposed height of the monopoles directly correlated with minimizing both the number of new transmission line structures required and impacts to sensitive areas. Accordingly, Heritage recommended that UI work in consultation with the SHPO to mitigate the visual impacts of the Project on the five NRHP/SRHP properties.

[29] While the review indicated that there are no individually listed SRHP in the vicinity of the Project, all the NRHP properties / districts also are included in the SRHP.

Archaeological Resources

Heritage's review concluded that the proposed Project will be located in areas that have been highly modified by previous development. As a result, the Project area no longer has the potential to encompass locations that could produce intact archaeological deposits, except near Milford Cemetery and in the vicinity of a proposed access road in Orange, where a known archaeological site is documented.

However, UI's Project design already reflects measures (longer spans between structures) to avoid construction in the vicinity of the Milford Cemetery. To avoid the potential for impacts to the known archaeological site in Orange (if the proposed access road is to be used for Project construction), Heritage recommends the use of best management practices to avoid any ground disturbance, including clearing vegetation manually, leaving tree stumps in place (no grubbing), and the use of timber matting (or equivalent).

Although unlikely given the past modifications to the railroad corridor and vicinity, buried archaeological materials potentially could be encountered during excavation activities performed during Project construction. To address this contingency, UI will include in the Project D&M Plan(s) protocols for implementation if unanticipated cultural materials are unearthed during construction.

6.9 TRANSPORTATION, UTILITIES, AND ENERGY FACILITIES

The construction and operation of the proposed Project will not result in any significant adverse effects on transportation or municipal utility systems. The Project is not located near any airports or flight paths, and the proposed new monopole heights were reviewed by the FAA, which issued Determinations of No Hazard, indicating that no special lighting or markers will be required on the rebuilt 115-kV lines to maintain aviation safety.

In general, the rebuilt 115-kV lines will span all roads and will not affect buried infrastructure or overhead distribution lines. The final design of the Project will reflect the results of UI's detailed investigations of existing utility facilities, including MNR signal and communications wires, as well as consultations with CT DOT and MNR. The Project's D&M Plan(s) will include specifications regarding the measures that will be implemented to avoid or minimize impacts to existing transportation and utility infrastructure.

UI conducted a review of all the proposed structures in coordination with the FAA's Obstruction Evaluation Group (OE) and submitted applicable Project information to the OE for aeronautical studies under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, Part

77. In all cases, the FAA OE issued a "Determination of No Hazard to Air Navigation" indicating the aeronautical studies revealed that the structures do not exceed obstruction standards and would not be a hazard to air navigation. Additional consultation with FAA will be conducted if Project design modifications require an increase in monopole heights that would exceed obstruction standards and as required to update or extend the FAA's 2021 determinations regarding the Project.

6.9.1 CT DOT and MNR

To properly plan and construct the proposed Project within the CT DOT corridor, UI has been consulting with and will continue to coordinate with representatives of CT DOT/MNR. For example, CT DOT/MNR representatives reviewed UI's 50% engineering design information for the Project, which forms the basis for the analyses included in this document.

Both construction and pre-construction activities are subject to CT DOT/MNR Right-of-Entry Permits which are secured by UI. This preconstruction coordination included the obtaining of a permit from CT DOT and MNR. Permission was granted by MNR and CT DOT with the approved entry permit for preconstruction activities on October 2, 2020. Permit terms include measures that the Contractor must follow, including but not limited to adhering to all MNR rules and regulations, and schedule.

The subsequent Right-of-Entry permit related to construction activities contemplates all the detailed information necessary for the safe removal of legacy bonnets and the repositioning of any CT DOT/MNR assets necessary for the safe and effective operation of the rail corridor. Following the measures discussed and provided by CT DOT and MNR, and with the comprehensive previous experience UI possesses from similar transmission line rebuilds, appropriate actions will be taken to preserve the safety of all stakeholders involved. Any maintenance activities would be coordinated with CT DOT personnel and conducted to avoid effects to rail operations.

6.9.2 Public Roads and Proposed Access

The Project area is readily accessible from the local and regional highway network. During construction, equipment and vehicles will use this road network, as well as temporary and permanent access roads established for the Project, to reach work sites. At locations where construction access along public roads could interfere with traffic flow patterns, UI will coordinate with municipal police departments and CT DOT (for state roads) to assure that appropriate construction warning zone signs are erected and that flaggers and/or police are on site to direct traffic.

Some construction activities could result in minor and short-term effects to vehicular traffic on the local roads leading to Project work sites. For example, localized traffic congestion may occur when heavy construction equipment or large components are transported to the work sites, when construction personnel travel to and from the Project sites. However, these effects will be minor and short-term. To the extent practical, UI will coordinate work with impacted landowners and the relevant municipality to minimize potential impacts to traffic on local roads. In addition, UI will obtain encroachment permits from CT DOT for the proposed transmission line spans across Boston Post Road (U.S. Route 1) in Milford, Saw Mill Road (State Route 162) in West Haven, I-95 in West Haven, and Ella T. Grasso Boulevard (State Route 10) in New Haven. The construction contractor will be required to obtain appropriate permits related to the transportation of oversized loads and equipment to and from the Project site.

6.9.3 Utilities

The Project area is served by public water, sewer, and storm sewer systems, as well as other utilities. Neither the construction nor the operation of the Project will affect any existing municipal utilities.

UI will coordinate with the relevant stakeholders regarding utility crossings and will design the Project to try to avoid impacts to existing utility systems, including the electrification, communications, and signaling systems used by MNR along the railroad corridor. As necessary, UI will temporarily or permanently relocate existing infrastructure outside of construction zones. In addition to Call Before You Dig procedures, UI utilizes a comprehensive program of advanced due diligence including archival research, ground penetrating radar, and the use of soft dig to minimize any potential for interruption of existing utility systems.

6.9.4 Energy Facilities

The proposed Project will not result in any adverse impacts to existing energy facilities and will significantly benefit the Connecticut energy system by maintaining the reliability and resiliency of UI's facilities, in accordance with applicable national and regional electric standards and criteria. The rebuilt 115-kV lines will be integral to the development of new energy infrastructure opportunities in surrounding locations. These upgrades will maintain and improve system reliability, preserve safety within and adjacent to the transmission line facilities, and provide technological enhancements to legacy system equipment.

6.10 AIR QUALITY, NOISE, AND LIGHTING

The Project will have minimal, short-term, and highly localized effects on air quality, noise, and lighting.

Air Quality

The development of the Project will result in short-term and localized effects on air quality because of emissions from construction equipment and vehicles, as well as from fugitive dust emissions generated during earth-moving and drilling activities. The operation of the Project facilities will not result in adverse impacts to air quality.

To minimize emissions from construction equipment and vehicles, UI will require Project contractors to properly maintain equipment and to adhere to Connecticut's anti-idling requirements (RCSA § 22a-174-18). In addition, UI will require its contractors to control dust emissions at work sites, as necessary, per guidance provided in the SWPCP. To minimize tracking of dirt from Project construction areas onto paved roads, as necessary, UI will direct its Project construction contractor to install crushed stone (or equivalent) anti-tracking pads and will require contractors to sweep roads at Project ingress/egress points.

Noise

The construction of the Project will result in minor and short-term increases in noise associated with construction activities, such as the movement and operation of construction equipment (e.g., earth movers, jackhammers, drilling rigs, cranes). However, the operation of the rebuilt transmission lines is not expected to cause any long-term change to the sound environment.

Further, the Project will not result in modifications that would change the sound output from any of the five substations. There will be associated temporary construction noise related to the work required to connect each of the substations to the rebuilt 115-kV transmission lines. However, there will be no long-term change to the operation of the substations.

During Project construction, noise impacts will be concentrated in the immediate vicinity of work sites on either side of the MNR rail lines. Any construction related noise will temporarily raise ambient sound levels near work sites. However, this increase will be short-term, lasting only for the duration of Project activities in a particular location. Moreover, all Project construction activities will be within or adjacent to the CT DOT railroad corridor and near major highways (e.g., I-95, U.S. Route 1) and urban/suburban areas. In such areas, the existing ambient sound environment is affected by train and vehicular traffic. As a result, the short-term noise increases associated with Project work are expected to be a minor component of the background noise environment.

In general, the extent of a noise effect to humans is dependent upon a number of factors, including the change in noise level from ambient, the duration and nature of the noise, the presence of other noise sources, people's attitudes, the number of people exposed to the noise, and the type of activity affected by the noise (e.g., sleep, recreation, conversation). UI's schedule for the construction of the proposed Project is expected to vary, depending on the type and location of work tasks. As described in Section 4, to the extend practical, typical construction work hours are expected to be 7:00 AM to 7:00 PM, Monday through Saturday.

However, all work on the catenary structures and near the rail lines must be closely coordinated with CT DOT / MNR, recognizing the need to maintain rail operations. As a result, UI expects that such construction activities will occur during non-peak railroad use periods, including at night and on Sundays, as required to minimize impacts to the rail system. Further, 24/7 work will be required during certain critical periods requiring electrical outages on the UI system. The specific Project work hours will be identified in the D & M Plan(s).

Although construction noise is exempt under the Connecticut regulations for the control of noise, (RCSA § 22a-69-1.8(h)), UI is aware that Orange, West Haven, and New Haven have adopted noise control ordinances, which identify typical hours for construction activities. UI will coordinate with the Council and the municipalities regarding the construction schedule. To assure that the public is aware of the Project work activities, UI will inform the involved municipalities and stakeholders of the Project schedule regarding when nighttime construction activities are anticipated.

UI also investigated the potential effect on noise of removing vegetation buffers, such as will be required along the northern boundary of the CT DOT corridor for the installation and operation of the rebuilt 115-kV lines. Research indicates that thick forest and shrub areas, 100 feet wide or more, need to exist between a noise emitter and noise receptor for vegetation to provide a substantial natural buffer to sound. The proposed Project will require vegetation removal within the CT DOT corridor and the proposed UI permanent easement. However, the existing vegetated areas that will have to be removed for the Project are less than 75 feet wide. Additionally, most of the existing vegetation within and along the CT DOT corridor is deciduous, providing very little sound buffer ability during the months when leaves are off the trees. As a result, the removal of any existing vegetation is not expected to change the nearby sound environment.

Lighting

Lighting will be required for Project construction activities that must occur during nighttime hours, which will be necessary to avoid conflicts with train movements. For such work, temporary portable lighting will

be needed. However, UI will require its contractors to install temporary lighting such that the illumination is directed solely on work sites. As a result, lighting-caused glare outside of the approved construction work zones is not anticipated. The operation of the Project will not require any lighting along the new 115-kV transmission line route or at the five existing UI substations.

7. ELECTRIC AND MAGNETIC FIELD CONSIDERATIONS

To assess the alternating current (AC) electric and magnetic fields (EMF) associated with the Project, UI retained Exponent, a company with specialized expertise in such evaluations. To perform the EMF analyses, Exponent measured EMF levels associated with the existing 115-kV lines located on top of the railroad catenary structures between UI's Milvon and West River substations.

Exponent also modeled the proposed EMF levels that would be associated with the operation of the rebuilt 115-kV lines, consisting mainly of double-circuit monopoles located mostly along the north side of the railroad tracks, principally within the existing CT DOT-owned railroad corridor.

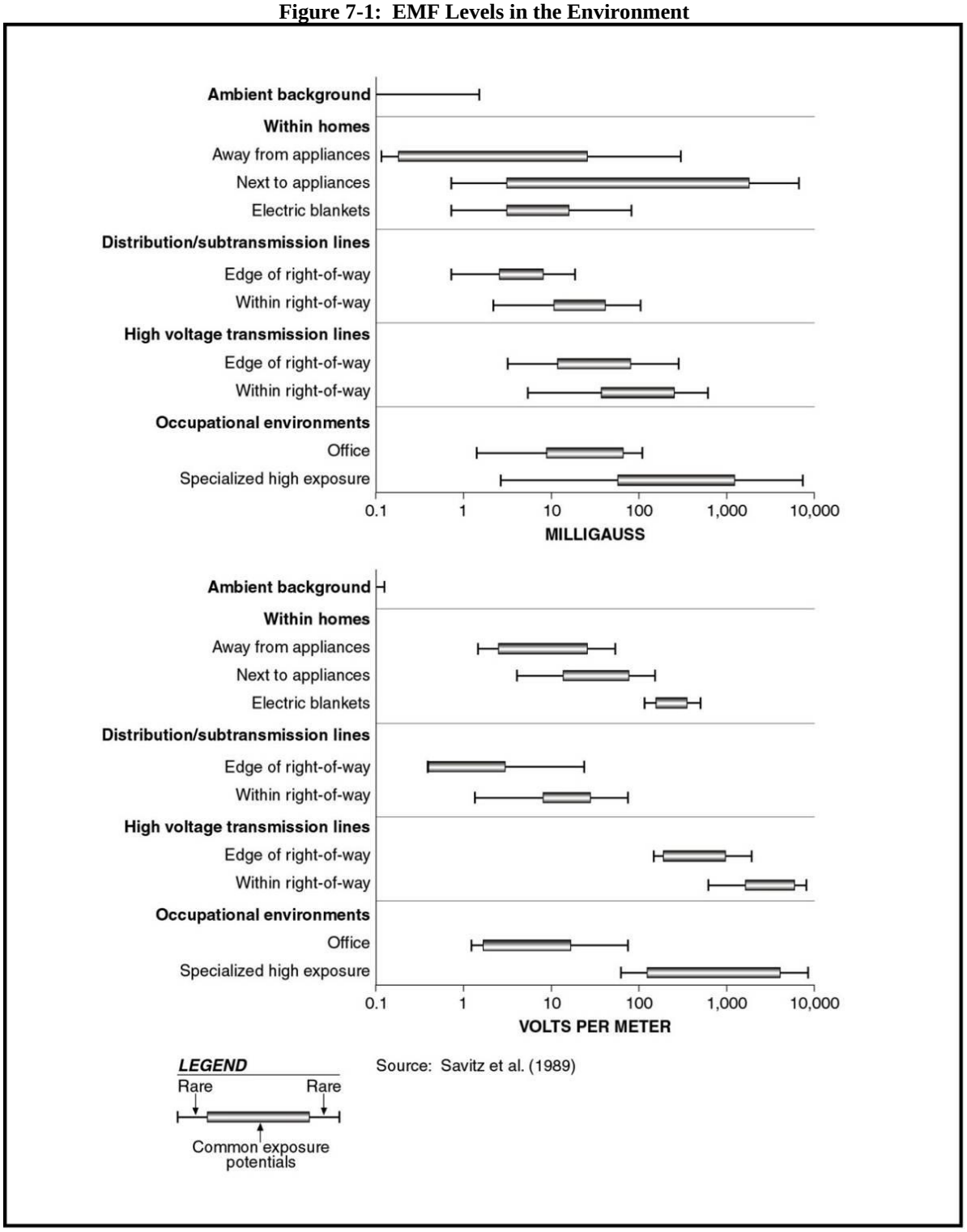
As summarized below, Exponent's assessment is that the proposed rebuild of the existing 115-kV transmission lines will generally result in a decrease in overall EMF levels compared to the existing EMF levels on both the north and south sides of the CT DOT corridor. This decrease will be due to the Project design that configures the transmission lines to minimize magnetic fields, UI's implementation of Project siting and design features consistent with the CSC's EMF BMPs, and - in select locations - UI's acquisition of permanent easement to maintain appropriate clearance between conductors and the edge of easement. With respect to the overall decrease in total post-construction EMF levels, the assessment calculations indicate a decrease in post-construction EMF levels at the southern CT DOT corridor boundary and a generally minor increase in post-construction EMF levels (that decreases rapidly with distance) at the northern CT DOT corridor boundary/new UI easement boundary.

All calculated EMF levels associated with the Project will be a small fraction of those recommended for the general public by international health-based standards.

7.1 OVERVIEW

EMF surrounds anything that generates, transmits, or uses electricity. As a result, people living in modern communities are surrounded by various sources of EMF on a daily basis. Figure 7-1 depicts typical EMF levels in residential and occupational environments, as well as on or at the edges of transmission line ROWs.

Figure 7-1: EMF Levels in the Environment



Magnetic fields and electric fields are described as follows:

- ***Magnetic Fields:*** The current flowing on the conductors of a substation bus-line or an overhead transmission line generates a magnetic field near the conductor. The strength of Project-related magnetic fields is expressed as magnetic flux density in units of milligauss (mG) where 1 Gauss (G) = 1,000 mG. The AC carried by transmission lines (and thus magnetic fields) varies in direction and magnitude in a continuous cycle that repeats 60 times per second, i.e., at a frequency of 60-Hertz (Hz). The level of the magnetic field around conductors varies with the circuit loading. Line loadings are expressed in units of amperes (A). Because of variations in line loadings, measurements or calculations of the magnetic field present a snapshot of the magnetic field at only one moment in time. On a given day, throughout a week, or over the course of months and years, the magnetic-field level can change depending upon the patterns of power demand on the bulk transmission system.

- ***Electric Fields:*** The voltage on the conductors of transmission lines generates an electric field in the space between the conductors and the ground. Electric fields are blocked by many objects that are conductive, including fences, shrubbery, and buildings, and thus shield electric fields. The electric fields from equipment within UI's Milvon, Woodmont, Allings Crossing, Elmwest, and West River substations therefore were not calculated since they would be attenuated to insignificant levels by the substation fence and any surrounding vegetation. Electric-field levels are expressed in units of kilovolts per meter (kV/m), where 1 kV/m = 1,000 volts per meter (V/m).

7.2 EMF MEASUREMENTS AND MODELING

To assess EMF from existing sources under pre-Project conditions, Exponent took measurements of the existing UI transmission lines along the CT DOT railroad corridor. The purpose of these measurements was to characterize existing EMF levels along the existing transmission lines and adjacent areas.

Field levels were measured at a height of approximately 3.28 feet (ft) (1 meter [m]) above ground using instruments meeting IEEE Standard 1308-1994[30] for obtaining accurate field measurements at power line frequencies and calibrated by EMDEX, LLC, using methods like those described in IEEE Standard 644-2019.[31] The measurements were taken and reported as the root mean square value of the field in accordance with IEEE Standard C95.3.1-2010[32] and IEEE Standard 644-2019. EMF measurements were obtained within the CT DOT railroad corridor (as close to the edges of the railroad tracks as could be safely measured) and at or near the boundaries of adjacent properties.

[30] Institute of Electrical and Electronics Engineers (IEEE). IEEE Recommended Practice for Instrumentation: Specifications for Magnetic Flux Density and Electric Field Strength Meters - 10 Hz to 3 kHz. (IEEE Std. 1308-1994, Reaffirmed 2010). New York: IEEE, 1994.

[31] Institute of Electrical and Electronics Engineers (IEEE). IEEE Approved Draft Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from Alternating Current Power Lines (IEEE Std. P644/D7, . New York: IEEE, 2019.

[32] Institute of Electrical and Electronics Engineers (IEEE). IEEE Recommended Practice for Measurements and Computations of Electric, Magnetic, and Electromagnetic fields with respect to Human Exposure to Such Fields, 0 Hz to 100 kHz. (IEEE Std. C95.3.1-2010). New York: IEEE, 2019.

Measured magnetic-field levels within the CT DOT corridor averaged between 20 and 23 mG. Measured electric-field levels within the CT DOT railroad corridor varied between approximately 0.2 and 0.3 kV/m with a maximum measured level of 0.5 kV/m. EMF measurements in other areas within approximately 300 ft (91 m) of the CT DOT corridor were generally lower, consistent with the rapid decrease in EMF levels with distance. The average measured magnetic field in these areas (outside the CT DOT corridor) varied from approximately 0.2 mG to 8.7 mG, and all electric-field levels were generally less than 0.1 kV/m.

To assess post-Project conditions, Exponent modeled the EMF levels from the existing and proposed configurations of the 115-kV lines, assuming peak and peak daily average loading in 2021 and projected peak and peak daily average load anticipated after the Project is scheduled to be completed in 2028.

The assumptions used in the modeling are consistent with CSC guidelines, as summarized in Section 7.4.

7.3 ASSESSMENT CRITERIA

Neither the federal government nor the State has enacted standards for EMF from power lines or other sources at power frequencies; however, the CSC has developed BMPs for siting new transmission lines, as summarized in Section 7.4. Several states have statutes or guidelines that apply to fields produced by new transmission lines, but these guidelines are not health based. For example, New York and Florida have limits on EMF that were designed to limit fields from new transmission lines to levels characteristic of the fields from existing transmission lines.

More relevant EMF assessment criteria include the exposure limits recommended by health and scientific organizations. These exposure limits are included in guidelines developed to protect health and safety and are based on reviews and evaluations of relevant health research.

The guidelines include exposure limits for the general public recommended by the International Committee on Electromagnetic Safety (ICES) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) to address health and safety issues.[33] In a June 2007 Factsheet, the World Health Organization

[33] International Committee on Electromagnetic Safety (ICES). IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz, Standard IEEE C95.1-2019, Oct. 2019; International Commission on Non-ionizing Radiation Protection (ICNIRP). Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz to 100 kHz). Health Phys 99: 818-836, 2010.

recommended that policy makers adopt international exposure limit guidelines, such as those from ICNIRP or ICES (refer to Table 7-2), for occupational and public exposure to EMF.[34]

Table 7-2: ICNIRP and ICES guidelines for EMF exposure at 60 Hz

	Exposure (60 Hz)	
	Electric Field	Magnetic Field
ICNIRP		
Occupational	8.3 kV/m	10 G (10,000 mG)
General Public	4.2 kV/m	2 G (2,000 mG)
ICES		
Occupational	20 kV/m	27.1 G (27,100 mG)
General Public	5 kV/m*	9.040 G (9,040 mG)

*Within power line ROWs, the guideline is 10 kV/m.

7.4 CONSISTENCY WITH CSC BEST MANAGEMENT PRACTICES

The CSC has adopted EMF Best Management Practices for the Construction of Electric Transmission Lines in Connecticut (EMF BMPs) based upon a consensus of health and scientific agencies that the scientific evidence "reflects the lack of credible scientific evidence for a causal relationship between MF [magnetic field] exposure and adverse health effects" (CSC, 2014, p. 3). Nevertheless, the CSC concluded that precautionary measures for the siting of new transmission lines in Connecticut are appropriate and advocated that "the use of effective no-cost and low-cost technologies and management techniques on a project-specific basis to reduce MF [magnetic field] exposure to the public while allowing for the development of efficient and cost-effective electrical transmission projects" (CSC, 2014, p.4).

The CSC's EMF BMPs formed the basis for Exponent's review of the Project's consistency with the CSC guidelines. The Project does not involve the development of new transmission lines, but rather the rebuilding existing 115-kV transmission lines, almost entirely within the same CT DOT corridor.

Exponent considers the Project consistent with the CSC's EMF BMPs for "no cost/low-cost" design recommendations for reasons that include:

- **Distance**: The removal of the transmission line from the southern railroad catenary structures significantly increases the distance between the transmission line and adjacent properties on the south side of the CT DOT railroad corridor. Additionally, in locations where the rebuilt double-

[34] World Health Organization (WHO). Fact Sheet No. 322: Electromagnetic Fields and Public Health – Exposure to Extremely Low Frequency Fields. Geneva, Switzerland: World Health Organization, 2007.

circuit 115-kV lines cannot be aligned within the CT DOT corridor (because of constraints such as narrow corridor width, existing land uses, or terrain) or where additional area is required to maintain appropriate clearance from conductors, UI proposes to acquire permanent easements adjacent to the northern boundary of the CT DOT property.

- **Height of Support Structures**: The taller monopole structures will allow the conductor heights of all the proposed 115-kV transmission lines to be far greater than the heights of the existing 115-kV lines on the catenary structures and minimum clearances required by the National Electrical Safety Code.

- **Line Consolidation and Conductor Configuration**: The proposed transmission line structures are dual-circuit vertical structures, with conductors arranged vertically, which greatly reduces the distance between lines compared to the existing configuration (where the two transmission lines are on bonnets on opposite sides of the railroad catenary structures). The proposed line configuration will result in substantial mutual-cancellation of EMF from the two transmission lines, resulting in lower overall EMF levels.

- **Optimum Phasing**: Related to the consolidation of the lines and their configuration and separation, UI has selected the phasing of the dual-circuit vertical structures to be optimal, minimizing Project-related EMF levels.

7.5 CONCLUSIONS

EMF calculations were performed using methods that are accepted within the scientific and engineering community and that have been found to match well with measured values. The results of these studies determined that post-construction magnetic-field levels at the edge of the easement are calculated to decrease by 16 mG to 62 mG over the majority of the transmission line route, with an increase of 8 mG at the northern easement boundary in one modeling configuration. Existing electric-field levels at the edge of the CT DOT railroad corridor boundary and post-construction EMF levels at the edge of the CT DOT railroad corridor / UI easement boundary are calculated to be low (0.6 kV/m or less).

Compared to existing EMF levels on both the north and south sides of the CT DOT corridor, the Project will generally result in a decrease in overall EMF levels. These decreases will be due to the Project design that configures the transmission lines to minimize magnetic fields, UI's implementation of Project siting and design features consistent with the CSC's EMF BMPs, and - in select locations - UI's acquisition of permanent easement to maintain appropriate clearance between conductors and the edge of easement. With regard to the overall decrease in total post-construction EMF levels, the post-construction EMF levels calculated at the northern CT DOT corridor boundary/new UI easement boundary are generally expected to increase (and then decrease rapidly with distance) compared to the existing EMF values. Additionally, the post-construction EMF levels calculated at the southern CT DOT corridor boundary are generally expected to decrease compared to the existing EMF values.

In summary, the calculated EMF levels resulting from the Project will be a small fraction of those recommended for the general public by international health-based standards (i.e., ICES and ICNIRP). The engineering design and other activities initiated by UI will achieve compliance with the CSC's EMF BMPs.

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8. PROJECT PERMITS, APPROVALS AND CONSULTATIONS

During the Project planning process to date, UI consulted with representatives of CT DOT, MNR, the USFWS, and FAA, as well as with officials from CT DEEP, the SHPO, and the four involved municipalities. Appendix A includes correspondence with federal and state regulatory agencies regarding the Project.

UI expects to continue to consult with the involved regulatory authorities and municipalities as the planning for and development of the Project continues. This section identifies the permits and approvals required for the construction and operation of the Project and summarizes the agency and municipal consultations that UI has conducted thus far.

8.1 FEDERAL AND STATE AGENCY APPROVALS REQUIRED AND CONSULTATIONS

In addition to authorization from the Council, the Project will require certain approvals from other state agencies, as well as federal regulators. Table 8-1 summarizes the permits and approvals expected to be required for the Project, along with the status of UI's consultations to date with the involved agencies and organizations.

8.2 MUNICIPAL CONSULTATION FILING AND OUTREACH

As part of the Project planning process, UI communicated with and/or met with officials from the affected municipalities along the Project route and coordinated with representatives of the involved regulatory agencies. In addition, during various regularly scheduled meetings regarding regulated utility projects in the city, UI briefed New Haven officials regarding this Project.

Further, UI meets with CT DOT and MNR on a bi-weekly basis. The purpose of these meetings is to maintain close communication with CT DOT and MNR throughout the Project planning and design process. UI expects to continue to coordinate with CT DOT and MNR during both the finalization of Project plans and throughout Project construction. The project is subject to an entry permit which will be secured from MNR and includes a letter of "No Objection" from CT DOT

The purpose of the meetings with municipal officials was both to inform them about the Project and to solicit input for UI's use in developing Project plans. On the municipal level, starting in February 2021, UI held meetings with representatives of Milford, West Haven, and Orange. UI has shared information about the Project with the City of New Haven on a frequent basis but was not able to schedule a meeting. Overall, UI maintained communication with the municipalities to inform local representatives of Project activities (e.g., geotechnical borings along the CT DOT corridor, drone flights to compile aerial photography).

In addition, the Council's MCF process, pursuant to which this document has been prepared and is being provided to the municipalities, represents a formalized mechanism both for informing the public and elected officials about the proposed Project and for soliciting comments on the Project from local leadership and the interested public.

During the formal 60-day municipal consultation period, UI will offer to meet with each municipality's chief elected official to review the proposed Project and this MCF, as well as to present an overview of the Council's siting process and the methods available for the municipalities to provide input in that process. Comments provided by the municipalities will be reflected in the Application that UI submits to the Council for the Project.

Table 8-1: Primary Permits and Approvals Expected to be Applicable to the Project

Agency	Potential Permit/Approval Required / Activity Regulated	Application Submitted or Consultation (Date)	Status
FEDERAL			
USACE	Clean Water Act Section 404 (inland and tidal water resource crossings) The Project may fall under GP-6, for which a Self-Verification Notification (SVNF) or Pre-Construction Notification (PCN) will be filed. There is a potential that an Individual Permit may be required.	Expected	Permit required to be determined
USFWS	Consultation per Section 7 of the Endangered Species Act	Consultation submitted January 26, 2021 & September 14, 2021	To be resubmitted as necessary
US Coast Guard	Notification		
FAA	Form 7460-1: Notice of Proposed Construction or Alternation	Consultation submitted by project segment: March 5, 2021, March 19, 2021, April 6, 2021, and May 11, 2021	Consultation with FAA complete. No lighting or marking required. FAA coordination may be required for contractor cranes
STATE			
CSC	Municipal Consultation Filing Certificate of Environmental Compatibility and Public Need under C.G.S. § 16-50*l*(a)(1) Development and Management Plan (after issuance of certificate and prior to Council's approval to start construction)	October 2021 Expected filing: January 2022 Anticipated late 2022-early 2023	Ongoing To be submitted at least 60 days after submission of MCF. Prepared after CSC approval of Application
CT DEEP • Land and Water Resources Division (LWRD) • NDDB	Water quality certification per Section 401 of the Clean Water Act; pertains to inland and tidal water resource crossings Tidal Wetlands Act: LWRD Temporary Authorization for Access and Geotechnical Due Diligence in Tidal Wetlands at Indian River Location (90 day limit) Structures Dredge & Fill (SDF) Permit, Tidal Wetlands Permit and/or 401WQC (tidal / coastal zone) (as may be needed per CT DEEP guidance) State threatened and endangered species; special concern species and significant natural communities' consultation, survey, and review	Expected filing prior to construction Application Submitted July 1, 2021 and was resubmitted August 31, 2021 Consultation submitted October 29, 2020; Preliminary State-listed Plant Survey Results Report completed January 13, 2021 State-listed Plant Species Survey Report, September 22, 2021	 Pending Determination response letter from CT DEEP received December 27, 2020 Wetlands and Vernal Pool field verification completed; Ecological Report (October 2021); State-Listed Plant Species Report (October 2021)
• Stormwater & Dewatering	General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (DEEP-WAPED-GP-015) and SWPCP	To be submitted after CSC approval of the Application; anticipated May 2023	

Agency	Potential Permit/Approval Required / Activity Regulated	Application Submitted or Consultation (Date)	Status
	General Permit for the Discharge of Groundwater Remediation Wastewater (DEEP-WPED-GP-027), if necessary		
• Bureau of Natural Resources, Wildlife Division	Osprey Consultation	February 2021 and updated May 2021	
• Coastal Management Program	Will be considered with any CT DEEP SDF or USACE permitting process	Prior to construction	
CT DEEP, PURA	Approval of method and manner of transmission line construction and energization per CGS Section 16-243	Anticipated filing after or in conjunction with D&M Plan	
CT DOT	Easement / license for work within MNR corridor (Right of Entry Permit) Encroachment permits for state highway crossings (I-95)		Anticipated 2023
MNR	Right of Entry Permit	Full Construction Permit: Anticipated submittal March 2022	Permit for Investigation Phase: Completed October 2, 2020
CT SHPO	Cultural Resource Consultation under C.G.S. § 16-50*l*(e)	Consultation Submitted January 22, 2021 Phase IA Cultural Resources Report submitted September 10, 2021	Pending
CGA Climate Change Planning and Resiliency	Public Act 18-82 Sea Level Rise	N/A	In flood zones where there is a potential for future sea level rise (20 inches), the tops of foundation elevations were designed to be at least 1' above the 100 year flood elevation mark plus the 20 inches to account for sea level rise.

9. ALTERNATIVES

9.1 INTRODUCTION AND SUMMARY OF THE ALTERNATIVES EVALUATION PROCESS

The Project represents UI's preferred solution for assuring that the 115-kV lines co-located within the CT DOT railroad corridor between Milvon and West River are upgraded to adhere to current NESC standards, conform to UI criteria which includes withstanding hurricane category 3 loads. This preferred solution was selected as a result of an iterative process whereby UI first evaluated the structural condition of the portion of the railroad catenary structures that support the existing 115-kV lines and then identified and analyzed a range of alternatives, including the no action option, line rebuild options both on and independent of the existing railroad catenary/bonnet structures, and 115-kV overhead configuration options.

Initially, UI performed an engineering assessment of the current condition of the portion of the railroad catenary structures that support the transmission assets (e.g., supports, transmission equipment along the approximately 9.5-mile CT DOT railroad corridor between Milvon and West River). The purpose of this assessment was first to analyze the structural integrity of the portion of the catenary/bonnet structures that presently support the 115-kV Milvon-West River 115-kV lines, including the transmission line mechanical loading and then to identify long-term solutions for supporting the UI facilities in accordance with national standards and Company technical specifications.

UI's assessment found that the portion of the existing catenary/bonnet structures that support UI equipment exhibited structural deficiencies (e.g., age-related deterioration) that jeopardize the long-term integrity of the UI lines. Thus, UI determined that the consequences of the "No Action" (i.e., "do nothing") option would pose unacceptable risks to the resiliency of the electric transmission system and the provision of reliable service to customers, since the structural failure of the existing UI support structures could result in a significant failure of the 115-kV circuits and/or a loss of power to one or more of the substations along the railroad corridor.

With the "No Action" option eliminated from consideration, UI next identified and investigated four primary alternatives, including the preferred solution, for upgrading the structural integrity of the 115-kV lines. These alternatives, all located along the railroad corridor, included:

- Alternative 1: Install new double-circuit monopoles to support the 115-kV lines that are presently located on both the north and south catenary structure bonnets, with the new monopoles installed within and in some areas adjacent to the CT DOT property predominantly north of the railroad tracks (preferred solution = proposed Project).

- Alternative 2: Install new single-circuit monopoles, to separately support the north and south circuits and to be located on either side of the CT DOT railroad corridor.

- Alternative 3: Rebuild one 115-kV circuit on new single-circuit monopoles, making structural modifications to the catenary structures / bonnets to allow the continued support of the other circuit.

- Alternative 4: Rebuild the existing catenary structures / bonnets completely to correct all structural deficiencies to continue to support both 115-kV lines.

UI's analyses found that Alternatives 3 and 4 would involve significantly higher costs (approximately 200% more) than Alternatives 1 and 2. These costs were attributable to the more detailed construction process and longer schedule attributable to the need for extensive coordination with CT DOT/MNR regarding the catenary structure rebuilds. Because of the overriding cost and schedule disadvantages, Alternatives 3 and 4 were eliminated from consideration.

Alternatives 1 and 2 were evaluated further, taking into consideration electric transmission line design criteria (such as clearance between the conductors and the railroad tracks and adjacent public/private properties; conductor blowout specifications); the need for additional permanent easements compared to the alignment of the new structures on CT DOT property; cost; and schedule. Based on these factors, Alternative 1 was selected as the preferred solution.

Thereafter, UI conducted more detailed engineering design studies of Alternative 1. The purpose of these studies was to further refine the Project design, taking into consideration the placement and configuration of the new monopoles. During this process, UI identified and assessed options for the alignment of the proposed double-circuit monopoles at various locations, including areas where UI recently installed new steel monopoles on the south side of the railroad tracks (as part of reliability projects), at substation interconnections, and in areas of environmental sensitivity (wetlands, land uses). For each of these locations, several options were evaluated, factoring in cost, constructability, environmental resources, real estate, and future operation and maintenance requirements. The proposed Project incorporates the results of these analyses.

In summary, based on the results of the alternatives evaluation process, the proposed Project represents the optimal solution for upgrading the 115-kV lines between Milvon and West River, thereby maintaining the electric system to the benefit of Connecticut and New England consumers. The proposed Project represents the least cost, least environmentally damaging alternative for UI's 115-kV transmission line upgrades. It also will continue the long-established co-location of the proposed new double-circuit monopoles primarily within CT DOT property. Thus, the Project will be consistent with the historical use of the linear railroad corridor for both utility and transportation uses and will maintain the interconnections between the 115-kV lines to UI's existing Milvon, Woodmont, Allings Crossing, Elmwest, and West River substations.

9.2 ALTERNATIVES REVIEWED BUT ELIMINATED

UI reviewed but eliminated two general alternatives for the Project: No Action and an All-Underground Configuration[35]. These alternatives were found to be inconsistent with UI's objectives for cost-effectively maintaining the reliability of the electric system, while minimizing environmental and social impacts.

The following sections summarize each alternative, along with the rationale for UI's decision to eliminate it from consideration.

9.2.1 No Action Alternative

Under the No Action Alternative, UI's existing 115-kV lines between Milvon and West River would continue in-service on the bonnets atop the railroad catenary structures. No improvements would be made to correct structural issues to conform to the current NESC and UI requirements.

The No Action Alternative was rejected because it would not resolve the asset condition issues, including mechanical loading, associated with the alignment of the existing 115-kV lines on top of the railroad catenary structures, and thus would not allow conformance industry codes and Company standards. As a result, the 115-kV lines would continue to be at risk for structural failures associated with mechanical loadings or stress associated with major weather events (e.g., hurricanes) that could lead to extended duration outages affecting customers and the bulk power system.

[35] Because the rebuilt 115-kV lines must necessarily connect to the UI's five existing substations located adjacent to the railroad corridor in Milford, West Haven, and New Haven, UI did not consider an alternative that would involve rebuilding the 115-kV lines in an overhead configuration on an entirely new ROW, not located along the railroad corridor. Such an alternative is not practical not only because of the need to connect the 115-kV lines to the five existing substations, but also because of the dense urban/suburban land development in the area. For example, a new overhead ROW for a double-circuit 115-kV in a vertical configuration would require a 70-foot-wide permanent easement width. Assuming a direct 9.5-mile route for such a new ROW between Milvon and West River substations, this alternative would require UI to acquire and remove any incompatible uses (e.g., buildings) from approximately 81 acres of land. Refer to Section 9.2.2 for a discussion of an all-underground configuration that was reviewed and eliminated from consideration as an alternative for rebuilding the 115-kV lines.

9.2.2 115-kV Underground Configuration Alternatives

Underground 115-kV Lines within CT DOT Corridor

UI reviewed the potential for rebuilding the 115-kV circuits underground, within the railroad corridor (primarily on CT DOT property).

Using an underground configuration, UI estimated that the cable system would consist of two cross-linked polyethylene (XLPE) cable circuits, contained within several polyvinyl chloride (PVC) conduits placed in a concrete-encased duct bank. For each circuit, the system also would require buried concrete splice vaults, where the underground cable sections would be spliced together. The splice vaults would be spaced at intervals of approximately 1,800 to 2,500 feet along the Milvon-West River substation alignment. Thus, for the approximately 9.5-mile route along the railroad corridor between Milvon and West River substations, a minimum of 50 splice vaults would be required.

Underground cable installation requires the excavation of a continuous trench, typically approximately 8-10 feet deep and 5 feet wide. This typically requires a minimum of a 30-foot-wide work area for the cable duct bank construction. In addition, excavations of approximately 12 feet wide by 12 feet deep and 28 feet long are typically required for each splice vault. The cable trench also must be backfilled with a flowable fill material (concrete) that serves to disperse the heat generated by the cables.

As a result, for an underground configuration between Milvon Substation and West River Substation, trenching would be required across both inland and tidal wetlands and smaller watercourses, as well as within the railroad ballast. Trench excavation also would be required near Milford Cemetery, as well as in the vicinity of numerous underground utilities and public infrastructure (e.g., water, sewer lines).

In addition, to avoid open cutting the larger watercourses spanned by the railroad corridor and existing 115-kV lines (e.g., the Wepawaug, Indian, and West rivers), a trenchless technology, such as horizontal directional drilling [HDD] would be required). Such trenchless technologies typically require approximately 1 acre of land on either side of the crossing for equipment set-up and material staging.

Further, where the railroad corridor spans roads (which would be spanned by the proposed double-circuit overhead 115-kV lines), the underground cable system would have to diverge from the CT DOT property and be trenched beneath the roads.

Given the varying width of the CT DOT property on both the north and south sides of the railroad tracks, in some locations, UI would have to acquire additional easements from property owners to install the cable system. UI anticipates that both permanent easements and temporary (construction) easements would be required from adjacent property owners. These easements are estimated to be approximately the same acreages as expected to be needed for the rebuilt double-circuit overhead lines.

Apart from these land use, real estate, and environmental issues, aligning the 115-kV lines underground within the CT DOT railroad corridor would require studies to assess whether the trench and splice vault excavations would be compatible with the maintenance of rail safety and the structural integrity of the catenary system. Moreover, even if such studies determined that the cable could be installed and maintained safely, CT DOT would have to agree to the underground colocation within the railroad corridor. Further, each of the five UI substations would have to be re-configured to support underground 115-kV line connections.

The construction schedule for an underground cable installation also would have to be closely coordinated with train schedules and, to avoid conflicts with train traffic. As a result, UI estimates that approximately 9-10 years could be required to install an underground double-circuit 115-kV system, using a segment-by-segment approach as planned for the proposed Project.

Overall, rebuilding the existing 115-kV lines in an all-underground configuration would be significantly more costly than the proposed overhead line construction. In general, underground construction is approximately 10-15 times more expensive than overhead construction.

Thus, compared to available overhead options, UI determined that an underground transmission line configuration between Milvon-West River substations would be cost-ineffective and inefficient. As a result, this option was eliminated from consideration due to the significantly higher construction costs and longer construction schedule, as well as substantial impacts to land uses and environmental resources.

Underground 115-kV Lines within Road ROWs

UI briefly considered, but quickly eliminated, an alternative that would involve aligning the 115-kV cables underground primarily within road ROWs between Milvon and West River substations. Any such route must necessarily link the Milvon, Woodmont, Allings Crossing, Elmwest, and West River substations, which all border the CT DOT railroad corridor.

However, because there are no straight-line roads that would provide a direct path between all five substations, any underground in-road route would have to follow numerous state and local highways. For example, from Milvon Substation to Woodmont Substation (in Milford), an underground route within road ROWs would likely extend south of the CT DOT corridor along US Route 1, State Route 162 (Bridgeport Avenue / New Haven Avenue), and Pepes Farm Road. In this area, these roads generally are aligned parallel to and within approximately 200-600 feet south of the railroad corridor. However, east of Woodmont Substation, there are no roads that parallel the CT DOT corridor for long distances and consequently, any underground 115-kV route would have to be aligned along a network of local roads on both sides of the CT DOT corridor, including through residential areas in West Haven.

Trenchless crossings, involving HDD or an equivalent method, would be required to extend the cable system beneath the Wepawaug River, Indian River, and West River. Further, open cut trenching would be required through the large wetland area located in West Haven, west of the West River.

As a result, UI estimated that an underground route aligned within roads would be a minimum of approximately 2 miles longer than the proposed overhead route along the CT DOT railroad corridor. Compared to other options, such an alignment would be cost-ineffective and more time-consuming to construct and would result in extensive social, environmental, and land use disruptions in terms of traffic congestion, noise, direct adverse effects on water resources, and other impacts.

9.3 OVERHEAD TRANSMISSION LINE REBUILD ALTERNATIVES

During the Project's conceptual engineering, UI identified and evaluated four primary overhead transmission alternatives for resolving the structural integrity issues associated with the location of the existing 115-kV lines on top of the railroad catenary structures/bonnets between Milvon and West River. These four alternatives, which would involve rebuilding the 115-kV lines along the CT DOT railroad corridor, included:

- Alternative 1: Install new double-circuit monopoles to support the 115-kV lines that are presently located on both the north and south catenary structure bonnets, with the new monopoles installed within or directly adjacent to CT DOT property primarily north of the railroad tracks (preferred solution = proposed Project).

- Alternative 2: Install single-circuit monopoles, to separately support the north and south circuits and to be located on either side of the railroad tracks.

- Alternative 3: Rebuild one 115-kV circuit on new single-circuit monopoles, making structural modifications to the catenary structures / bonnets to allow the continued support of the other circuit.

- Alternative 4: Rebuild the existing catenary structures / bonnets completely to correct all structural deficiencies to continue to support both 115-kV lines.

UI's analyses determined that to implement either Alternative 3 or Alternative 4, extensive structural modifications to upgrade the existing railroad catenary structures and bonnets would be required. Compared to Alternatives 1 and 2, either of these options would involve significantly higher costs (on a 200% order-of-magnitude), as well as an extensive construction program, which would have to be coordinated with CT DOT / MNR.

These costs would be a consequence of the more detailed construction process and longer schedule attributable to the need for extensive coordination with CT DOT / MNR regarding the catenary structure rebuilds. For example, UI estimated that approximately 17 years and $315 million[36] would be required to upgrade the 115-kV lines using Alternative 3, whereas the 115-kV upgrades pursuant to Alternative 4 would entail about 15 years and $291 million. These overriding cost and schedule disadvantages are the reasons why Alternatives 3 and 4 were eliminated from consideration after the conceptual review phase.

UI conducted more detailed analyses of both Alternatives 1 and 2. These analyses evaluated the available clearance between the railroad tracks, proposed monopoles, and existing catenary structures, as well as the overall width of the CT DOT corridor. The need for UI to acquire additional permanent ROW for both Alternative 1 and Alternative 2 was determined based on the juxtaposition of the width of the CT DOT corridor, specified clearances for the 115-kV conductors on the proposed monopoles (assuming spans of 300 feet to minimize conductor blowout), and adjacent land uses. UI vegetation management standards dictate a minimum clearance distance. Construction clearance was also considered.

Figures 9-1 and 9-2 provide representative cross-sections of the proposed (rebuilt) 115-kV structures along the railroad corridor under Alternatives 1 and 2, respectively.

[36] Costs from UI's 2018 engineering report.

Figure 9-1: Alternative 1 (Conceptual Double-Circuit Monopole, North Side of Railroad Corridor): Typical Cross-Section of ROW Pursuant to UI Clearance Standards

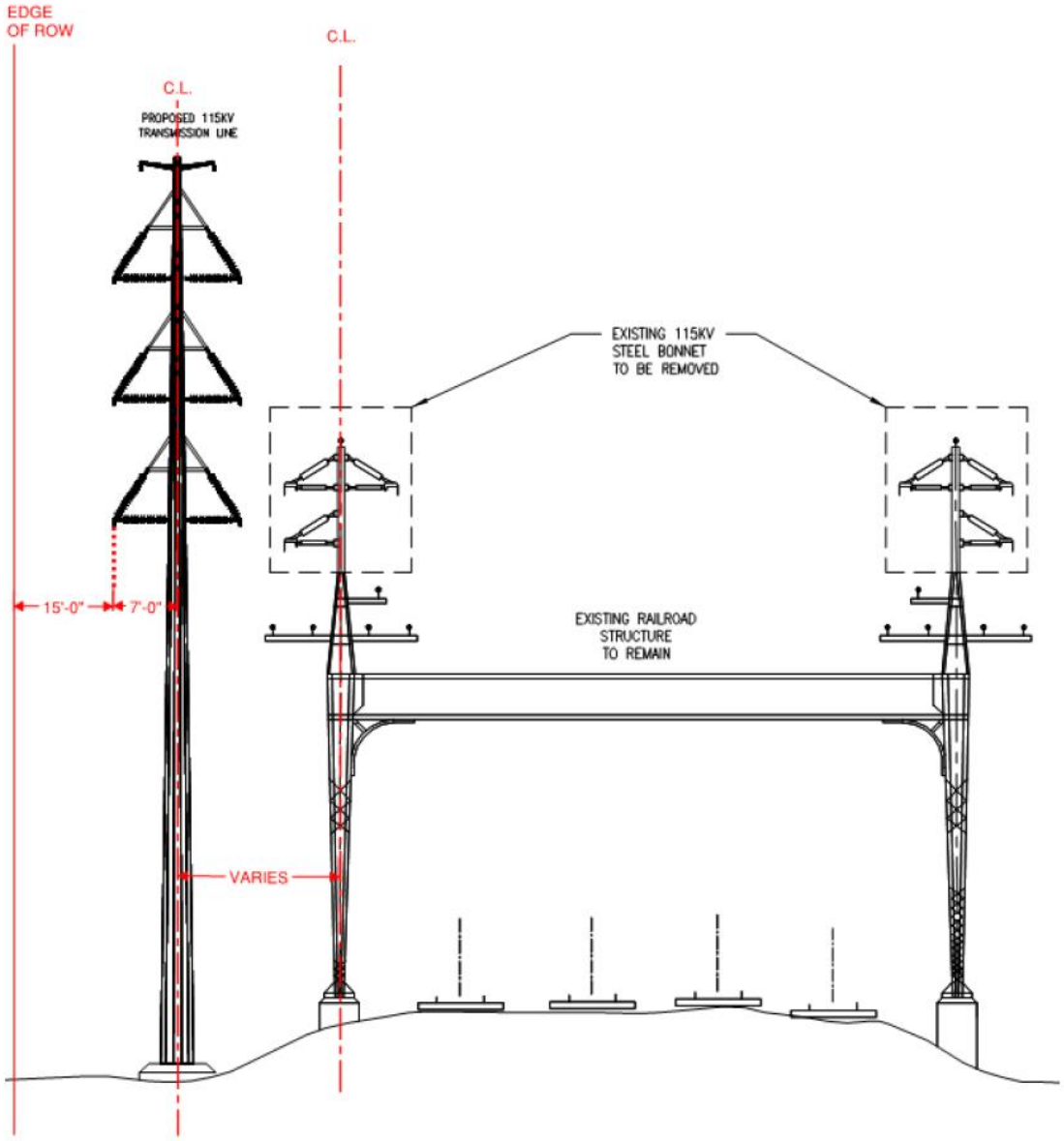
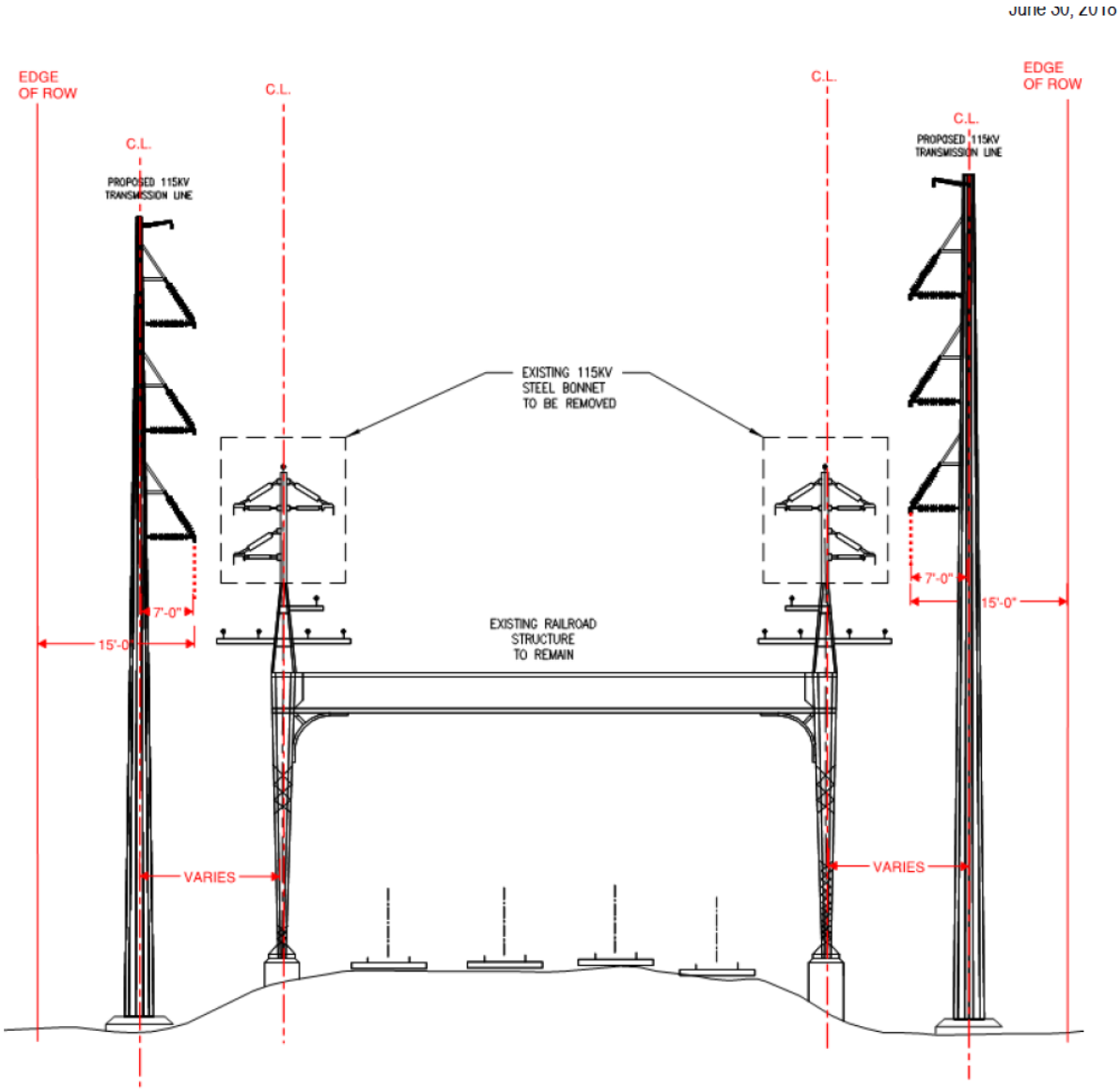


Figure 9-2: Alternative 2 (Conceptual Single-Circuit Monopoles, Both Sides of Railroad Corridor): Typical Cross-Section of ROW Pursuant to UI Clearance Standards



Based on clearance distances and the existing width of the railroad corridor owned by CT DOT, UI estimated the additional permanent easement (ROW) that would have to be acquired to rebuild the 115-kV lines using either Alternative 1 or Alternative 2. This information is summarized in Table 9-1. These estimates applied conceptual engineering design and baseline assumptions to generally compare the alternatives in terms of anticipated easement acquisition requirements and cost.

Table 9-1: Conceptual Estimates: Additional ROW (Permanent, Acres) Required: Comparison of Alternatives 1 and 2*

Line Segment	Alternative 1 (DCT Monopoles) Acres	Alternative 2 (SCT Monopoles) Acres		
	North Side of Railroad Corridor Only	North of Railroad Tracks	South of Railroad Tracks	Total
Milvon-Woodmont	1.25	0.18	2.11	2.29
Woodmont-Allings Crossing	0.14	0.02	1.54	1.56
Allings Crossing-Elmwest	0.61	0	1.23	1.23
Elmwest-West River	0.74	0.38	0.99	1.37
TOTAL	**2.74**	**0.58**	**5.87**	**6.45**

*Information based on 2018 conceptual engineering design and baseline assumptions in UI's analyses of alternatives for rebuilding the 115-kV lines between Milvon and West River substations. Note that between Milvon and West River substations, the railroad tracks are not uniformly centered within the CT DOT property; thus, in many locations, the width of the CT DOT property on the south side of the railroad tracks is not sufficiently wide to accommodate the Alternative 2 monopoles.

Using the information available at the conceptual engineering design stage, Alternative 1 was estimated to entail the acquisition of approximately 2.7 acres of permanent easement outside the CT DOT property, whereas Alternative 2 was anticipated to require approximately 6.5 acres. Thus, Alternative 2 (rebuilding the existing 115-kV lines on single-circuit monopoles – with one 115-kV line alignment parallel to and north of the tracks and the other parallel to and south of the tracks) would require UI to acquire approximately 2.5 times more permanent easement from the owners of properties adjacent to the CT DOT corridor than would Alternative 1.

The evaluation of Alternatives 1 and 2 was based on conceptual design information. As the Project planning process has continued, site-specific details regarding the CT DOT corridor have been determined, new UI and industry standards have been developed, and more detailed Project

engineering designs have been completed. As a result, UI now estimates that Alternative 1 (i.e., the Project) will require approximately 17.5 acres of permanent easement – seven times more than estimated in the conceptual report. UI expects that the amount of permanent easement required for Alternative 2 would also increase commensurately.

In the 2018 engineering study, UI also compared Alternatives 1 and 2 based on conceptual construction schedules and estimated costs. These analyses showed that Alternative 1 could be constructed for approximately $197 million, over an 8-year period, while Alternative 2 would require about $245 million over an 11.5-year time-period.

Based on these evaluations, UI selected Alternative 1 for the proposed Project. Compared to other alternatives, Alternative 1 represents the most technologically feasible, lowest cost option. It will allow the 115-kV lines to be rebuilt on independent monopoles within less than 10 years, while minimizing both the amount of permanent easement that UI must acquire outside of the CT DOT corridor and environmental impacts.

9.4 SITE-SPECIFIC ROUTE AND CONFIGURATION VARIATIONS

After selecting Alternative 1 as the preferred solution for rebuilding the 115-kV Milvon-West River transmission lines, UI performed more detailed engineering design and environmental evaluations of the proposed route and line configuration, conducted outreach to representatives of the involved municipalities, investigated environmental resources, and performed real estate analyses to verify property boundaries between the CT DOT railroad corridor and adjacent public/private landowners. As a result of these studies and consultations, UI identified specific locations along the proposed route (i.e., Alternative 1) that merited further analyses of structure-specific transmission line routing or configuration options. Table 9-2 identifies each of these locations, by municipality and structure number; describes the rationale for the additional analyses; compares the options considered; and describes the preferred solution. The proposed Project incorporates the preferred options, as identified for each of these variations.

As shown in Table 9-2, seven of the route configuration variations involved analyses of whether UI should optimally re-use existing single-circuit monopoles that were installed as part of reliability projects (i.e., 2015 Milvon Take-Off Structure Replacement Project [CSC Petition No. 1151]; FAC-08 Project; 2010 West Haven Train Station Project [CSC Petition No. 940]). The remaining variations were identified to avoid or minimize impacts to environmental resources

(e.g., wetlands, watercourses) and land uses adjacent to the railroad tracks and to optimize the connections of the rebuilt 115-kV lines to UI's existing substations.

UI's analyses regarding whether to reuse any of the single-circuit monopoles that were installed in conjunction with other projects were based on engineering design and constructability considerations. Avoiding the need for additional 115-kV line spans of the railroad tracks was a key consideration. Table 9-2 summarizes the rationale for UI's selection of a preferred option in each of these cases.

Other variations, such as those involving options for the alignment of the rebuilt 115-kV lines across the Indian and West rivers and near train stations, involved analyses not only of engineering and constructability considerations, but also environmental, land use, and real estate factors.

Table 9-2: Summary of Route and Configuration Variations

Municipality / Variation	Reason for Variation	Within CT DOT Corridor (Y or N)	Options Considered	Recommendation
Milford				
Structure P887N (Milvon Substation)	Existing steel monopole P887N, which is located adjacent to the railroad tracks north of Milvon Substation, was installed as part of UI's Milvon Take-Off Structure Replacement Project in 2015 to support the northern 115-kV line. It was not designed to support a double-circuit configuration.	Y	***Option 1***: Retain Structure P887N and add one new monopole on the south side of the tracks to support the rebuilt southern 115-kV circuit. This option allows the existing conductors comprising the north circuit to remain as-is in the span crossing the tracks. ***Option 2***: Replace existing Structure P887N with a new monopole that will support both the northern and southern circuits.	Option 1. This option minimizes the number of conductors required to cross the tracks.
Structure P898AS	UI installed Structure P898AS, which is located on the south side of the railroad tracks near Bridgeport Avenue, as part of its FAC-08 project.	Y (but additional land would be required for Option 1)	***Option 1***: Continue to use existing Structure P898AS, crossing the southern 115-kV circuit to the south side of the railroad tracks for a short segment, and installing three new single-circuit monopoles (two to the west and one to the east of Structure P898AS) before re-crossing the southern circuit to the north side of the tracks. Because of development directly adjacent to the railroad corridor on the south side in this location, UI would have to acquire new easements. ***Option 2***: Remove Structure P898AS and maintain the proposed DCT configuration on the north side of the railroad tracks.	Option 2: This option will avoid new easement acquisition and the need for two crossings of the railroad tracks.
Milford Cemetery	During Project consultations, UI was informed that there are unmarked graves in the Milford Cemetery near the cemetery boundary with the CT DOT corridor.	Y	***Option 1:*** Continue standard transmission line structure spacing every 300 feet. Two structures would be adjacent to the cemetery. ***Option 2***: Increase pole heights to accommodate longer 800-foot spans to avoid installation of a new pole adjacent to the cemetery.	Option 2: This option will minimize new structure footprints adjacent to the cemetery.
Milford Train Station	A new mixed-use building is planned for the corner of Railroad Avenue and River Street	Y	***Option 1***: Alignment ensures no conductors would span over buildings by routing around the ticketing building. ***Option 2***: Alignment spans over ticketing building but does not interfere with possible future development in what is currently a parking lot adjacent to and north of the Train Station. ***Option 3***: Keeps the proposed alignment as close to the existing catenary structures as possible to minimize impacts to both the future development noted in Option 2 and a proposed mid-use building at the corner of Railroad Avenue and River Street.	Option 3: This option will minimize impacts to all future development planned north of the train station.
Structure P930AS	This structure, which is located between Wampus Lane and the Indian River, was installed south of the railroad tracks as part of UI's FAC-08 project.	Y	***Option 1***: Continue to use existing Structure P930AS, crossing the southern 115-kV circuit to the south side of the railroad tracks for a short segment and installing 2 new SCT monopoles (1 to the west and 1 to the east of Structure P930AS) before re-crossing the tracks to the north. ***Option 2***: Remove Structure P930AS and maintain the proposed DCT configuration on the north side of the railroad tracks.	Option 2: This option will avoid the need for two crossings of the railroad tracks.
Indian River Crossing	Effort to minimize environmental impacts.	N	***Option 1***: Continue standard transmission line structure spacing every 300'. ***Option 2***: Increase pole heights to accommodate longer 600' spans to avoid installation of a new pole in the Indian River tidal wetlands.	Option 2: This option will minimize new structure footprints in the Indian River tidal wetlands.
Structure P959AN (east of Woodmont Substation)	Structure P959AN was installed as part of UI's FAC-08 project. It currently supports only the northern 115-kV circuit.	Y	***Option 1***: Retain Structure P959AN and install a second monopole, adjacent to this structure, to support only the southern 115-kV line. This new single-circuit monopole would also support MNR signal and/or feeder wires.	Option 2: Remove Structure P959AN and install a monopole to support the DCT

Municipality / Variation	Reason for Variation	Within CT DOT Corridor (Y or N)	Options Considered	Recommendation
			Option 2: Replace existing Structure P959AN with a new double-circuit monopole to support both the northern and southern 115-kV circuits. This will allow the continued separation of UI and MNR infrastructure facilities.	configuration on the north side of the railroad tracks.
Structure P968AS (between Heenan Drive and Marble Lane)	Structure P968AS is a single-circuit monopole (which supports the southern 115-kV circuit) that was installed as part of UI's FAC-08 project.	Y	**Option 1**: Reuse Structure P968AS in a single-circuit configuration to the southern 115-kV circuit. This would require crossing the southern 115-kV circuit to the south side of the railroad tracks for a short segment and installing two new single-circuit monopoles (1 to the west and 1 to the east of Structure P968AS) before re-crossing the tracks to the north. Due to the proximity to wetlands and existing buildings south of the railroad tracks, the new structures on the southern side of the tracks would have to be built in-line and the MNR signal wires would have to be transferred to the new monopoles. ***Option 2:*** Remove Structure P968AS and maintain the proposed double-circuit configuration on the north side of the railroad tracks.	Option 2: This option will avoid the need for two crossings of the railroad tracks.
West Haven				
Structure P1015AS (near Lake Phipps)	Structure P1015AS is a single-circuit monopole (which supports the southern 115-kV circuit) that was installed as part of UI's FAC-08 project.	Y (but additional land would be required for Option 1)	**Option 1:** Reuse Structure P1015AS in a single-circuit configuration to support the southern 115-kV circuit. This would require crossing the southern 115-kV circuit to the south side of the railroad tracks for a short segment and installing two new single-circuit monopoles (1 to the west and 1 to the east of Structure P1015AS) before re-crossing the tracks to the north. Because of the narrow width of the CT DOT corridor south side of the tracks, additional ROW would have to be acquired near Lake Phipps. **Option 2:** Remove Structure P1015AS and maintain the proposed DCT configuration on the north side of the railroad tracks.	Option 2: This option will avoid the need for two crossings of the railroad tracks.
West Haven Train Station	Structures TP1019S and TP1020S are single-circuit monopoles (which support the southern 115-kV circuit) that were installed as part of the 2010 West Haven Train Station Project. As part of this project, 4 additional single-circuit monopoles (Structures TP1017N, TP1018N, TP1019N, TP1020N) were also installed to support the northern 115-kV circuit.	Y (but additional land would be required for Option 1)	**Option 1**: Reuse Structures TP1019S and TP1020S in a SCT configuration to support the southern 115-kV circuit. This would require crossing the southern 115-kV-circuit to the south side of the railroad tracks for a short segment and installing three new single-circuit monopoles (1 to the west of Structure TP1019S and two to the east of Structure TP1020S) before re-crossing the tracks to the north. This option would allow the re-use of existing structures TP1019N and TP1020N. ***Option 2.*** Remove all existing single-circuit monopoles and maintain the proposed DCT configuration on the north of the tracks.	Option 2: This option will avoid the need for two crossings of the railroad tracks.
Structure P1026AS (west of Elmwest Substation)	Structure P1026AS is a single-circuit monopole (which supports the southern 115-kV circuit) that was installed as part of UI's FAC-08 project.	Y (but additional land would be required for both options)	***Option 1***: Reuse Structure P1026AS in a single-circuit configuration to support the southern 115-kV circuit. This would require crossing the southern 115-kV circuit to the south side of the railroad tracks at Catenary Structure 1025 and installing 3 new single-circuit monopoles (1 to the west and 1 to the east of Structure P1026AS) until the northern 115-kV circuit crosses the tracks at Catenary Structure 1028 in order to enter Elmwest Substation, which is located on the south side of the tracks. Due to the proximity to existing buildings on the southern side of the railroad tracks, the new structures on the southern side of the tracks would have to be built in-line and the MNR signal wires would have to be transferred to the new monopoles. In addition, additional ROW would have to be acquired on the south side of the railroad tracks. ***Option 2***: Remove Structure P1026AS and maintain the proposed double-circuit configuration on the north side of the railroad tracks.	Option 2: This option will avoid the need for two crossings of the railroad tracks.

Municipality / Variation	Reason for Variation	Within CT DOT Corridor (Y or N)	Options Considered	Recommendation
West Haven Train Station to Elmwest Substation	Multiple existing single-circuit steel poles are located both north and south of the railroad tracks and along the south side of the tracks between the West Haven Train Station and Elmwest Substation, which is located south side of the tracks. Thus, both circuits would have to cross the tracks to connect the proposed double-circuit lines (to be located north side of the railroad tracks) to the substation.	Y (but additional land would be required for both options)	***Option 1***: Maintain the proposed double-circuit configuration on the north side of the railroad tracks. ***Option 2***: Reuse of existing single circuit monopoles located between Structures TP1019N/TP1019S and Elmwest Substation by crossing the southern 115-kV circuit to the south side of the railroad tracks at Catenary Structure 1018. This option would increase the construction impacts to residential properties adjacent to the south side of the tracks.	Option 1: Reduce impact to residences and maintain a double-circuit configuration on the north side of the tracks.
West Haven / New Haven				
West River Crossing	The West River is bordered to both the east and west by extensive wetlands. UI identified and evaluated various options, all located in a double-circuit configuration on the north side of the railroad tracks, for minimizing impacts to these wetlands	Y	***Option 1***: Install new double-circuit monopoles with a 25-foot offset from the existing catenary support columns. ***Option 2***: Install new double-circuit monopoles in line with the existing catenary support columns. ***Option 3:*** Install new, taller double-circuit monopoles to allow longer spans between structures (about 600 feet), thereby minimizing the placement of pole foundations in the wetlands.	Option 3: This option will minimize new structure footprints in the wetlands around West River.

Note: No variations were identified along the proposed route in the Town of Orange.

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9.5 JUSTIFICATION FOR THE SELECTION OF THE PROPOSED PROJECT

After considering various options for rebuilding the 115-kV lines between the Milvon and West River substations, UI concluded that the proposed double-circuit overhead configuration, to be aligned primarily within the CT DOT railroad corridor best met the Company's objectives for providing a cost-effective solution for maintaining the reliability and resiliency of the transmission grid, while avoiding or minimizing impacts to environmental resources, cultural resources, and land uses. In particular, the proposed Project:

- **Maximizes the use of CT DOT's long-established linear railroad corridor and minimizes the need to acquire additional property for utility use.** The continued co-location of the 115-kV lines within the railroad corridor also will be consistent with federal policies regarding linear energy facility siting.

- **Minimizes environmental and land use impacts.** Although unavoidable temporary effects and minor long-term impacts to site-specific environmental resources will occur as a result of the construction and operation of the rebuilt 115-kV transmission lines, the development of the Project along existing utility and transportation corridors will be consistent with state and local land use policies, long-term goals for upgrading the electric transmission grid, and will minimize long-term adverse environmental impacts to the maximum extent practical.

- **Achieves a Cost-Effective Solution.** The proposed Project represents a cost-effective solution for accomplishing the required 115-kV rebuilds in the densely developed Milford, Orange, West Haven, and New Haven areas.

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10. ACRONYMS AND GLOSSARY OF TERMS

Acronym	Description
115-kV:	115-kilovolts or 115,000 volts
ACSR:	Aluminum conductors with steel reinforcement, a common type of overhead conductor
ACSS:	Aluminum Conductor with Steel Support, a common type of overhead conductor
ANSI:	American National Standards Institute
APE	Area of Potential Effect (for cultural resources)
Application:	Application to the Connecticut Siting Council for a Certificate of Environmental Compatibility and Public Need
BMP:	Best Management Practices
Certificate:	Certificate of Environmental Compatibility and Public Need (from the Connecticut Siting Council)
C.G.S.:	Connecticut General Statutes
Council (or CSC):	Connecticut Siting Council
CT DEEP:	Connecticut Department of Energy and Environmental Protection
CT DOT	Connecticut Department of Transportation
CT DOT Corridor	Property owned by CT DOT encompassing the railroad tracks and areas both north and south of the tracks
D&M Plan:	Development and Management Plan (required by the Connecticut Siting Council)
dBA:	Decibel, on the A-weighted scale
dbh:	Diameter breast height (tree trunk measurement)
EMF:	Electric and magnetic field
EMF BMP Document:	Electric and Magnetic Fields Best Management Practices for the Construction of Electric Transmission Lines in Connecticut prescribed by the Connecticut Siting Council
FAA	Federal Aviation Administration
FEMA:	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
ICES	International Committee on Electromagnetic Safety
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEEE	Institute of Electrical and Electronics Engineers
kV: kilovolt	Equals 1,000 volts
LiDAR	Light detection and ranging (remote sensing technology)
MCF:	Municipal Consultation Filing, part of the Connecticut Siting Council Application process
MNR	Metro-North Railroad
NAAQS:	National Ambient Air Quality Standards
NAVD88	North American Vertical Datum 1988
NDDB:	Connecticut Natural Diversity Data Base (CT DEEP)
NERC:	North American Electric Reliability Council, Inc. (initially, the National Electric Reliability Council)
NESC:	National Electrical Safety Code
NPCC:	Northeast Power Coordinating Council
NRCS:	Natural Resources Conservation Service (United States Department of Agriculture)
NRHP:	National Register of Historic Places

Acronym	Description
OPGW:	Optical groundwire (a shield wire containing optical glass fibers for communication purposes)
Permanent Easement	Pertains to the transmission line structures, wire clearances, access, vegetation management, limitations on structures that can be placed on the easement (e.g., buildings, pools,), and protection from excavation, all as needed for UI's installation, maintenance, operation, and repair of the utility infrastructure
Project:	Milvon-West River Railroad Transmission Line 115-kV Rebuild Project
Project Area:	Collectively, the location of the work both within and north/south of the CT DOT corridor
RCSA:	Regulations of Connecticut State Agencies
ROW:	Right-of-way
SCADA:	Supervisory Control and Data Acquisition System
SHPO:	State Historic Preservation Office
SRHP:	State Register of Historic Places
SWPCP:	Stormwater Pollution Control Plan
UI, Company:	The United Illuminating Company
USACE	United States Army Corps of Engineers
USGS:	United States Geological Survey (U.S. Department of the Interior)
WHO	World Health Organization
XS:	Cross-section (drawing)