



# Ecological Assessment Report

The United Illuminating Company  
Milvon-West River Railroad Transmission Line 115-kV Rebuild Project

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

October 2021

## Contents

1. Executive Summary .....	2
2. Introduction .....	2
3. Water Resources .....	4
3.1 Wetlands and Watercourses .....	4
Table 1: Wetlands along the Proposed Transmission Line Route .....	6
3.2 Vernal Pools .....	7
3.3 Wetlands and Watercourses Impacts .....	7
4. Flora and Fauna – General Habitat Conditions .....	8
5. Regulatory Agency Consultations .....	9
5.1 Listed Species Discussion .....	10
5.1.1 Surveys for State-Listed Plant Species .....	10
Table 2: Survey dates, weather and effort .....	12
5.1.2 State-Listed Birds and Reptiles .....	13
5.1.3 Federally-Listed Species .....	17
Appendices .....	19

## 1. Executive Summary

This report documents existing ecological communities occurring within and proximate to The United Illuminating Company's proposed transmission line rebuild Project between the Milvon and West River Substations. This report also evaluates potential Project effects on these communities and provides descriptions of proposed mitigation techniques to be employed during construction. The ecological communities include wetland resources, floral associations and wildlife habitats, as well as listed species identified by the Connecticut Department of Energy and the Environment Natural Diversity Database. The data presented herein is based on publicly-available mapping, reports prepared by others and field inspections conducted in 2020 and 2021.

## 2. Introduction

To maintain the reliability of the bulk transmission grid in Connecticut and regionally, The United Illuminating Company (UI) proposes to rebuild its two existing single-circuit 115-kilovolt (kV) overhead lines that extend southwest-northeast within the Connecticut DOT (CT DOT) - Metro-North Railroad (MNR) corridor between UI's Milvon Substation (located in the City of Milford) and UI's West River Substation (located in the City of New Haven), all in New Haven County, Connecticut.

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

Currently, the Milvon-West Haven 115-kV lines are located within the railroad corridor, on top of catenary structures that span the MNR rail lines. The UI transmission lines are supported on columns, referred to as "bonnets", located on top of the CT DOT catenary structures. 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.

A total of 186 catenary structures support UI's 115-kV line infrastructure along the railroad corridor, including bonnet/pole extensions, along with conductors, shield wires, insulators, and insulator hardware. Between the Milvon and West River substations, the corridor varies in width,

but generally ranges from approximately 125 to 175 feet. From the northern catenary support structure, the distance to the northern edge of the CT DOT property varies in width from 5 to 145 feet, depending on location.

To maintain the reliability of the bulk transmission grid, UI has determined that the transmission support structures need to be upgraded due to asset condition issues, as well as to meet current electrical codes and to withstand extreme weather conditions. UI proposes to rebuild the 115-kV lines on double-circuit monopoles, expected to be located parallel to and mostly along the north side of the railroad tracks.

The Project will generally involve first constructing the new monopoles to support the double-circuit 115-kV lines, after which the existing 115-kV transmission line facilities will be removed from the top of the catenary structure bonnets. The Project is expected to be constructed in segments, extending from substation to substation, with the new transmission facilities on one segment placed into service prior to performing extensive work on the next segment.

Access to construct and operate/maintain the rebuilt 115-kV lines is expected to be via the existing public road network, new temporary or permanent access roads on private property, and either temporary or permanent access roads within the CT DOT corridor. Most of the UI Project will be on undeveloped portions of the CT DOT property abutting and to the north of the railroad tracks. However, in some locations, the CT DOT railroad corridor is not wide enough to accommodate the proposed new structures and the clearances required to maintain, operate and repair the new infrastructure. In such areas, UI will acquire permanent easements, adjacent to the CT DOT property boundary, from various property owners.

All-Points Technology Corporation, P.C. (“APT”) and its subconsultant, Davison Environmental LLC, completed inspections of the Project corridor to document and inventory existing ecological communities, wetland resources, floral associations and wildlife habitat types including listed species identified by the Connecticut Department of Energy and the Environment (CT DEEP) Natural Diversity Database (NDDB).

### 3. Water Resources

In conjunction with UI's initial Project planning evaluations, wetland and watercourse delineations along the CT DOT corridor were completed by BL Companies in April 2018; April and May 2019; and August 2021. These delineations are documented in the following reports, attached herein as Appendix A:

Wetland Identification and Delineation Report, West River – Elm West and ElmWest – Allings Crossing Transmission Line Railroad Project, West Haven and New Haven, CT, May 4, 2018; updated August 12, 2021.

Wetland Identification and Delineation Report, Milvon Substation (Milford, CT) to Allings Crossing Substation (West Haven, CT), New Haven County, CT, September 20, 2019; updated April 28, 2021.

Please refer to these documents for descriptions of those wetlands, watercourses and upland systems present and an evaluation of associated wetland functions and values.

#### 3.1 Wetlands and Watercourses

Soil scientists Matthew Davison and Eric Davison, of Davison Environmental LLC, and registered with the Society of Soil Scientists of Southern New England (SSSSNE), reviewed the previously-delineated wetland and watercourse boundaries in September and October 2020, and again in April and September 2021. The review focused on accessible areas north and south of, and within, the CT DOT corridor. These areas were accessed from nearby public roads, public properties or areas accessible at the rear of commercial properties. The limits of wetlands were compared visually to the previously-delineated wetlands illustrated on Project mapping (included in Volume 2 Aerials), which includes aerial photography and 2-foot contour elevations for accuracy. In select locations, soil profiles were investigated using a hand auger to evaluate soil properties and classifications. Based on this review, the wetland and watercourse boundaries delineated by BL Companies were found to be substantially correct (i.e., accurately mapped and depicted). No additional wetland areas or watercourses were identified.

There are a total of 32 inland wetlands in the Project area, including 17 in Milford, 2 in Orange, and 13 in West Haven. Three wetland cover types are prevalent, including: forested wetlands (a.k.a. Palustrine Forested Wetlands), emergent marshes (a.k.a. Palustrine Emergent Wetlands) and shrub swamps (a.k.a. Palustrine Scrub-shrub Wetlands). Forested wetlands

consist of vegetation common across Connecticut, often referred to as “red maple swamps” as they are dominated by the red maple (*Acer rubrum*). Most wetlands are open-canopy (as opposed to forested) palustrine emergent wetlands, with the most common wetland type being emergent marsh dominated by common reed (*Phragmites australis*). In addition, 9 tidally influenced wetlands, including tidal brackish and tidal freshwater systems, are located in the Project area: 3 in Milford, 4 in West Haven and 2 in New Haven.

In addition to these wetlands, there are also a total of 36 watercourses: 13 in Milford (including the Wepawaug River and the Indian River); 4 in Orange (including the Oyster River, which also flows into West Haven), and 19 in West Haven, including the Cove River and the tidally influenced West River. Watercourses include both natural (i.e., undisturbed) perennial streams, intermittent ditches/channelized streams as well as tidal watercourses. Phipps Lake is also located in West Haven, immediately south of the Project.

Wetlands present within the Project limits consist predominately of urbanized wetlands with a history of anthropogenic alteration. Most wetland areas have been partially filled and/or channelized, with surface flows directed around bordering infrastructure.

Typical principal functions and values provided by Project wetlands include flood-flow alteration, groundwater recharge, fish/shellfish habitat, nutrient removal/attenuation and pollutant retention. Due to the urbanized landscape in which most of these wetlands occur, the functions of flood-flow alteration, nutrient removal/attenuation and pollutant removal are critical for the protection of downstream water quality. As most of these systems have an indirect or direct connection to Long Island Sound, their ability to capture attenuate pollutant-laden runoff from high intensity development before it reaches Long Island Sound is notable.

Table 1 lists the delineated wetlands, identifying each wetland based on the National Wetland Inventory (NWI) classification regarding habitat type.<sup>1</sup>

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<sup>1</sup> 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.

Table 1: 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)
<b>Milford</b>			
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
<b>Orange</b>			
20/6	O-W1	PEM	I
20/6	O-W2	PFO	I
<b>West Haven</b>			
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
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

Municipality/Project 100/400 Scale Mapsheet Nos. (Volume 2)	Wetland Number*	NWI Classification	Inland (I) or Tidal (T)
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
<b>New Haven</b>			
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.

### 3.2 Vernal Pools

Both BL Companies and Davison Environmental LLC determined that no vernal pool habitat is present within or proximate to the Project corridor. This was not unexpected, as vernal pool dependent amphibians require upland forest surrounding the breeding pools as their primary habitat during the non-breeding season, and upland forest is lacking in the region, having been replaced by development. Furthermore, observed wetland hydroperiods<sup>2</sup> were generally found not to be appropriate for vernal pool amphibians. Most resources were either saturated or permanently flooded, and few possessed the seasonal flooding required by vernal pool indicator species.

### 3.3 Wetlands and Watercourses Impacts

Based on the current Project design, some of the proposed new monopole structures will unavoidably be located in freshwater (aka inland) wetlands, resulting in permanent impacts (fill) to accommodate the new pole foundations. New access roads will permanently impact some freshwater wetlands. No permanent impacts will occur within tidal wetlands.

The Project will also result in temporary effects to inland and tidal wetlands due to the placement of construction mats for access roads and work pads. All construction mats will be promptly removed upon Project completion and wetland areas will be restored, as necessary, in accordance with Avangrid, industry and regulatory best management practices.

<sup>2</sup> 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.

The Project will also require the clearing of existing vegetation in several wetland areas for access, placement of temporary construction pads and line clearances.

Several watercourses will be affected by the Project during construction, for purposes of access (crossing) or placement of work pads. Each of the crossings and construction work pad areas will be spanned using temporary construction mats. All construction mats will be promptly removed upon Project completion.

#### **4. Flora and Fauna – General Habitat Conditions**

From a biogeographical perspective, the survey area falls within the Long Island Sound Coastal Lowland ecoregion in the central part of the State, between the Housatonic and Quinnipiac Rivers<sup>3</sup>. The Project corridor has supported railroad and utility infrastructure for decades and experiences periodic vegetation maintenance. Existing plant communities and wildlife found along the corridor are associated with urbanized environs. Such habitats are of low significance in 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 corridor 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. Small habitat islands present can support migratory birds during their northward migration along the Connecticut coastline, but long-term habitat for birds is restricted to disturbance-tolerant species.

Vegetation within the majority of the Project limits is dominated by non-native invasive species, including escaped ornamental vegetation often associated with residential landscaping. One exception to this is the Indian River wetland system, which is largely dominated by native tidal marsh vegetation (i.e., *Spartina alterniflora* and *Spartina patens*).

The dominant upland (non-wetland) soil complex present is Udorthents – urban lands throughout the Project corridor. Udorthents is a miscellaneous land type used to denote moderately well to excessively drained earthen material which has been so disturbed by cutting, filling, or grading that the original soil profile can no longer be discerned. In areas where the native soils remain intact, 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

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<sup>3</sup> <https://www.plantmaps.com/interactive-connecticut-ecoregions-l4-map.php>

Canton and Charlton complex and Paxton and Montauk complex along till ridges and hills. Many of the remaining wetland soil areas are organic soils which are difficult to fill and develop. These include the Catden and Freetown complex, and the Timakwa and Natchaug complex.

Based on the initial reconnaissance surveys, only three areas of significance were considered to have any potential to support flora of conservation concern. All three locations consist of riverine habitats associated with the Wepawaug River, Indian River and West River. The Indian and West Rivers are tidally influenced, whereas the portion of the Wepawaug River within the Project corridor is not. These three rivers are currently spanned by the railroad and existing 115-kV lines; the proposed rebuilt lines will continue to cross these resources.

## 5. Regulatory Agency Consultations

In 2017, UI initiated consultations with the CT DEEP NDDDB to assess the potential for the Project corridor to traverse portions of habitats identified as supporting State- or Federally-listed species. The results of these consultations 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 Carolina* (eastern box turtle)
- Special Concern *Malaclemys terrapin terrapin* (northern diamondback terrapin)
- Special Concern *Bolboschoenus novae-angliae* (Salt marsh bulrush).

During further Project planning, UI continued to coordinate with the NDDDB. The agency's most recent determination letter ("Determination"; No. 2020073487, dated December 27, 2020) confirmed no additional species had been added to the initial listings and provided recommendations for surveys and protective measures during construction. 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 NDDDB (see Appendix B: NDDDB Determination Letter).

To fulfill the requirements of the U.S. Fish and Wildlife Service (USFWS) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.), UI also consulted

with the New England Ecological Services Field Office through the Environmental Conservation Online System Information for Planning and Consultation (iPaC). The iPaC system identified two species (listed as “threatened”) potentially occurring within the Project area and one additional species that is a candidate for listing.

- Northern long-eared bat (*Myotis septentrionalis*) - threatened
- Red knot (*Calidris canutus rufa*) - threatened
- Monarch Butterfly (*Danaus Plexippus*) – candidate for listing

The iPaC review determined there are no critical habitats within the Project area.

Results of the iPaC review are provided in Appendix C (USFWS Species List, September 14, 2021).

## 5.1 Listed Species Discussion

The following summarizes the characteristics of the listed species, describes the surveys completed to date regarding each species (where applicable), and presents UI’s initially proposed protection/avoidance measures to be used during the Project construction to avoid or minimize the potential for impacts to these species.

### 5.1.1 Surveys for State-Listed Plant Species

Saltmarsh bulrush is a member of the Cyperaceae family, and one of four species of *Bolboschoenus* present in Connecticut<sup>4</sup>. It can be distinguished from the other members of its genus by the fruit shape, peduncle lengths, and persistence of perianth bristles<sup>5</sup>. As its common name suggests, salt marsh bulrush grows in tidally influenced salt marshes.

Estuary pipewort (*Eriocaulon parkeri*) is a member of the Eriocaulaceae family and is one of two species of the genus present in Connecticut<sup>6</sup>. It can be recognized by its basal rosette of leaves, and flowering scape. It is distinguished from its congener common pipewort (*Eriocaulon aquaticum*) most readily by habitat; estuary pipewort grows in fresh to brackish marshes whereas common pipewort grows in freshwater habitats. They can also be distinguished by the number of scapes per basal rosette, level of pubescence, and inflorescence shape<sup>7</sup>.

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<sup>4</sup> Dreyer G.D., C. Jones, et al. 2014. Native and Naturalized Vascular Plants of Connecticut Checklist. Connecticut Botanical Society. New Haven, CT.

<sup>5</sup> <https://guides.nynhp.org/saltmarsh-bulrush/>

<sup>6</sup> Dreyer G.D., C. Jones, et al. 2014. Native and Naturalized Vascular Plants of Connecticut Checklist. Connecticut Botanical Society. New Haven, CT.

<sup>7</sup> Haines, Arthur. 2000. *Eriocaulon parkeri* Conservation and Research Plan for New England. New England Plant Conservation Program. New England Wild Flower Society.

Botanists familiar with Parker's pipewort and saltmarsh bulrush conducted a preliminary field survey for the two target species in September 2020 when both target species would be in an identifiable state.<sup>8</sup> Initial field reconnaissance was conducted across the Project limits to identify suitable habitat for these species, which consists of tidally inundated wetland and tidal riverine habitat. Those preliminary surveys identified two tidal wetlands requiring surveys.

Detailed surveys were conducted at two saltmarsh habitats associated with the Indian River in Milford and the West River in West Haven. These two areas were the only areas deemed to have suitable tidal wetlands habitat based on field observations during the initial reconnaissance surveys. The Coastal Jurisdictional Line (CJL) for Milford is 4.7 feet NAVD88. The Indian River survey area lies between 2 and 6 feet NAVD88. The CJL elevation for West Haven is 4.6 feet NAVD88. The West River survey area lies between 2 and 6 feet NAVD88.

A third area along the Wepawaug River in Milford was investigated but was found not to be tidally influenced. This area lies above an impoundment (a dam just north of State Route 162, aka New Haven Avenue) which prevents tidal flow upstream, with the elevation of the wetlands/River along the Project corridor lying between 16 and 18 feet NAVD88. Below the impoundment, approximately 400 feet downstream, the river is tidal.

These survey areas are influenced by tidal flow and deposition. The land use surrounding these sites is primarily urban, possessing little native vegetation and soils with the exception of lands below the ordinary high-water mark. The area has a flat topography at or close to mean sea level. Overall, the survey areas are vegetated by native graminoid species, with some native non-graminoid herbaceous species, and some areas of invasive incursion, especially adjacent to human impact areas.

Wetland soils within the consist of Westbrook mucky peat, derived from shallow organic material associated within tidal wetlands.

#### *5.1.1.1 Survey Protocol*

An initial reconnaissance survey was conducted by biologist Eric Davison on September 1, 2020 to identify tidal wetland areas that might support target plant communities. Detailed botanical surveys were conducted on September 22, 2020, by Botanist's James Cowen and Aubree

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<sup>8</sup> Detailed botanical surveys were conducted in September 2020 by James Cowen and Aubree Keurajian, of Davison Environmental LLC.

Keurajian. Subsequent surveys were completed on September 16<sup>th</sup> and 28<sup>th</sup> of 2021. The surveys were timed when both target species would be in an identifiable state and conducted by slowly walking and methodically inspecting the survey areas for the target species. Areas of suitable habitat not easily accessible were observed using binoculars. Botanists utilized field keys, a 10X hand lens, with photographs and/or specimens collected as needed. Technical keys and a microscope were used in the office as needed to confirm field identifications.

Survey effort information is provided in Table 2 below.

Table 2: Survey dates, weather and effort

Survey Date	Weather	Survey Duration (Total Person Hours)
September 1, 2020	Sunny, 75F	6 person hours
September 22, 2020	Sunny, 60F	12 person hours
September 16, 2021	Overcast, 72F	8 person hours
September 28, 2021	Overcast, 75F	4 person hours

Survey areas were determined by a review of aerial photograph-based maps of the Project area (current leaf-off and false color infrared aerial photographs that best display vegetation types) and the information provided by the NDDDB. Identification and other information about target species were reviewed prior to survey.

#### 5.1.1.2 Survey Results

No target species or congeners<sup>9</sup> were found in the survey areas, which generally consisted of rocky coastline, tidal saltmarsh, forested wetland, and developed urban areas. Descriptions of the plant communities observed in these wetlands is provided in the following sub-sections.

#### Indian River, Milford

The survey area adjacent to the Indian River is the most suitable habitat area surveyed in this effort. On the eastern side of the river, between Route 162 and the rail lines, the vegetation is primarily the following native species: seaside goldenrod (*Solidago sempervirens*), spearscae orache (*Atriplex patula*), annual saltmarsh American-aster (*Symphyotrichum subulatum*),

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<sup>9</sup> A member of the same taxonomic genus as another plant.

glasswort (*Sella cornea*), saltmarsh cordgrass (*Spartina alterniflora*), saltmeadow cordgrass (*Spartina patens*), saltgrass (*Distichlis spicata*), common reed (*Phragmites australis*), maritime marsh-elder (*Iva frutescens*), and sea-lavender (*Limonium carolinianum*), with some invasive mugwort (*Artemisia vulgaris*), bittersweet, and purple loosestrife near the roadside and train tracks. Woody natives such as cottonwood (*Populus deltoides*), fox grape (*Vitis labrusca*), and Virginia creeper are also present in the drier ground near the tracks. On the western side of the river, also between Route 162 and the rail lines, the land is higher and maintained by mowing. Along the road and edges are invasive Japanese knotweed, spotted knapweed (*Centaurea stoebe*), and autumn-olive (*Elaeagnus umbellatus*), with native maritime marsh-elder, saltmarsh cordgrass and saltmeadow cordgrass. The shoreline between the marsh and the river is very steep and rocky, with only one small area of suitable mudflat habitat in the northeast corner of the survey area south of the train tracks.

North of the rail lines, accessible from Old Gate Lane, the saltmarsh opens up into a much larger area. It is vegetated by the herbaceous species listed above, notably with large swathes of saltmarsh cordgrass, saltmeadow cordgrass, saltgrass, and common reed, with glasswort and annual saltmarsh American-aster.

### West River, West Haven

South of the rail lines, the eastern side of the West River is very steep and rocky, vegetated primarily by maritime marsh-elder and cordgrass. The western side of the West River is dominated by common reed and saltmarsh cordgrass.

North of the rail lines, the eastern side is likewise steep and rocky, with maritime marsh-elder and sea-lavender, saltmarsh cordgrass and saltmeadow cordgrass, with invasive mugwort and Japanese knotweed present closer to the rail lines. The western side of the West River is dominated by saltmarsh cordgrass and saltmeadow cordgrass.

Additional details regarding the saltmarsh surveys are in Appendix D.

### 5.1.2 State-Listed Birds and Reptiles

No onsite surveys have been conducted for listed avian or reptile species. DEEP has recommended protective measures be employed during construction to avoid unintended encounters and mitigate potential adverse effects. UI is committed to implementing and maintaining appropriate protective measures prior to and during construction activities.

*State Threatened Seaside sparrow (Ammodramus maritimus) and State Special Concern saltmarsh sharp-tailed sparrow (Ammodramus caudacutus)*

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). DEEP records indicate the presence of these birds in the salt marshes surrounding the Indian River in Milford.

Provided work occurs outside of these species' breeding season, either prior to May 1<sup>st</sup> or after August 31<sup>st</sup>, active nests can be avoided and no additional precautions required. DEEP recommends preventing the introduction of any new excessive noise between April 15<sup>th</sup> and August 15<sup>th</sup> to minimize any disturbances.

In the event outages or other unavoidable schedule conflicts arise, and work must occur during the breeding season, surveys will be conducted to determine if active nests are present that could be impacted by the Project. If a nest is discovered, applicable work will be postponed until after August 31<sup>st</sup>.

*State Special Concern Eastern box turtle (Terrapene carolina carolina)*

DEEP recommends Best Management Practices (BMPs) be implemented throughout the Project work area. These include avoiding the use of both crushed stone to the extent practicable (and installing temporary matting in its place) and wood chips in any Eastern box turtle upland habitat. Potential impacts from this Project on box turtle habitat is not anticipated to be significant given the work area locations immediately adjacent to the rail line. Regardless, UI is committed to adhering to the agency's recommendations during construction. In fact, UI has developed an education and awareness program for its contractors involved in Project activities in noted areas of potential habitat.

Further, protective measures for both the inactive and active periods are required, as summarized below.

**Protection Measures During Inactive Period (October 1st through March 30th):**

- Implement a contractor education and awareness program for those working within turtle habitat.
- To the greatest extent possible, keeping heavy equipment in the open ROW and hand-felling trees to minimize the potential for crushing hibernating turtles located in the forested edges.
- Minimizing ground disturbance along the forest edges during the winter months.
- Avoid or limit any equipment use within 50 feet of streams and brooks.
- Felling trees adjacent to brooks and streams away from the waterway and not dragging trees across the waterway or removing stumps from banks.
- No heavy machinery or vehicles may be parked in any turtle habitat.
- Any confirmed sightings of box, wood or spotted turtles should be reported and documented with the NDDB.

**Protection for Turtles during Active Period (April 1st through September 30th):**

- Implement a contractor education and awareness program for those working within turtle habitat.
- Hire a qualified herpetologist to be on site to ensure these protection guidelines remain in effect and prevent turtles from being run over when moving heavy equipment.
- Conduct daily sweeps of the work area each morning prior to any work being done.
- Relocate turtles found inside work areas or notify appropriate personnel to relocate individuals.
- Exclusionary practices will be required to prevent any turtle access into construction areas. These measures will need to be installed at the limits of disturbance and be regularly maintained (at least bi-weekly and after major weather events) to secure any gaps or openings at ground level that may let animals pass through. The use of plastic or netted silt-fence is not allowed.

- All staging and storage areas, outside of previously paved locations, regardless of the duration of time they will be utilized, must be reviewed to remove individual specimens and exclude them from re-entry.
- In areas where silt fence is used for exclusion, it shall be removed as soon as the area is stable to allow for reptile and amphibian passage to resume.
- No heavy machinery or vehicles may be parked in any turtle habitat that has not been confined by silt fencing and cleared of turtles.
- Special precautions must be taken to avoid degradation of wetland habitats including any wet meadows and seasonal pools.
- Felling trees adjacent to brooks and streams away from the waterway and not dragging trees across the waterway or removing stumps from banks.
- Avoid and limit any equipment use within 50 feet of streams and brooks.
- Any confirmed sightings of box, wood or spotted turtles should be reported and documented with the NDDDB.
- Special care should be taken for any work conducted in the early morning and evening hours to avoid harm to basking or foraging individuals.

*State Special Concern Northern Diamondback Terrapin (Malaclemys t. 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. DEEP maintains records of this turtle in the Indian River in Milford.

To protect Northern diamondback terrapin, DEEP recommends ground disturbance in the area of Indian River crossing be limited to the turtle's inactive periods (November 1<sup>st</sup> to April 1st).

In the event that construction cannot be completed during the winter months then the work may be performed between April and November in accordance with similar protection measures and best management practices to those of the eastern box turtle during its active season.

### *State Special Concern northern leopard frog (*Rana pipiens*)*

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*). As such, they require the following protective measures for this species.

- Work conducted during fall and winter months (October through February) should use temporary matting to avoid adverse impacts to the northern leopard frog population.

For work that occurs during the frog's active period (between March and October), additional protection strategies that protect and enhance wetland habitat should be implemented in those areas where floodplain and alluvial marsh and wet meadow habitat exist.

- No gravel or hard surface should be placed in any floodplain or alluvial marsh habitat.
- Construction personnel should also be notified of the presence of this species and provide information to assist in the identification of leopard frogs.
- During disturbance, geotextile silt fence is required be installed along the perimeter of the project disturbance limits and would will serve as a barrier for the northern leopard frog to access the work area.
- Any sightings of northern leopard frog should be reported to the NDDDB.

### 5.1.3 Federally-Listed Species

#### *Northern long-eared bat*

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

#### *Red knot*

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. Not known to occur at inland locations, red knots can be found on Connecticut's barrier beaches from mid-April to the end of May, and then again from July through

mid-September.<sup>10</sup> Sometimes non-breeding individuals may linger along Connecticut barrier beaches between migratory periods, and late individuals may pass through on southbound migration well into November.

Migration and wintering habitats include both high-energy ocean- or bay-front areas, as well as tidal flats in more sheltered bays and lagoons. Preferred wintering and migration microhabitats are muddy or sandy coastal areas, specifically, the mouths of bays and estuaries, unimproved tidal inlets and tidal flats. In many wintering and stopover areas, quality high-tide roosting habitat (i.e., close to feeding areas, protected from predators, with sufficient space during the highest tides, free from excessive human disturbance) is limited.

The Project area is located within highly developed areas that provide no suitable foraging habitat for red knot. The only intertidal habitats within the Project limits are the West River and Indian River tidal embankments discussed previously. However, both locations are inland tidal habitats as opposed to coastal, and both lack broad intertidal flats that could support feeding. Elevation changes along the 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, we do not anticipate construction activities would result in an “incidental take”<sup>11</sup> of this species or negative effects to their habitat.

### *Monarch Butterfly*

The monarch butterfly is one of the most recognizable species in North America, boasting iconic orange and black markings. Monarchs lay their eggs on milkweed, their only caterpillar host plant. As caterpillars, monarchs feed exclusively on the leaves of milkweed, wildflowers in the genus *Asclepias*. North America has several dozen native milkweed species with which monarchs coevolved and upon which they rely to complete their life cycle. Over the past two decades, monarch numbers in North America have declined, a result of habitat loss and fragmentation throughout the species' range. Pesticide use can destroy the milkweed plants that monarchs need to survive. A changing climate has intensified weather events which may also impact monarch populations. The USFWS recently determined the monarch butterfly is a candidate for listing under the Endangered Species Act.

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<sup>10</sup> Connecticut Audubon Society Bird Finder for May 23: Red Knot - <http://www.ctaudubon.org/2014/05/connecticut-audubon-society-bird-finder-for-may-23-red-knot/#sthash.oT1QBhV3.dpuf>.

<sup>11</sup> According to the federal Endangered Species Act of 1973, ‘take’ means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. An incidental take is a ‘take’ that results from activities that are otherwise lawful.

## Appendices

A: Wetland Identification and Delineation Reports: 2018 - 2021.

B: NDDDB Determination Letter

C: USFWS Species List

D: Saltmarsh Surveys

## APPENDIX A – Wetland Identification and Delineation Reports: 2018 - 2021

- Wetland Identification and Delineation Report, West River – Elm West and Elm West – Allings Crossing Transmission Line Railroad Project, West Haven and New Haven, CT, May 4, 2018; updated August 12, 2021.
  - Wetland Identification and Delineation Report, Milvon Substation (Milford, CT) to Allings Crossing Substation (West Haven, CT), New Haven County, CT, September 20, 2019; updated April 2021.
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**WETLAND AND WATERCOURSE IDENTIFICATION KEY**

The United Illuminating Company engaged BL Companies, Inc. to conduct wetland identification and delineation studies within the proposed project area along the CTDOT Corridor. These studies were initially completed in advance of the development of project plans and engineering design in two different intervals and resulted in two report deliverables. In order to provide a unified numbering convention with respect to the proposed project, the wetlands and watercourses identified in the studies have been numbered using the following designations with reference to the names contained in the BL Companies, Inc. reports.

Municipality	Wetland / Watercourse Map Identifier	Wetland / Watercourse Identifier in BL Companies, Inc. Reports*	USFWS NWI Classification or Watercourse Designation
Milford	M-W1	Wetland A (W-A)	PFO
Milford	M-WC1	Watercourse A (WC-A)	R45BE1
Milford	M-W2	Wetland B (W-B)	PFO
Milford	M-WC2	Watercourse AA (WC-AA)	R45BE1
Milford	M-W3	Wetland U (W-U)	PEM
Milford	Wepawaug River (Tidal)	Watercourse B (WC-B)	E1UBL
Milford	M-W4	Wetland C (W-C)	PSS1C (PEM sample point)
Milford	M-W5	Wetland D (W-D)	PFO
Milford	M-W6	Wetland E (W-E)	PFO
Milford	M-TW1	Coastal Wetland A (W-CA)	E2EM1Pd (PEM sample point)
Milford	M-TW2	Coastal Wetland B (W-CB)	E2EM1Pd (PEM sample point)
Milford	Indian River (Tidal)	Coastal Watercourse A (WC-A) (Indian River)	E1UBL3/E1UBL
Milford	M-TW3	Coastal Wetland C (W-CC)	Not listed on NWI/E2EM1Pd (PEM sample point)
Milford	M-TWC2	Coastal Watercourse B (CWC-B)	E2EM1Pd
Milford	M-TWC3	Coastal Watercourse V (CWC-V)	E2EM1Pd
Milford	M-W7	Wetland EA (W-EA)	PEM
Milford	M-W8	Wetland F (W-F)	PSS
Milford	M-WC4	Watercourse D (WC-D)	R45BE1
Milford	M-W9	Wetland G (W-G)	PFO
Milford	M-WC5	Watercourse C (WC-C)	R5UBh1
Milford	M-WC6	Watercourse EA (WC-EA)	R45BE1
Milford	M-W10	Wetland S (W-S)	PEM
Milford	M-WC7	Watercourse E (WC-E)	R5UBh1
Milford	M-W11	Wetland H (W-H)	PSS
Milford	M-W12	Wetland I (W-I)	PFO
Milford	M-W13	Wetland K (W-K)	PSS
Milford	M-WC8	Watercourse F (WC-F)	R5UBh1
Milford	M-W14	Wetland J (W-J)	PFO
Milford	M-W15	Wetland T (W-T)	PEM1/SS1E (PSS sample point)
Milford	M-WC9	Watercourse G (WC-G)	R45BE1
Milford	M-W16	Wetland M (W-M)	PSS1E
Milford	M-W17	Wetland L (W-L)	PSS
Milford	M-WC10	Watercourse H (WC-H)	R45BE1
Orange	O-WC1	Watercourse I (WC-I)	R45BE1
Orange	O-WC2	Watercourse JA (WC-JA)	R45BE1
Orange	O-WC3	Watercourse JB (WC-JB)	R45BE1
Orange	O-W1	Wetland NA (W-NA)	PEM
Orange	O-W2	Wetland N (W-N)	PFO
Orange/West Haven	Oyster River	Watercourse J (WC-J)	R5UBh1
West Haven	WH-WC1	Watercourse Ja (WC-Ja)	R45BE1
West Haven	WH-WC2	Watercourse K (WC-K)	R45BE1
West Haven	WH-W1	Wetland O (W-O)	PEM
West Haven	WH-WC3	Watercourse T (WC-T)	R45BE1
West Haven	WH-WC4	Watercourse U (WC-U)	R45BE1
West Haven	WH-WC5	Watercourse N (WC-N)	R5UBh1
West Haven	WH-W2	Wetland P (W-P)	PSS
West Haven	WH-WC6	Watercourse M (WC-M)	R45BE1
West Haven	WH-W3	Wetland Q (W-Q)	PEM
West Haven	WH-WC7	Watercourse L (WC-L)	R5UBh1
West Haven	WH-WC8	Watercourse O (WC-O)	R45BE1
West Haven	WH-WC9	Watercourse P (WC-P)	R5UBh1
West Haven	WH-WC10	Watercourse Q (WC-Q) <sup>2</sup> / Stream 9 <sup>1</sup>	R45BE1 / R45BC
West Haven	WH-WC11	Stream 5	R4UBC
West Haven	WH-WC12	Stream 8	R4SBC
West Haven	WH-W4	Wetland R (W-R) <sup>2</sup> encompasses delineated CT Wetland 1 <sup>1</sup>	PEM
West Haven	WH-WC13	Stream 7	R4UBC/R45BC
West Haven	WH-WC14	Stream 4	R4UBC/R45BC
West Haven	WH-WC15	Stream 6 <sup>2</sup> / Watercourse R (WC-R) <sup>3</sup>	R4UBC / R45BE1
West Haven	WH-WC16	Watercourse S (WC-S)	R45BE1
West Haven	WH-W5	Wetland 8	PSS1E
West Haven	WH-W6	Wetland 9	PSS1E
West Haven	WH-WC17	Stream 3	R4UBCh
West Haven	WH-W7	Wetland 7	PFO1E
West Haven	WH-W8	Wetland 5	PSS1Eh
West Haven	WH-WC18	Stream 1	R45Ch
West Haven	Cove River	Cove River / Phipps Lake	R5UBh
West Haven	WH-W9	Wetland 6	PFO1E
West Haven	WH-W10	Pond 1	PUBHx
West Haven	WH-W11	Wetland 3	PEM5E
West Haven	WH-W12	Wetland 1	E2EM5/E2SS1P
West Haven	WH-W13	Wetland 2	E2EM5/SS1P
West Haven / New Haven	West River (Tidal)	West River	E1UBL
West Haven	WH-TW1	Wetland 2 (Tidal portion - southern area)	E2EM5/E2SS1P
West Haven	WH-TW2	Wetland 1 (Tidal portion - northern area)	E2EM5/E2SS1P
West Haven	WH-TW3	Wetland 1 (Tidal portion - southern area)	E2EM5/E2SS1P
West Haven	WH-TW4	Wetland 2 (Tidal portion - northern area)	E2EM5/E2SS1P
New Haven	NH-TW1	Wetland 4 (northside CTDOT Corridor)	E1UBL
New Haven	NH-TW2	Wetland 4 (southside CTDOT Corridor)	E1UBL

\* Wetland Identification and Delineation Reports prepared by BL Companies, Inc.  
 1. Wetland Identification and Delineation Report Update, Milvon Substation (Milford, CT) to Allings Crossing Substation (West Haven, CT), New Haven County, CT, BL Project No: 18S3476, dated September 17, 2017 (updated April 28, 2021)  
 2. Wetland Identification and Delineation Report Update, West River-Elm West and Elm West-Allings Crossing Transmission Line Railroad Project, West Haven and New Haven, CT, BL Project No: 17S3304-A, B, and D, dated May 4, 2018 (updated April 2021)

LEGEND	
	Inland Wetland
	Tidal Wetland
	Watercourse
	Tidal Watercourse

APPENDIX B – NDDDB Determination Letter

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Connecticut Department of  
**ENERGY &  
ENVIRONMENTAL  
PROTECTION**

December 27, 2020

Mr. Todd Berman  
The United Illuminating Company  
100 Marsh Hill Road  
Orange, CT 06477  
[Todd.berman@uinet.com](mailto:Todd.berman@uinet.com)

Project: United Illuminating Company Milvon-West River Railroad 115-KV Transmission Line Upgrade in Milford, Orange, West Haven and New Haven, Connecticut  
NDDDB Determination No.: 202073487

Dear Todd Berman,

I have reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map you provided for the proposed United Illuminating Company Milvon-West River Railroad 115-KV Transmission Line Upgrade in Milford, Orange, West Haven and New Haven, Connecticut. According to our information we have known extant populations of State Endangered *Eriocaulon parkeri* (Parker's pipewort) State Threatened *Ammodramus maritimus* (seaside sparrow) and State Special Concern *Ammodramus caudacutus* (saltmarsh sharp-tailed sparrow), *Rana pipiens* (northern leopard frog), *Terrapene carolina carolina* (eastern box turtle) and *Malaclemys terrapin terrapin* (northern diamondback terrapin) and *Bolboschoenus novae-angliae* (Salt marsh bulrush) in the vicinity of this project.

**State Endangered Plant Protection**

State Endangered *Eriocaulon parkeri* (Parker's pipewort)  
Habitat: Muddy tidal shores of coastal estuaries.  
Blooms late July – September.

State Special Concern *Bolboschoenus novae-angliae* (Salt marsh bulrush)  
Habitat: Brackish tidal marshes.  
Blooms mid-July with seeds through October

**In order to prevent adverse impacts to *Eriocaulon parkeri* (Parker's pipewort) and State Special Concern *Bolboschoenus novae-angliae* (Salt marsh bulrush):**

- 1) Provide a botanical survey for the Indian River section of right-of-way during the 2021 growing season and **before any work is started in this area of the right-of-way**. The botanical survey must be conducted by a qualified botanist familiar with these species. The botanical survey results and report must be submitted to the NDDDB Program ([deep.nddbrequest@ct.gov](mailto:deep.nddbrequest@ct.gov)) **before any work is done in this section of the right-of-way**. The report should include: a resume/CV of the qualified botanist conducting the survey, dates of survey, detailed maps of the route taken during the survey and locations of state listed species, list of all component plant species in study area with scientific nomenclature, if state listed species are observed include rare plant forms that can be found at: <https://portal.ct.gov/DEEP/Endangered-Species/Contributing-Data>;

And conservation plans to protect any state listed plants observed in the right-of-way from project activities.

- 2) Do all structure replacements in winter, outside of growing season.
- 3) Do not expand existing pads or service roads, instead use temporary wooden matting when replacing structures. No additional gravel should be placed within the right-of-way either on roads or on pads in this right-of-way.
- 4) Remove all wood chips and slash if created by this rebuild of the transmission line. Do not add any wood chips to this right of way.
- 5) All state listed plant species found during structure replacement or hazardous tree removal must be reported on a special plant form and submitted to the NDDDB ([deep.nddbrequest@ct.gov](mailto:deep.nddbrequest@ct.gov)) as soon as possible.

### **State Special Concern *Terrapene carolina carolina* (eastern box turtle)**

Best management practices to protect these turtles should be implemented throughout the entire work area. For all upland work, crushed stone should be avoided as much as possible and temporary mats should be used instead. No wood chips should be placed in any eastern box turtle upland habitat. Instead these wood chips should be removed and used elsewhere (off site). Any sightings of these turtles should be reported to the Natural Diversity Data Base ([deep.nddbrequest@ct.gov](mailto:deep.nddbrequest@ct.gov)) using a special animal form along with photographs to ensure proper identification of this species. The link to this form can be found here: [https://www.ct.gov/deep/lib/deep/endangered\\_species/general\\_information/Vertebrateform.pdf](https://www.ct.gov/deep/lib/deep/endangered_species/general_information/Vertebrateform.pdf)

### **Protection for Turtles during Inactive Period (October 1<sup>st</sup> through March 30<sup>th</sup>):**

- Keeping heavy equipment in the open ROW to the greatest extent possible and hand-felling trees to the greatest extent possible will minimize the potential for heavy machinery to crush hibernating turtles located in the forested edges along the ROW (a preferred habitat for box turtles to hibernate in).
- Overall, minimizing ground disturbance along the forest edges will minimize the potential for box turtle mortality during the winter months.
- Avoid and limit any equipment use within 50 feet of streams and brooks (wood turtles may be active in waterways even during the winter months).
- When felling trees adjacent to brooks and streams please cut them to fall away from the waterway and do not drag trees across the waterway or remove stumps from banks.
- No heavy machinery or vehicles may be parked in any turtle habitat.
- All construction personnel working within the turtle habitat must be apprised of the species description and the possible presence of a listed species, and instructed to notify the appropriate authorities to relocate any observed turtle.
- Any confirmed sightings of box, wood or spotted turtles should be reported and documented with the NDDDB ([nddbrequestdep@ct.gov](mailto:nddbrequestdep@ct.gov)) on the appropriate special animal form found at ([http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323460&depNav\\_GID=1641](http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323460&depNav_GID=1641))

### **Protection for Turtles during Active Period (April 1<sup>st</sup> through September 30<sup>th</sup>):**

- Hire a qualified herpetologist to be on site to ensure these protection guidelines remain in effect and prevent turtles from being run over when moving heavy equipment. This is especially important in the month of June when turtles are selecting nesting sites. All construction personnel working within the turtle habitat must be apprised of the species description and the possible presence of a listed species, and instructed to relocate turtles found inside work areas or notify the

appropriate authorities to relocate individuals. The Contractor and consulting herpetologist must search the work area each morning prior to any work being done. If a turtle is discovered later in the day after the initial search work should stop until the turtle can be relocated by the qualified herpetologist or educated construction worker. Any turtles encountered within the immediate work area shall be carefully moved to an adjacent area outside of the excluded area and any exclusionary fencing should be inspected to identify and remove access point. The goal is to keep turtles from being unintentionally killed during this project.

- Exclusionary practices will be required to prevent any turtle access into construction areas. These measures will need to be installed at the limits of disturbance.
- Exclusionary fencing must be at least 20 in tall and must be secured to and remain in contact with the ground and be regularly maintained (at least bi-weekly and after major weather events) to secure any gaps or openings at ground level that may let animal pass through. Do not use plastic or netted silt-fence.
- All staging and storage areas, outside of previously paved locations, regardless of the duration of time they will be utilized, must be reviewed to remove individuals and exclude them from re-entry.
- In areas where silt fence is used for exclusion, it shall be removed as soon as the area is stable to allow for reptile and amphibian passage to resume.
- No heavy machinery or vehicles may be parked in any turtle habitat.
- Special precautions must be taken to avoid degradation of wetland habitats including any wet meadows and seasonal pools.
- When felling trees adjacent to brooks and streams please cut them to fall away from the waterway and do not drag trees across the waterway or remove stumps from banks.
- Avoid and limit any equipment use within 50 feet of streams and brooks.
- Any confirmed sightings of box, wood or spotted turtles should be reported and documented with the NDDDB ([nddbrequestdep@ct.gov](mailto:nddbrequestdep@ct.gov)) on the appropriate special animal form found at ([http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323460&depNav\\_GID=1641](http://www.ct.gov/deep/cwp/view.asp?a=2702&q=323460&depNav_GID=1641))

### **State Special Concern *Rana pipiens* (northern leopard frog):**

The northern leopard frog is a species of special concern frog that utilize 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. We have records of this frog from the wetlands surrounding the West River in New Haven.

### **Protection Measures for State Special Concern Northern Leopard Frog:**

Most work should occur during the frog's active period (between March and October). Additional protection strategies that protect and enhance wetland habitat should be implemented in all areas where floodplain and alluvial marsh and wet meadow habitat will be impacted. No gravel or hard surface should be placed in any floodplain or alluvial marsh habitat. Construction personnel should also be notified of the presence of this species and provide information to assist in the identification of leopard frogs. During disturbance, geotextile silt fence is required be installed along the perimeter of the project disturbance limits and would will serve as a barrier for the northern leopard frog to access the work area. Any sightings of these frogs should be reported to the Natural Diversity Data Base ([deep.nddbrequest@ct.gov](mailto:deep.nddbrequest@ct.gov)) using a special animal form along with photographs to ensure proper identification of this species. The link to this form can be found here:

[https://www.ct.gov/deep/lib/deep/angered\\_species/general\\_information/Vertebrateform.pdf](https://www.ct.gov/deep/lib/deep/angered_species/general_information/Vertebrateform.pdf)

No gravel should be placed in any floodplain or alluvial marsh habitat. Construction personnel should also be notified of the presence of this species and provide information to assist in the identification of

leopard frogs. I do not anticipate any adverse impacts to the northern leopard frog population from this project if activities are confined to fall and winter months (October through February) if temporary matting is used and removed promptly once the project is finished.

**State Special Concern *Malaclemys t. terrapin* (Northern Diamondback Terrapin)**

The Northern diamondback terrapin is a turtle that inhabits salt marshes and salt or brackish tidal waters. They can also be found in mud flats, shallow bays, coves, and tidal estuaries. Adjacent sandy dry upland areas are required for nesting. Nesting takes place in June-July on salt marshes and adjacent beach areas. The peaks of hatching occurrences are April – June and September – November. This species overwinters in depressions in the bottom of estuaries, creeks, and salt marsh channels. We have records of this turtle in Golf Pond and Indian River in Milford.

**Recommended Protection Measures for Northern Diamondback Terrapin:**

To protect Northern diamondback terrapin any ground disturbance in the area of **Golf Pond/Indian River** should be done during the turtle's inactive periods (November 1<sup>st</sup> to April 1st).

In the event that construction cannot be completed during the winter months then the work may be performed between April - November in accordance with the protection measures and Best Management Practices below:

1. Hire a qualified herpetologist to be on site to ensure these protection guidelines remain in effect and prevent turtles from being run over when moving heavy equipment. This is especially important in the month of June when turtles are selecting nesting sites. All construction personnel working within the turtle habitat must be apprised of the species description and the possible presence of a listed species, and instructed to relocate turtles found inside work areas or notify the appropriate authorities to relocate individuals. The Contractor and consulting herpetologist must search the work area each morning prior to any work being done. If a turtle is discovered later in the day after the initial search work should stop until the turtle can be relocated by the qualified herpetologist or educated construction worker. Any turtles encountered within the immediate work area shall be carefully moved to an adjacent area outside of the excluded area and any exclusionary fencing should be inspected to identify and remove access point. The goal is to keep turtles from being unintentionally killed during this project.
2. Daily inspections should be conducted during the construction period to monitor for any turtles or terrapins. All construction workers should be advised and educated about these turtles and protection strategies.
3. Silt Fencing should be installed around the work area prior to commencement of construction and will be inspected daily.
4. A visual inspection should be conducted once silt fencing is in-place and prior to start of any work activity to locate any potential turtles.
5. All work personnel will be notified to be alert for the potential presence of the turtles and will be provided with a description of the species. Any turtle that may be discovered will be carefully moved, without harm, to a location outside the work area, and positioned in the same orientation that it had been moving. NO turtles will be removed or relocated from the area.
6. No vehicles or machinery should be parked in any identified turtle habitat that has not been confined by silt fencing and cleared of turtles.
7. Special care to avoid harm to basking or foraging individuals should be taken for any work conducted in the early morning and evening hours.

8. Report any observations of these turtles to our DEEP-NDDDB Program at [deep.nddbrequest@ct.gov](mailto:deep.nddbrequest@ct.gov) as soon as possible.

**State Threatened *Ammodramus maritimus* (Seaside sparrow) and State Special Concern *Ammodramus caudacutus* (saltmarsh sharp-tailed sparrow)**

The State Threatened *Ammodramus maritimus* (Seaside sparrow) and State Special Concern *Ammodramus caudacutus* (saltmarsh sharp-tailed sparrow) are two wetland bird species that nest in salt marsh complexes and are most susceptible to human disturbance during the breeding season (approximately April through August). We have records of these birds in the salt marshes surrounding the Indian River in Milford. Adults return to set up territories as early as April. Nests for these species are usually not established until May 1<sup>st</sup> but can be started as late as August 1<sup>st</sup>.

**Recommended Protection Measures for Seaside Sparrow and Saltmarsh Sharp-tailed Sparrow**

- Begin work before May 1<sup>st</sup> or after August 31<sup>st</sup> to avoid impacting an active nest. Do not introduce any new excessive noise between April 15<sup>th</sup> and August 15<sup>th</sup>.

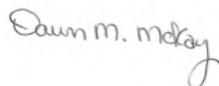
- If work must occur between May 1<sup>st</sup> and August 31<sup>st</sup>, before initiating work, nest surveys must occur to determine if nests are present impacted by project activities. Nest surveys must be conducted by an ornithologist familiar with the identification and the habitat requirements of this species. A report summarizing the results of such surveys should include habitat descriptions, survey results species list and a statement/resume giving their qualifications. Please forward the results of these surveys to the NDDDB Program ([deep.nddbrequest@ct.gov](mailto:deep.nddbrequest@ct.gov)) within 14 days of this survey. If a nest is discovered all work should halt until after August 31<sup>st</sup>.

If these protection strategies are followed then the proposed activities will lessen the impact on these state-listed species. This determination is good for two years. Please re-submit an NDDDB Request for Review if the scope of work changes or if work has not begun on this project by December 27, 2022.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substitutes for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Please contact me if you have further questions at (860) 424-3592, or [dawn.mckay@ct.gov](mailto:dawn.mckay@ct.gov) . Thank you for consulting the Natural Diversity Data Base.

Sincerely,



Dawn M. McKay  
Environmental Analyst 3

APPENDIX C – USFWS Species List

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## United States Department of the Interior



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In Reply Refer To:

September 14, 2021

Consultation Code: 05E1NE00-2021-SLI-4746

Event Code: 05E1NE00-2021-E-14571

Project Name: Milvon-West River Railroad Transmission Line 115-kV Rebuild Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan ([http://www.fws.gov/windenergy/eagle\\_guidance.html](http://www.fws.gov/windenergy/eagle_guidance.html)). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at:

<http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>;

<http://www.towerkill.com>; and

<http://>

[www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html](http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html).

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
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## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**New England Ecological Services Field Office**

70 Commercial Street, Suite 300

Concord, NH 03301-5094

(603) 223-2541

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## Project Summary

Consultation Code: 05E1NE00-2021-SLI-4746

Event Code: Some(05E1NE00-2021-E-14571)

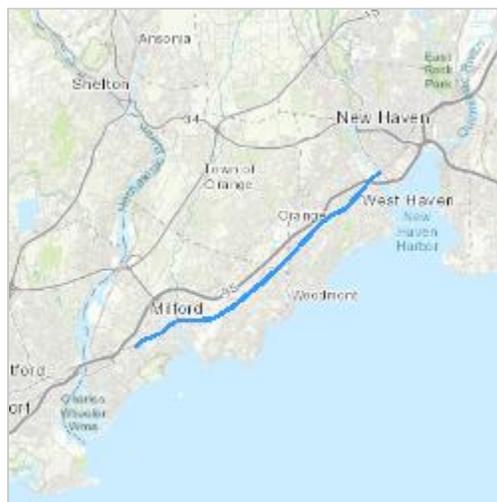
Project Name: Milvon-West River Railroad Transmission Line 115-kV Rebuild Project

Project Type: TRANSMISSION LINE

Project Description: Rebuild of approximately 9.5 miles (19 circuit miles) from Milvon Substation (Milford, CT) to West River Substation (New Haven, CT). Relocate the transmission lines off the existing railroad catenary bonnets (overhead wire systems) and install on independent monopoles with new insulators, hardware and conductor adjacent to the railroad corridor. The 115 kV transmission lines between New Haven and Milford are supported by the Connecticut Department of Transportation (CTDOT) owned railroad catenary structures and connected through UI owned bonnet structures. As a result of age, asset deterioration, and increased mechanical loads, it was recommended that new 115 kV transmission lines be installed in new monopoles along the CTDOT railroad corridor. These upgrades will help maintain system reliability, preserve safety within and adjacent to the right-of-way, and provide technological enhancements to legacy system equipment. The upgrades will improve the reliability, capacity and resiliency of the transmission system, ensuring that the safe and reliable transmission of power is maintained for the customers throughout Fairfield and New Haven County, in accordance with Federal reliability standards. Estimated timetable (subject to change) is construction from 2023 to 2028.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@41.250798,-72.99296129555944,14z>



Counties: New Haven County, Connecticut

## Endangered Species Act Species

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries<sup>1</sup>, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

### Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/9045">https://ecos.fws.gov/ecp/species/9045</a>	Threatened

### Birds

NAME	STATUS
Red Knot <i>Calidris canutus rufa</i> There is <b>proposed</b> critical habitat for this species. The location of the critical habitat is not available. Species profile: <a href="https://ecos.fws.gov/ecp/species/1864">https://ecos.fws.gov/ecp/species/1864</a>	Threatened

### Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/9743">https://ecos.fws.gov/ecp/species/9743</a>	Candidate

### Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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## APPENDIX D – Saltmarsh Surveys



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Biodiversity Studies • Wetland Delineation & Assessment • Habitat Management • GIS Mapping • Permitting • Forestry

## **State-Listed Plant Species Survey**

The United Illuminating Company

Milvon-West River Railroad Transmission Line 115-kV Rebuild Project

Indian River, City of Milford

West River, Cities of West Haven and New Haven

October 8, 2021

### Contents

Executive Summary .....	2
General Site Characteristics.....	2
Survey Protocol.....	5
Survey Results .....	7

## Executive Summary

<i>Project:</i>	The United Illuminating Company's proposed transmission line rebuild Project between the Milvon and West River Substations
<i>Location:</i>	Indian River Saltmarsh, north of Route 162, Milford, Connecticut and West River Saltmarsh, West Haven and New Haven, Connecticut
<i>Survey Target:</i>	Parker's pipewort ( <i>Eriocaulon parkeri</i> ) and New England tuber-bulrush ( <i>Schoenoplectus novae-angliae</i> )
<i>Survey Area:</i>	Indian River Saltmarsh north of Route 162 and access from Old Gate Road and Wampus Road and West River Saltmarsh southwest of Route 10 and access from Mix Avenue
<i>Dates/Duration:</i>	September 1 and 22, 2020; September 16 and 28, 2021. 30 Person hours
<i>Survey Results:</i>	No target species found.

## General Site Characteristics

The survey areas at Indian River Saltmarsh are located on either side of the Connecticut Department of Transportation/Metro-North Railroad (MNR) corridor, where the United Illuminating Company requires access and work pad area to complete soil borings prior to Project construction activities. This portion of the survey area is divided into four parts: northeastern, northwestern, southeastern, and southwestern. The northeastern portion is accessed from the east via Old Gate Road. It is bound to the south by the railroad corridor and to the west by the Indian River (Appendix A: Photo 1). The saltmarsh extends to the north well beyond the scope of work proposed in this Project (Appendix A: Photo 2,3), the survey area is bound to the north by the main eastern tributary and a deep mosquito ditch.

The northwestern portion of the survey area is similarly bound to the south by the railroad corridor and to the east by the Indian River (Appendix A: Photo 4). Much like on the eastern side of the Indian River, the saltmarsh extends to the north well beyond the

scope of the proposed work area (Appendix A: Photo 5). It is accessed from Wampus Road and is bound to the west by upland wooded areas.

The southeastern and southwestern portions are bound to the north by the railroad corridor and to the south by Route 162 (Appendix A: Photo 6,7), with the western side being comprised mostly of upland areas. They are divided by the Indian River, and bound to the east and west, respectively, by developed upland areas. South of Route 162 and beyond the scope of the survey, Indian River widens to include substantial areas of mudflats. 7.28 acres of this area is protected as the New Haven Avenue parcel of the Milford Land Conservation Trust.<sup>1</sup>

Likewise, the survey areas at the West River are located on either side of the railroad corridor, where the United Illuminating Company requires access and work pad area to complete soil borings prior to Project construction activities and is divided into four parts: northern, eastern, southern, and western. The northern, western, and southern portions are accessed from the west, along the railroad corridor via Mix Avenue. The northern portion is bound to the north and east by private commercial property, to the south by the railroad corridor and to the west by the West River (Appendix A: Photo 8). The western portion is bound to the north and west by a drainage channel that is a remnant of historic mosquito drainage ditches visible in the 1934 MAGIC UCONN aerial imagery. It is bound to the east by the West River and to the south by the railroad corridor (Appendix A: Photo 9). The southern portion is bound to the northwest by the railroad corridor, to the southwest by developed, nontidal wetlands, and to the east and south by the West River (Appendix A: Photo 10). The eastern portion is accessed from the New Haven Fire Academy parking lot on Road A. It is bound to the northeast by upland developed areas, to the northwest by the railroad corridor and to the southwest by the West River (Appendix A: Photo 11). North and south of the survey area the tidal saltmarsh and mudflat habitats become more expansive (Appendix A: Photo 12, 13).

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<sup>1</sup> <https://www.milfordctlandtrust.org/website/publish/properties/parcelsDetail.php?New-Haven-Avenue-114>

Overall, the survey area has few areas of native saltmarsh vegetation or mudflat habitat. Small areas of these habitats are bound by nontidal developed areas dominated by nonnative species. The southern and eastern portions have steep banks that are comprised, in areas, primarily of anthropogenic materials such as traprock (Appendix A: Photo 14).

The northern portions of the Indian River survey area are comprised entirely of one soil type, Westbrook mucky peat<sup>2</sup> a tidally influenced soil comprised of deep organic material underlain by mineral loam.<sup>3</sup> The soil on both sides of the southern portion of the survey is Udorthent-Urban land complex, derived primarily from urban influenced parent material,<sup>4</sup> (Appendix A: Photo 15). Because of their location, these areas are also tidally influenced, particularly on the eastern side, which appears to be made primarily of tidally derived materials (Appendix A: Photo 16). The entirety of the West River survey area is comprised of tidally influenced Udorthent-Urban land complex.

Bordering areas are primarily forested, with an understory dominated by invasive species, or developed. The saltmarsh area is primarily vegetated by native graminoid species, with a band of invasive common reed (*Phragmites australis* var. *australis*) in most places where the saltmarsh transitions to more upland, often anthropogenic, habitat (Appendix A: Photo 17, 18, 19).

While MNR acquired the railroad track in 1983,<sup>5</sup> the corridor itself was built in the mid-1840s by the New Haven and New York Railroad Company.<sup>6</sup> Current aerial

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<sup>2</sup> UCONN Center for Land Use Education and Research and CT DEEP “CT Environmental Conditions Online Simple Viewer” *CT Environmental Conditions Online*, UCONN.

<http://cteco.uconn.edu/viewer/index.html?viewer=simple>

<sup>3</sup> Natural Resources Conservation Service: Soils “Westbrook Series” *Official Soil Series Descriptions*, United States Department of Agriculture.

[https://soilseries.sc.egov.usda.gov/OSD\\_Docs/W/WESTBROOK.html](https://soilseries.sc.egov.usda.gov/OSD_Docs/W/WESTBROOK.html).

<sup>4</sup> UCONN Center for Land Use Education and Research and CT DEEP “CT Environmental Conditions Online Simple Viewer” *CT Environmental Conditions Online*, UCONN.

<http://cteco.uconn.edu/viewer/index.html?viewer=simple>

<sup>5</sup> “New York, New Haven & Hartford Railroad Records”, *Archives and Special Collections, University of Connecticut Library*. <https://archivessearch.lib.uconn.edu/repositories/2/resources/9>

<sup>6</sup> Hauptman, Leo M., “Papers of the New York, New Haven, and Hartford, Railroad Company”, *Railroad Collection 1813-1939*. Manuscript no. B18, New Haven Colony Historical Society. August, 1978.

photography, as well as channels observable in the field, show clear evidence of historical mosquito drainage channels. From a review of the images available in the UConn Air Photo Archive, it can be determined that the mosquito drainage channels that are visible today in the eastern portion of the Indian River saltmarsh, both north and south of the railroad corridor, were dug prior to 1934. The area south of the railroad corridor and west of the Indian River appears in the 1934 aerial imagery to likewise already be developed. By 1951 mosquito drainage ditches had been dug throughout the entirety of the Indian River Saltmarsh, all the way to its northern terminus, just south of modern Route 1. Some minor drainage channels are apparent on the western side of the saltmarsh, north of the railroad corridor, in the 1934 aerial photography; however, the channels currently visible, including the two larger open water areas to the west of the saltmarsh, do not appear until the 1986 mapping.

The West River survey areas likewise show preexisting human impact in the 1934 aerial imagery. The saltmarsh on the western side of the West River, north of the railroad corridor, including the western portion of the survey area, shows drainage for mosquito ditching. The eastern portion of the survey area appears entirely developed, with the shoreline consistent with its current location. The northern and southern portions of the survey area have some historic areas of anthropogenic fill as required for the railroad corridor. There is some development in the upland areas just north of the northern portion of the survey areas from the 1950s and expanding to its current extent in the early 1990s. The southern portion of the survey area and saltmarsh areas extending southwest show mosquito drainage ditches in the 1986 aerial imagery, as well as anthropogenic activity in adjacent upland areas.<sup>7</sup>

### Survey Protocol

The survey area was determined by an overview of Project mapping and NDDDB letter No. 2020073487, dated December 27, 2020. The target survey areas were tidal

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<sup>7</sup> UConn Air Photo Archive, 1934, 1951, 1970, 1986.  
<https://connecticut.maps.arcgis.com/apps/View/index.html?appid=044e8e6266aa44dc8ccc9b6e2eecacb4&extent=-74.8197,40.6374,-70.2054,42.4665>

saltmarsh areas within and bordering proposed Project work areas, with emphasis on any muddy bank habitat. Upland access to work areas was also surveyed and characterized. Botanists were escorted by United Illuminating Safety and Environmental Permitting and Compliance Specialists in both portions of the survey area and a Metro North Rail Flagger at West River where surveys require crossing and walking within the railroad corridor. Preliminary surveys were done on September 1 and 22, 2020 to gain an understanding of the general target area. However, Project design was only progressed to 30% and proposed work areas were not finalized at that time.

Prior to field surveys, diagnostic identification information and representative photographs of target species were reviewed. Parker's pipewort (*Eriocaulon parkeri*) is a plant in the Eriocaulaceae family, one of two species of the only genus in the family found in CT.<sup>8</sup> Like its congener seven-angled pipewort (*Eriocaulon aquiticum*), it is a very small plant comprised of a basal rosette of leaves from which emerge leafless scapes with a small inflorescence of tiny white flowers. Parker's pipewort is distinguished from seven-angled pipewort by usually having multiple scapes per basal rosette, smaller and more rounded inflorescences, measuring only 3-4 mm wide, and by habitat, with seven-angled pipewort being restricted to freshwater habitats.<sup>9</sup> Parker's pipewort is found on sandy, silty, or muddy substrates in fresh or brackish-tidal river shores.<sup>10</sup>

The other target species for this survey, New England tuber-bulrush (*Bolboschoenus novae-angliae*) is a plant in the Cyperaceae family, and one of five species or naturally occurring hybrids or subspecies in its genus found in Connecticut. Like its congeners, it is a thick-stemmed graminoid with an inflorescence made of numerous flower spikes.<sup>11</sup>

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<sup>8</sup> Dreyer G.D., C. Jones, et al. 2014. Native and Naturalized Vascular Plants of Connecticut Checklist. Connecticut Botanical Society. New Haven, CT.

<sup>9</sup> Native Plant Trust "Dichotomous Key: *Eriocaulon*" *Go Botany*, Native Plant Trust. 2021. <https://gobotany.nativeplanttrust.org/dkey/ericaulon/#all>

<sup>10</sup> Haines, Arthur, Elizabeth Farnsworth, and Gordon Morrison. New England Wildflower Society's Flora Novae Angliae: A Manual for the Identification of Native and Naturalized Higher Vascular Plants of New England. Framingham, Mass.: New England Wild Flower Society, 2011. Print. Page 172.

<sup>11</sup> Dreyer G.D., C. Jones, et al. 2014. Native and Naturalized Vascular Plants of Connecticut Checklist. Connecticut Botanical Society. New Haven, CT.

New England tuber-bulrush is distinguished from its congeners by having larger inflorescence spikes (5-10 mm diameter), more than half of which are borne on elongate branches, having leaf blades measuring 7-22 mm wide, and compressed-trigonous achenes.<sup>12</sup> New England tuber-bulrush is found on brackish-tidal river shores.<sup>13</sup>

## Survey Results

Field surveys were conducted by botanists James Cowen and Aubree Keurajian on September 16<sup>th</sup> and 28<sup>th</sup> of 2021. Surveys were timed to coincide with end of the flowering period of Parker’s Pipewort and the fruiting period of New England tuber-bulrush and low tide, so that all possible mud flat habitat was visible. The survey effort on September 16<sup>th</sup> began at 11 am, at the midpoint between high tide at 8 am and low tide at 2:05 pm. All survey areas at the Indian River, as well as the eastern survey area the West River were surveyed. The survey effort on September 28<sup>th</sup> began at 10:30 am, shortly before low tide at 11:03 am. Survey efforts are listed in Table 1 below and survey routes are shown in Appendix B.

*Table 1: Survey dates, weather, and effort*

Survey Date	Weather	Survey Duration (Total Person Hours)
September 1, 2020	Sunny, 75F	6 person hours
September 22, 2020	Sunny, 60F	12 person hours
September 16, 2021	Overcast, 72F	8 person hours
September 28, 2021	Overcast, 75F	4 person hours

<sup>12</sup> Native Plant Trust “Dichotomous Key: *Bolboschoenus*” *Go Botany*, Native Plant Trust. 2021.

<https://gobotany.nativeplanttrust.org/dkey/bolboschoenus/#all>

<sup>13</sup> Haines, Arthur, Elizabeth Farnsworth, and Gordon Morrison. *New England Wildflower Society's Flora Novae Angliae: A Manual for the Identification of Native and Naturalized Higher Vascular Plants of New England*. Framingham, Mass.: New England Wild Flower Society, 2011. Print. Page 172.

No target species were found. One congener of New England tuber-bulrush was found, the naturally occurring hybrid between American saltmarsh tuber-bulrush (*Bolboschoenus maritimus* spp. *paludosus*) and sea-coast tuber-bulrush (*Bolboschoenus robustus*) (Appendix A: Photo 20,11). This hybrid is distinguished from the target species, New England tuber-bulrush, most readily by having fewer than half of the inflorescence spikes borne on branchlets and perianth bristles mostly absent on mature, dark-brown achenes. Plants found were determined to be a hybrid of saltmarsh tuber-bulrush and sea-coast tuber-bulrush by their barely translucent scales and other intermediary characteristics. European saltmarsh tuber-bulrush (*Bolboschoenus maritimus* spp. *maritimus*) is not known from Connecticut. American saltmarsh tuber-bulrush has dark brown trigonous-compressed achenes and opaque floral scales whereas sea-coast tuber-bulrush has white-brown to medium, and less commonly dark, brown lenticular achenes and translucent floral scales. The plants found in the survey had fewer than half of inflorescence spikes borne on branchlets, (Appendix A: Photo 22) dark brown, compressed-trigonous achenes (Appendix A: Photo 23) that have few persistent perianth bristles and barely translucent floral scales (Appendix A: Photo 24), and leaf sheaths with intermediary characteristics. The apex of the leaf sheath opposite the leaf blade is more similar to that of saltmarsh tuber-bulrush in that it is prolonged and lacks the hyaline obtriangular<sup>14</sup> area of sea-coast tuber-bulrush; however, it also lacks the abruptly diverging veins characteristic of saltmarsh tuber-bulrush (Appendix A: Photo 25). Although this hybrid is not a state listed species, occurrences within or near the work area were mapped, all areas of potential habitat near or within the proposed work area were geolocated.

### *Indian River Survey Areas*

The entire Indian River tidal saltmarsh survey area was surveyed on September 16<sup>th</sup>, 2021. The Indian River tidal saltmarsh is vegetated on the east and west side of the Indian River by smooth cordgrass (*Spartina alterniflora*), saltmarsh hay (*Spartina*

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<sup>14</sup> Triangular with the apex in reverse of the ordinary or usual position.

*patens*), saltgrass (*Distichlis spicata*), annual saltmarsh American-aster (*Symphotrichum subulatum*), seaside goldenrod (*Solidago sempervirens*), common glasswort (*Salicornia depressa*), spearscale orache (*Atriplex patula*), high tide bush (*Iva frutescens*), common reed (*Phragmites australis* var. *australis*), climbing hempvine (*Mikania scandens*) and hybrid tuber-bulrush (*Bolboschoenus maritimus* x *robustus*).

Most of the proposed work area north of the railroad corridor, on both sides of the Indian River, is vegetated by invasive common reed (*Phragmites australis* var. *australis*) (Appendix A: Photo 26-31). This band of common reed extends north beyond the proposed work area and survey area, between the native vegetation of the saltmarsh and more upland areas (Appendix A: Photo 32). The invasive subspecies of common reed can be distinguished from the native subspecies by its dense growth habit and dull, blue-green leaves with leaf sheaths that adhere tightly to the green culm and persist on dead culms, dense inflorescences not yet in seed at the time of survey.<sup>15</sup> Its presence is also restricted to areas of prior disturbance.

Within the northwestern portion of the survey area there are several small muddy sections of the riverbank (Appendix A: Photo 33-35), however throughout most of this area the banks are quite steep (Appendix A: Photo 36). The largest portion of open mudflat-like habitat is at the confluence of the Indian River and the eastern tributary of the saltmarsh; however, this area is somewhat heavily used for fishing, as evidenced by metal grates, litter, including beer bottles, and a broken chair. The vegetation in this area is trampled and it is likely that much of the open soil area is maintained as such by foot traffic (Appendix A: Photo 37-39). No muddy banks were observed along the south side of this tributary where it runs parallels to the railroad corridor (Appendix A: Photo 40). At the point where this tributary bends at a right angle and flows from the north there are two mosquito ditches which make the rest of the tributary inaccessible for surveying. These mosquito ditches have steep banks with no habitat for Parker's

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<sup>15</sup> J. Swearingen and K. Saltonstall, "*Phragmites Field Guide: Distinguishing Native and Exotic Forms of Common Reed (Phragmites australis) in the United States.*" Technical Note Plant Materials Number 56. October 2012. USDA Natural Resources Conservation Service, Boise, ID.

pipewort. Some of the shallower mosquito ditches have exposed muddy bottoms at low tide (Appendix A: Photo 41), but as all others, have steep banks (Appendix A: Photo 2). Only one small area of open mud habitat was found in the northwestern portion of the survey area (Appendix A: Photo 42).

The saltmarsh areas south of the railroad corridor are vegetated by most of the same species found north of the corridor (Appendix A: Photo 43). The west side of the Indian River south of the corridor has only a small area of tidally influenced area which is vegetated by high tide bush, smooth cordgrass, saltmarsh hay, seaside goldenrod, and common reed (Appendix A: Photo 44). Much of the shoreline on this side is made up of rip rap and asphalt, with some areas of smaller gravel and muddy banks under the tree canopy (Appendix A: Photo 45). The eastern side is notable in having two unvegetated tidal pools, one of which is muddy at low tide (Appendix A: Photo 46, 47). This side of the river is vegetated by the same species as the western side, as well as purple loosestrife, saltgrass, and annual saltmarsh American-aster. A historic mosquito drainage channel to the north of this area is muddy at low tide (Appendix A: Photo 48, 49), as are some portions of the bank (Appendix A: Photo 50).

Adjacent upland and forested areas are vegetated primarily by a complex of common introduced and native species, including many invasive species, such as Autumn olive (*Elaeagnus umbellata*), Asiatic bittersweet (*Celastrus orbiculatus*), and Tree-of-Heaven (*Ailanthus altissima*). The staging area on Old Gate Road is vegetated primarily by herbaceous species and introduced, cool-season grasses (Appendix A: Photo 51). The proposed access and area adjacent to the railroad corridor is vegetated primarily by woody species, notably quaking aspen (*Populus tremuloides*) and Autumn olive (Appendix A: Photo 52). The upland area in the northeastern portion of the survey area is primarily vegetated by native species, with a mostly white oak canopy (*Quercus alba*) and a primarily greenbrier (*Smilax rotundifolia*) herb layer, with lower areas vegetated by common reed (Appendix A: Photo 53, 54). The western side of the Indian River Saltmarsh is accessed from Wampus Road. The access itself is an unmaintained asphalt road, heavily overgrown with herbaceous species and bordered by early

successional forests (Appendix A: Photo 55, 56). On the western bank of the Indian River, just north of the railroad corridor are two large black cherries (*Prunus serotina*) within the proposed work area (Appendix A: Photo 57). Likewise in the southwestern portion of the survey area there are Norway maple (*Acer palmatum*) and red oak (*Quercus rubra*) that are within the proposed work area. One exceptionally large white oak (*Quercus alba*) is present on the edge of the work area, during the field meeting with member of the project team it was determined that, while some large limbs will need to be removed, all feasible effort will be made to preserve this tree (Appendix A: Photo 7). The upland area to the west of the small area of saltmarsh in the southwestern portion of the survey area is vegetated almost entirely by nonnative species, and much of it is maintained by mowing (Appendix A: Photo 58). A complete species list for all bordering areas is found in Appendix D.

#### *West River Survey Areas*

The eastern portion of the West River Survey Area, accessible from the New Haven Fire Academy parking lot was surveyed on September 16<sup>th</sup>, all other areas were surveyed on September 28<sup>th</sup>.

The eastern portion of the West River Survey Area is comprised of a narrow band of rocky shore vegetated by smooth cordgrass and hightide bush. The rocky shoreline is comprised of natural material, stone fill, broken asphalt, and tidally deposited sediment. There are substantial amounts of wrack made up of dead vegetation and garbage, primarily plastic (Appendix A: Photo 11, 14, 59).

The access from Mix Avenue is highly developed. It is vegetated in upland areas by a mix of invasive shrubs and herbaceous species, particularly mugwort (*Artemisia vulgaris*), multiflora rose (*Rosa multiflora*), and Tree-of-Heaven, and in wetland areas by a monoculture of common reed, which extends into the tidal saltmarsh (Appendix A: Photo 60, 61). A complete species list for this area is found in Appendix C.

The western portion of the West River Survey Area is comprised of a small area of native vegetation bound to the west by a monoculture of common reed that occupies the historic mosquito drainage ditch and surrounding, non-tidally influenced wetland habitat, to the north by a mosquito drainage ditch and, to the east by the West River, and to the south by the railroad corridor. Like all other portions of this survey area, the soils are primarily made up of fill and earth moved in the original construction and historic maintenance of the railroad corridor, however there are also substantial amounts of tidally deposited sediments, as well as mussel beds (Appendix A: Photo 62). These unvegetated areas are potentially suitable habitat for Parker's Pipewort; however, none was found. The area is vegetated by sea lavender (*Limonium carolinianum*), smooth cordgrass, seaside goldenrod, high tide bush, Mexican-tea (*Dysphania ambrosioides*), and common reed which is stunted at the Structure. (Appendix A: Photos 9, 63). The historic mosquito drainage ditch, which now drains the common reed monoculture, (Appendix A: Photo 64) forms the northern boundary of this portion of the survey area is itself bordered to the north by an unvegetated mudflat (Appendix A: Photo 65). This mudflat is the most suitable Parker's pipewort habitat found during this survey. It is well outside of the work area and could not be surveyed on foot due to the fragility of the habitat. It was surveyed visually, and no Parker's pipewort was found (Appendix A: Photo 66). Further north, beyond this mudflat, there is a larger area of native saltmarsh vegetation (Appendix A: Photo 67).

The northern portion of the West River Survey Area is comprised of a small area of mostly rocky shoreline bound to the southeast by the railroad corridor, to the west and north by the West River, and to the east by developed upland areas. The rocks which comprise much of the shoreline in this area are primarily fill from construction and historic maintenance of the railroad corridor (Appendix A: Photo 68, 69). The area is vegetated primarily by smooth cordgrass, with lesser amounts of spearscale orache and sea lavender, with Asiatic bittersweet and Tree-of-Heaven growing in adjacent traprock (Appendix A: Photo 70, 71). On the far eastern edge of portion of this survey area there

is an unvegetated mudflat comprised of tidally derived sediment which is potential habitat for Parker's pipewort; no plants were found (Appendix A: Photo 72).

The southern portion of the West River Survey Area is the smallest of the four areas, comprising a small area of native vegetation near Structure WH-TW3. It is comprised of introduced fill rock and tidally derived sediments which contain both mussel and oyster beds (Appendix A: Photo 14, 73, 74). It is vegetated by smooth cordgrass and common reed (Appendix A: Photo 10, 19). Southwest of this point the saltmarsh like vegetation is comprised almost entirely of common reed, with some native and introduced weedy species on the upland edge (Appendix A: Photo 75). At Catenary 1047 these additional species are comprised of mugwort, climbing false buckwheat (*Fallopia scandens*), Chinese foxtail (*Setaria faber*), pilewort (*Erechtites hieraciifolius*), and tall goldenrod (*Solidago altissima*) (Appendix A: Photo 76).

## Appendices

A: Site Photographs

B: Survey Route Map

C: Species List

D: Summary of qualifications



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## APPENDIX A – Site Photographs

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Photo 1: Northeast portion of Indian River survey area, bound to the south by the MNR tracks and to the west by the Indian River. Photo taken looking south from the northernmost point of survey area. 9/16/2021.



Photo 2: Eastern side of Indian River saltmarsh as it extends to the north. Photo taken looking north at deep mosquito ditch that bounds the survey area to the north. Note steepness of banks. 9/16/2021.



Photo 3: Eastern side of Indian River saltmarsh as it extends to the north. Indentation in bank is the confluence of the main tributary, which is the northern limit of the survey area. Photo taken looking north. 9/16/2021.



Photo 4: Northwestern portion of Indian River survey area, bound to the south by the MNR tracks. Photo taken looking south. Note areas of open mud. 9/16/2021.



Photo 5: Western portion of Indian River saltmarsh, extending far north of survey area. Indian river visible as dark bank on righthand side. Photo taken looking north. 9/16/2021.



Photo 6: Southeastern portion of Indian River survey area. Photo taken looking northeast. 9/16/2021.



Photo 7: Southwestern portion of Indian River survey area. Photo taken looking north. 9/16/2021.



Photo 8: Northern portion of West River survey area. Photo taken looking northeast. 9/28/2021.



Photo 9: Western portion of West River survey area. Photo taken looking northwest. 9/28/2021.



Photo 10: Southern portion of West River survey area. Photo taken looking west. 9/28/2021.



Photo 11: Eastern portion of West River survey area. Photo taken looking north. 9/16/2021



Photo 12: West River saltmarsh, north beyond the scope of the survey on the western side of the West River. Larger mudflat is northern limit of western portion of survey area. Photo taken looking northwest. 9/28/2021.



Photo 13: Eastern portion of West River survey area. Note saltmarsh to the south in the background. Photo taken looking southeast. 9/28/2021.



Photo 14: Photo taken from southern portion of the West River survey area, looking northeast to the eastern portion. Note rip-rap and other anthropogenic fill from historic and continuing land use. 9/28/2021.



Photo 15: Urban derived Udorthent soil in southwestern portion of Indian River survey area. Note large pieces of asphalt. Photo taken looking south. 9/16/2021.



Photo 16: Tidally derived soils in southeastern portion of Indian River survey area. Photo taken looking south. 9/16/2021.



Photo 17: Common reed between upland edge of MNR track and saltmarsh, in northwestern portion of Indian River survey area. Photo taken looking south. 9/16/2021.



Photo 18: Common reed between upland edge of MNR track and saltmarsh, in northeastern portion of Indian River survey area. Photo taken looking south. 9/16/2021.



Photo 19: Common reed between upland edge of MNR track and thin band of native saltmarsh vegetation. Southern portion of West River survey area. Photo taken looking southwest. 9/16/2021.



Photo 20: Hybrid tuber bulrush (*Bolboschoenus maritimus* x *robustus*) in northeastern portion of survey area, on edge of common reed. 9/16/2021.



Photo 21: Hybrid tuber bulrush (*Bolboschoenus maritimus x robustus*) in northwestern portion of survey area, on edge of common reed. 9/16/2021.



Photo 22: Hybrid tuber-bulrush. Note fewer than half of inflorescence spikes on branchlets. 9/16/2021.



Photo 23: Compressed-trigonous, dark brown achenes of hybrid tuber-bulrush. 9/16/2021.



Photo 24: Achenes and floral scales of hybrid tuber-bulrush. Note that lines on page can only be seen through some scales and perianth bristles lacking on most achenes. 9/16/2021.



Photo 25: Apex of leaf sheath opposite leaf blade, lacking the hyaline obtriangular area characteristic of sea-coast tuber-bulrush and the abruptly diverging veins of saltmarsh tuber-bulrush. 9/16/2021.



Photo 26: Phragmites in work area at eastern end of survey area. Photo taken looking west. 9/16/2021.



Photo 27: Northeastern portion of survey area at widest point of common reed. Photo taken looking west. 9/16/2021.



Photo 28: Band of common reed between MNR track and saltmarsh. Note stunted height of common reed and treed upland area with proposed boring area in background. Photo taken looking west. 9/16/2021.



Photo 29: Common reed edge just west of upland area with proposed boring site. Common reed ends at large tree. Photo taken looking west. 9/16/2021.



Photo 30: Area in northeastern portion of survey area where native species are within proposed work area otherwise vegetated by common reed. Photo taken looking south. 9/16/2021.



Photo 31: Edge of common reed in northwestern portion of survey area, bordering MNR track and wooded area. Photo taken looking west. 9/16/2021.



Photo 32: Common reed at northeastern edge of survey area, note continuous area of common reed to the north. Photo taken looking north. 9/16/2021.



Photo 33: Muddy portion of eastern bank of Indian River, photo taken looking north. 9/16/2021.



Photo 34: Muddy portion of eastern bank of Indian River, photo taken looking south. 9/16/2021.



Photo 35: Muddy portion of eastern bank of Indian River, photo taken looking south. 9/16/2021.



Photo 36: Steep banks of Indian River, typical of most portions of the bank in this area. Photo taken looking north. 9/16/2021.



Photo 37: Largest portion of mudflat-like habitat in northeastern portion of survey area. Note trash, dead fish, and metal grates. Vegetation trampled. Photo taken looking south. 9/16/2021.



Photo 38: Largest portion of mudflat-like habitat in northeastern portion of survey area. Note trash, dead fish, and metal grates. Vegetation trampled. Photo taken looking north. 9/16/2021.



Photo 39: Largest portion of mudflat-like habitat in northeastern portion of survey area. Note trash, dead fish, and metal grates. Vegetation trampled. 9/16/2021.



Photo 40: Natural tributary of Indian River on northeastern side, no muddy banks. Photo taken looking east. 9/16/2021.



Photo 41: Shallow mosquito ditch with muddy bottom. Photo taken looking east. 9/16/2021.



Photo 42: Area of mudflat like habitat in northwestern portion of survey area. Photo taken looking north. 9/16/2021.



Photo 43: Southeastern portion of survey area. Primarily vegetated by native saltmarsh species found north of MNR tracks, but with urban influence. Photo taken looking north. 9/16/2021.



Photo 44: Southwestern portion of survey area. Small area of saltmarsh-like habitat vegetated primarily by smooth cordgrass, with much high tide bush on edge with upland areas. Photo taken looking north. 9/16/2021.



Photo 45: Asphalt dominated shoreline, with some muddy bank areas. Note riprap shore in background. Photo taken looking south. 9/16/2021.



Photo 46: Deeper tide pool in southeastern portion of survey area. Photo taken looking northwest. 9/16/2021.



Photo 47: Shallower tidepool in southeastern portion of survey area. Photo taken looking east. 9/16/2021.



Photo 48: Mosquito ditch with muddy bottom at northern edge of southeastern portion of survey area. Photo taken looking west. 9/16/2021.



Photo 49: Muddy bottom mosquito ditch at northern edge of southeastern portion of survey area. Photo taken looking north. 9/16/2021.



Photo 50: Muddy banks of Indian River in southeastern portion of survey area. Photo taken looking south. 9/16/2021.



Photo 51: Staging area just west of Old Gate Road. Photo taken looking south. 9/16/2021.



Photo 52: Possible access area of Old Gate Road, vegetated by common reed and woody species. Photo taken looking south. 9/16/2021.



Photo 53: Upland area in northeastern portion of survey area. Canopy primarily white oak, shrub layer primarily greenbrier. Photo taken looking west. 9/16/2021.



Photo 54: Upland area in northeastern portion of survey area. Note low area vegetated by common reed. Photo taken looking south. 9/16/2021.



Photo 55: Access to northwestern portion of survey area from Wampus Road. Photo taken looking east. 9/16/2021.

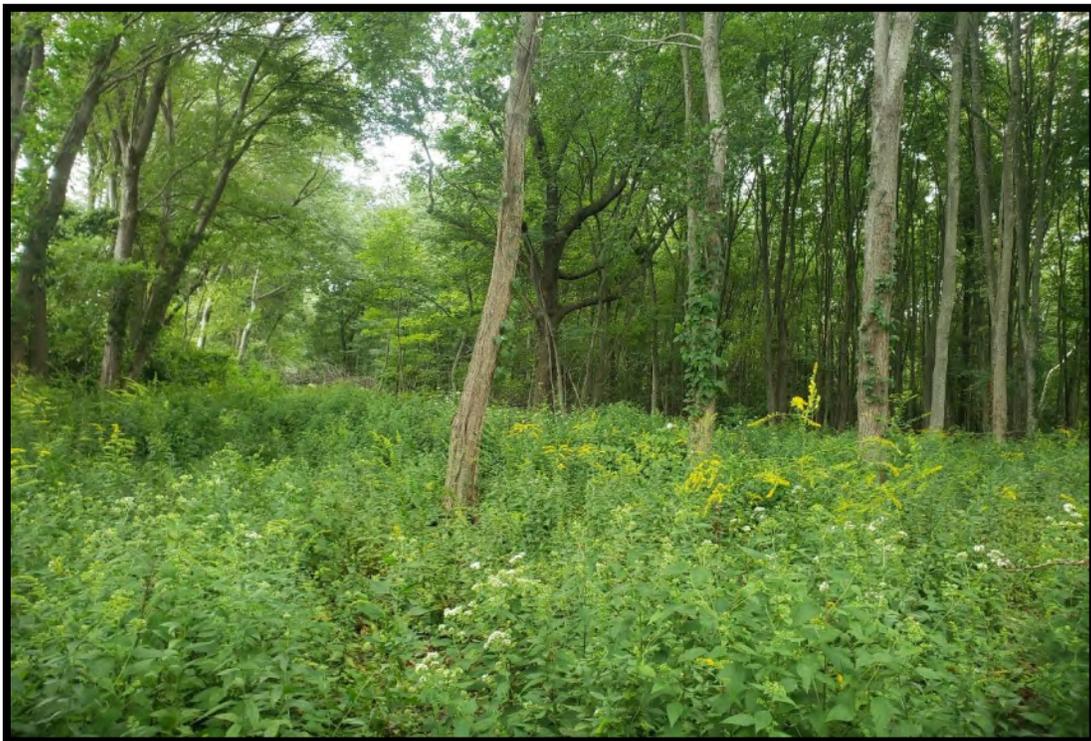


Photo 56: Access from Wampus road. Photo taken looking east. 9/16/2021.



Photo 57: Two large cherries at bank of Indian River in northwestern portion of survey area. Photo taken looking east. 9/16/2021.



Photo 58: Upland area in southwestern portion of survey area. Photo taken looking south. 9/16/2021.



Photo 59: Narrow, rocky shoreline of eastern portion of West River survey area. Note large amount of wrack and garbage. Photo taken looking southeast. 9/28/2021.



Photo 60: Access from Mix Avenue. Vegetated almost entirely by introduced species. Photo taken looking southwest. 9/28/2021.



Photo 61: Access from Mix Avenue. Dense common reed monoculture beyond this point to survey area.  
9/28/2021.



Photo 62: Tidally deposited sediment with mussel beds near Structure WH-TW1 . Potentially suitable Parker's  
pipework habitat. 9/28/2021.



Photo 63: Smooth cordgrass and stunted common reed near Structure WH-TW1 in western portion of West River Survey Area. Photo taken looking northwest. 9/28/2021.



Photo 64: Historic mosquito ditch now draining common reed monoculture into West River. Photo taken looking south. 9/28/2021.



Photo 65: Historic mosquito ditch draining common reed into West River. Note mudflat in center of photo.  
Photo taken looking looking north. 9/28/2021.



Photo 66: Unvegetated mudflat just northwest of survey area. Photo taken looking north. 9/28/2021.



Photo 67: Native saltmarsh vegetation extending north beyond scope of survey, along the western bank of the West River. Photo taken looking northwest. 9/28/2021.



Photo 68: Rocky shoreline of eastern portion of West River Survey area. primarily fill. 9/28/2021.



Photo 69: Rocky shoreline of eastern portion of West River Survey Area. Photo taken looking southwest.  
9/28/2021.



Photo 70: Rocky shoreline with vegetation, primarily smooth cordgrass. Photo taken looking northeast.  
9/28/2021.



Photo 71: Rocky shoreline with vegetation, primarily smooth cordgrass. Photo taken looking southwest. 9/28/2021.



Photo 72: Rocky unvegetated mudflat, potentially suitable Parker's pipewort habitat. Photo taken looking northeast. 9/28/2021.



Photo 73: Rip-rap slope of MNR corridor, with a thin bank of native vegetation, comprised of smooth cordgrass. Photo taken looking northwest. 9/28/2021.



Photo 74: Mussels and oysters among rocks in southern portion of West River Survey Area. 9/28/2021.



Photo 75: Extensive common reed monoculture bordering upland MNR corridor. Photo taken looking southwest. 9/28/2021.



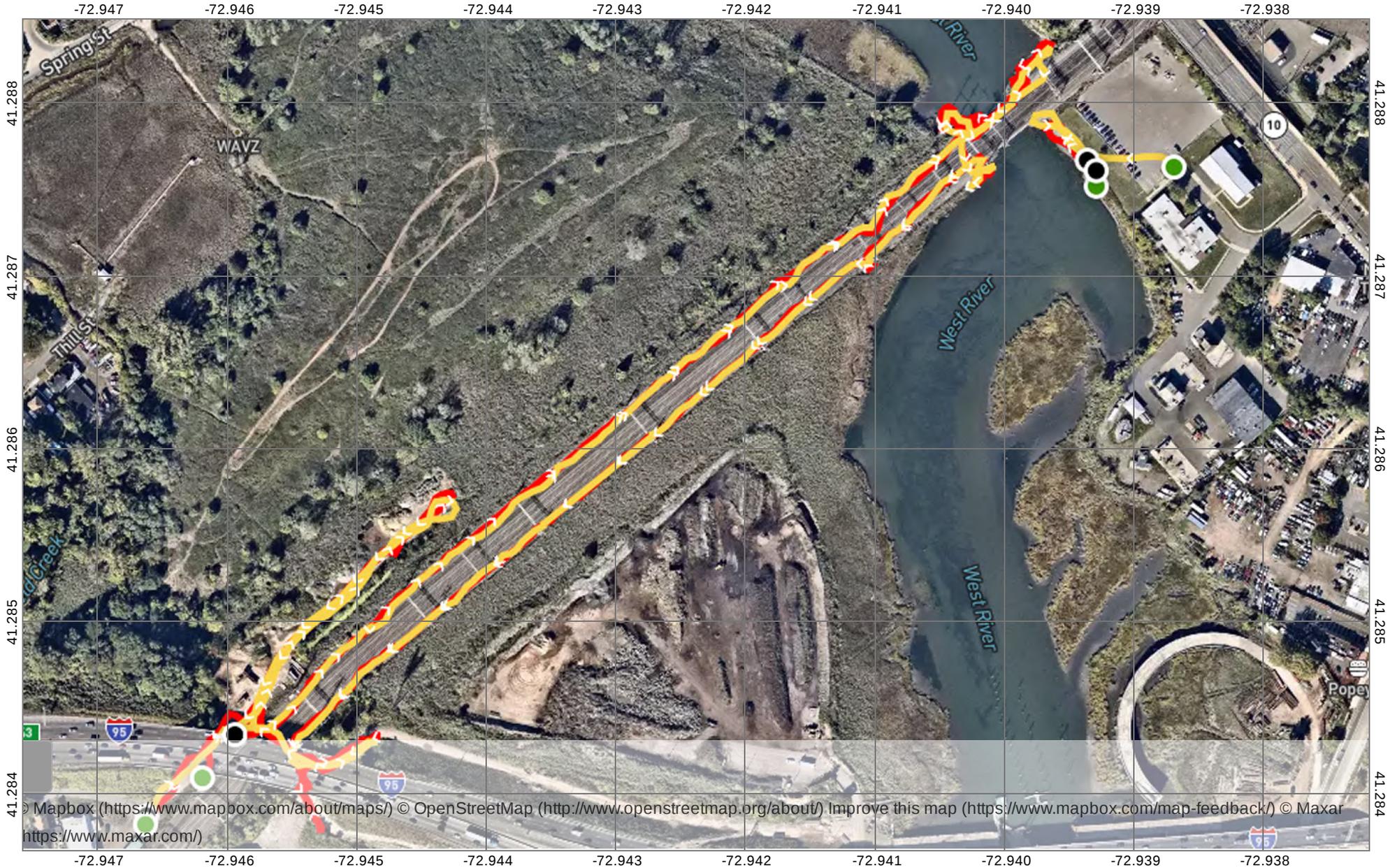
Photo 76: Upland vegetation at base of Catenary 1047. Photo taken looking southwest. 9/28/2021.



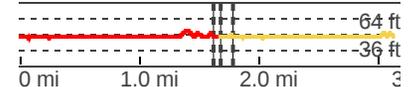
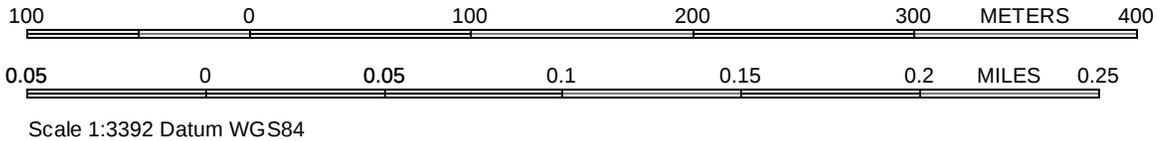
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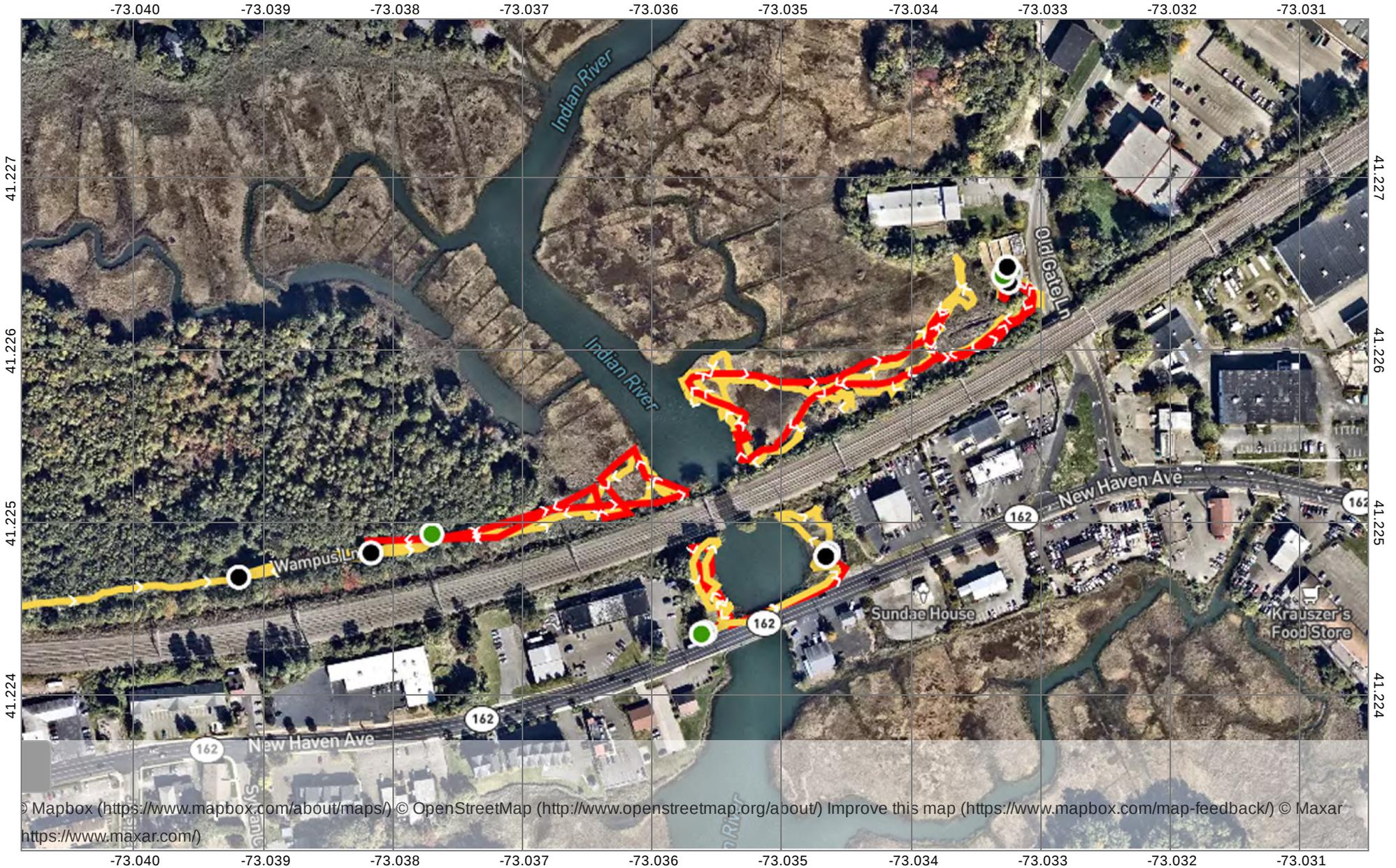
## APPENDIX B – Survey Routes

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MN  
13.5°W  
10/7/21

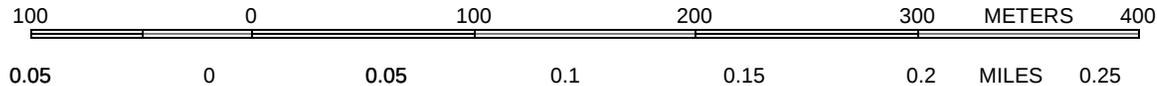




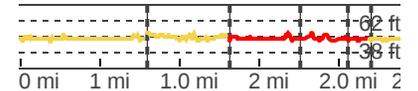
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MN  
13.4°W  
9/21/21



Scale 1:3395 Datum WGS84





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## APPENDIX C – Species List

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SCIENTIFIC NAME	STRATUM	COMMON NAME	IND	STATUS	Staging area off Old Gate	Wooded area off Old Gate and along tracks	Upland area with proposed boring location	Woods off Wampus Road	Upland area off 162	Access from Mix Avenue
<i>Acer platanoides</i>	Trees	Norway Maple	UPL	invasive					x	
<i>Acer rubrum</i>	Trees	Red Maple	FAC	native			x			
<i>Achillea millefolium</i>	Herbs	Yarrow	FACU	native					x	
<i>Ageratina altissima</i>	Herbs	White Snakeroot	FACU-	native		x	x		x	
<i>Ailanthus altissima</i>	Trees	Tree-of-Heaven	NC	invasive	x					x
<i>Alliaria petiolata</i>	Herbs	Garlic Mustard	FACU-	invasive					x	
<i>Amelanchier canadensis</i>	Shrubs	Oblong-leaf Serviceberry	FAC	native			x			
<i>Arctium minus</i>	Herbs	Common Burdock	FACU	introduced			x			
<i>Artemisia vulgaris</i>	Herbs	Common Mugwort	UPL	invasive	x					x
<i>Betula populifolia</i>	Trees	Gray Birch	FAC	native		x				
<i>Bidens frondosa</i>	Herbs	Devil's Beggar-ticks	FACW	native						x
<i>Catalpa</i> sp.	Trees	Catalpa	FAC(U)	introduced						x
<i>Celastrus orbiculatus</i>	Vines	Asiatic Bittersweet	UPL	invasive	x		x		x	x
<i>Centaurea stoebe</i>	Herbs	Spotted Knapweed	NC	invasive					x	x
<i>Commelina communis</i>	Herbs	Asiatic Dayflower	FAC-	invasive			x			
<i>Cyperus esculentus</i>	Herbs	Yellow nutsedge	FACW	invasive					x	
<i>Dactylis glomerata</i>	Herbs	Orchard Grass	FACU	introduced	x					
<i>Daucus carota</i>	Herbs	Queen Annes's Lace	NC	introduced					x	x
<i>Digitaria sanguinalis</i>	Herbs	Hairy Crabgrass	FACU	introduced	x					
<i>Echinochloa crusgalli</i>	Herbs	Barnyard Grass	FACU	introduced						x
<i>Elaeagnus umbellata</i>	Shrubs	Autumn Olive	NC	invasive	x	x			x	
<i>Eragrostis spectabilis</i>	Herbs	Purple Love Grass	UPL	native	x					
<i>Erechtites hieracifolia</i>	Herbs	Fireweed	FACU	native			x			
<i>Erigeron annuus</i>	Herbs	White-top Fleabane	FACU	native	x					
<i>Erigeron canadensis</i>	Herbs	Horseweed	FACU	native	x					
<i>Euonymus alatus</i>	Shrubs	Winged Burning Bush	NC	invasive		x				
<i>Euphorbia maculata</i>	Herbs	Spotted sandmat	FACU	native	x					
<i>Fallopia japonica</i>	Herbs	Japanese Knotweed	FACU	invasive			x		x	x
<i>Fallopia scandens</i>	Herbs	Climbing buckwheat	FAC	native					x	
<i>Froelichia gracilis</i>	Herbs	slender cotton-weed	NC	introduced					x	
<i>Juncus tenuis</i>	Herbs	Path Rush	FAC-	native			x			
<i>Juniperus virginiana</i>	Trees	Eastern Red Cedar	FACU	native						x
<i>Leersia virginica</i>	Herbs	White Grass	FACW	native			x			
<i>Lonicera japonica</i>	Vines	Japanese Honeysuckle	FAC-	invasive	x				x	
<i>Lotus corniculatus</i>	Herbs	Birdsfoot Trefoil	FACU-	introduced					x	
<i>Lycopus virginicus</i>	Herbs	Virginia Bugleweed	OBL	native			x			
<i>Lysimachia quadrifolia</i>	Herbs	Whorled Loosestrife	FACU	native						x
<i>Lythrum salicaria</i>	Herbs	Purple Loosestrife	FACW+	invasive	x					
<i>Malus pumila</i>	Trees	Apple	NC	introduced					x	
<i>Melilotus alba</i>	Herbs	White Sweet Clover	FACU-	introduced	x					
<i>Microstegium vimineum</i>	Herbs	Japanese Stiltgrass	FAC	invasive			x			
<i>Morus alba</i>	Trees	White Mulberry	FACU	introduced		x				
<i>Oenothera biennis</i>	Herbs	Common Evening-primrose	FACU-	native	x				x	
<i>Onoclea sensibilis</i>	Herbs	Sensitive Fern	FACW	native			x			
<i>Panicum capillare</i>	Herbs	Witch-grass	FAC-	native	x					
<i>Parthenocissus quinquefolia</i>	Vines	Virginia Creeper	FACU	native		x	x		x	
<i>Persicaria hydropiper</i>	Herbs	Mild Water-pepper	OBL	introduced			x			

SCIENTIFIC NAME	STRATUM	COMMON NAME	IND	STATUS	Staging area off Old Gate	Wooded area off Old Gate and along tracks	Upland area with proposed boring location	Woods off Wampus Road	Upland area off 162	Access from Mix Avenue
<i>Persicaria longiseta</i>	Herbs	Cespitose Smartweed	FACU-	invasive				x		
<i>Phragmites australis</i> var. <i>australis</i>	Herbs	Common Reed	FACW	invasive		x	x			
<i>Phytolacca americana</i>	Herbs	Pokeweed	FACU+	native		x			x	
<i>Plantago lanceolata</i>	Herbs	English Plantain	FACU	introduced	x					
<i>Populus tremuloides</i>	Trees	Quaking Aspen	FACU	native	x	x				
<i>Prunus serotina</i>	Trees	Black Cherry	FACU	native		x	x		x	x
<i>Pteridium aquilinum</i>	Herbs	Bracken Fern	FACU	native			x			
<i>Quercus alba</i>	Trees	White Oak	FACU-	native			x		x	
<i>Quercus palustris</i>	Trees	Pin Oak	FACW	native		x				
<i>Quercus rubra</i>	Trees	Red Oak	FACU-	native					x	
<i>Rhus hirta</i>	Shrubs	Staghorn Sumac	NC	native					x	
<i>Rosa multiflora</i>	Shrubs	Multiflora Rose	FACU	invasive		x				x
<i>Rubus hispidus</i>	Shrubs	Bristly Dewberry	FACW	native				x		
<i>Rubus occidentalis</i>	Shrubs	Black Raspberry	NC	native					x	
<i>Rubus phoenicolasius</i>	Shrubs	Wineberry	FACU	invasive				x		
<i>Salix discolor</i>	Shrubs	Pussy Willow	FACW	native	x	x				
<i>Sambucus canadensis</i>	Shrubs	Common Elderberry	FACW-	native		x				
<i>Sassafras albidum</i>	Trees	Sassafras	FACU-	native				x		
<i>Setaria viridis</i>	Herbs	Green Foxtail	NC	introduced	x				x	x
<i>Smilax rotundifolia</i>	Vines	Common Greenbrier	FAC	native		x				
<i>Smilax rotundifolia</i>	Vines	Common Greenbrier	FAC	native			x			
<i>Solanum dulcamara</i>	Herbs	European Bittersweet	FAC-	introduced		x			x	
<i>Solidago altissima</i>	Herbs	Tall Goldenrod	FACU-	native	x	x				x
<i>Solidago rugosa</i>	Herbs	Rough-stemmed Goldenrod	FAC	native			x			
<i>Solidago sempervirens</i>	Herbs	Seaside Goldenrod	FACW	native			x		x	x
<i>Strophostyles helvola</i>	Herbs	Trailing Wild Bean	FAC	native		x				
<i>Symphotrichum</i> sp.	Herbs	Fall American Aster	NA	native						x
<i>Thalictrum pubescens</i>	Herbs	Tall Meadow-Rue	FACW+	native				x		
<i>Toxicodendron radicans</i>	Vines	Poison Ivy	FAC	native		x	x		x	x
<i>Trifolium repens</i>	Herbs	White Clover	FACU-	introduced	x					
<i>Vaccinium corymbosum</i>	Shrubs	Highbush Blueberry	FACW-	native				x		
<i>Vaccinium pallidum</i>	Shrubs	Blue Ridge Blueberry	NC	native			x			
<i>Vitis labrusca</i>	Vines	Fox Grape	FACU	native		x				



## APPENDIX D – Summary of Qualifications

**Davison Environmental, LLC** provides consulting services in the areas of biological, wetland, and soil sciences. In addition to identification, description, and classification of natural resources, the firm also provides functional evaluation of wetlands and other biological systems, guidelines for mitigation of potential adverse impacts, and permit support through expert testimony and public representation. Services provided revolve around the impact of human activities on terrestrial, wetland, aquatic, and marine resources. The firm specializes in biological and wetland surveys, impact assessment, and mitigation planning.

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#### James Cowen

James Cowen has over 20 years of experience conducting botanical surveys in Connecticut. He is a Registered Soil Scientist, Certified Professional Wetland Scientist, and has previously served on the Board of Directors for the Connecticut Botanical Society. Mr. Cowen maintains a Connecticut Department of Energy and Environmental Protection Scientific Collector's Permit for the collection of plants. He holds a bachelor's degree in Biology and master's degree in Landscape Design.

#### Eric Davison

Eric Davison holds a bachelor's Degree in wildlife conservation from the University of Massachusetts. He is certified as both a Professional Wetland Scientist and Soil Scientist. Mr. Davison has experience conducting avian, amphibian and reptile surveys, evaluating and inventorying wetlands and conducting soil surveys in Connecticut. He has also experience conducted both Phase 1 and Phase 2 bog turtle assessments in Connecticut.

#### Aubree Keurajian

Aubree Keurajian has a bachelor's degree in the Science of Natural and Environmental Systems from Cornell University. She has worked as a Forest Ecology Field Technician at Duke and Indiana Universities, as well as a Seed Collection and Arid Land Restoration Technician at the Southern Nevada District Office of the Bureau of Land Management. Ms. Keurajian's experience includes botanical and faunal surveys and forest censuses, as well as insect identification and databasing from her time as a Collections Assistant at the Cornell University Insect Collection.