



**C189-M108-H137-G146
Structure Replacement Project
Wildlife Protection Plan**

NHB22-3395, NHB22-3396, NHB-3399

Bow, Concord, and Pembroke, New
Hampshire

April 28, 2023

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April 28, 2023

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1.0 INTRODUCTION

The Public Service Company of New Hampshire d/b/a Eversource Energy (Eversource) owns and maintains the C189, M108, H137, and G146 electrical transmission lines (Project) in Concord, Pembroke, and Bow, New Hampshire. These four lines share portions of an existing right-of-way (ROW) between the Farmwood Substation off Farmwood Road in Concord and the Merrimack Substation off River Road in Bow with the P145 transmission line. The C189 line extends approximately 4.4 miles from the Farmwood Substation to the Curtisville Substation north of Portsmouth Street in Concord. The M108 line extends approximately 5.5 miles from the Curtisville Substation to the Garvins Substation on Garvins Falls Road in Bow. The H137 line extends approximately 2.8 miles from the Garvins Substation to the Merrimack Substation in Bow. The G146 line extends approximately 1.8 miles north from the Garvins Substation in the P145 and M108 ROW but diverges from this ROW north of Portsmouth Street in Pembroke and heads east in a separate ROW to the Deerfield Substation off Cate Road in Deerfield. The P145 Transmission Line Rebuild Project along with select structures on the C189, M108, and H137 lines (hereafter, P145 project) was recently permitted and is currently under construction. Eversource has identified that all remaining wooden structures on the C189, M108, and H137 lines as well as the co-located portion of the G146 line need to be replaced within the shared ROW due to age, cracking, leaning, and/or woodpecker damage. The existing wooden structures will be replaced with new, steel structures to provide more reliable electrical infrastructure. This Wildlife Protection Plan addresses measures proposed to protect state- and federally listed species of wildlife during construction activities that will occur within the ROW containing the C189, M108, and H137 lines and the co-located section of the G146 line.

New Hampshire Natural Heritage Bureau (NHB) DataCheck result letters have been received for the Project (NHB22-3395, NHB22-3396, and NHB22-3399) and indicate that several state- and federally listed wildlife species may be present within and proximal to the Project area. Eversource and Stantec Consulting Services Inc. (Stantec) have been working closely with the New Hampshire Fish and Game Department (NHFG) to identify protection measures for the species of concern in association with the P145 project. The wildlife protection plan for the P145 project¹ addressed the same suite of endangered, threatened, and special concern species as the Project, and similar protection measures and best management practices (BMP) are proposed for the proposed structure replacement work on the adjacent C189, M108, H137, and G146 lines. Thus, this document summarizes the proposed protection measures relative to state- and federally listed species and refers specifically to previous consultation with NHFG related to the P145 project that occurred in 2022.

¹ Stantec. 2022. P145 structure replacement project wildlife protection plan. Prepared for Public Service Company of New Hampshire. Stantec Consulting Services Inc., Topsham, Maine. 20 July.



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2.0 EXISTING CONDITIONS

The C189, M108, and H137 lines, along with approximately 1.8 miles of the G146 line, are co-located with the P145 transmission line and other distribution lines in this larger corridor. This ROW is approximately 250 feet to 300 feet wide in most areas. The ROW is primarily shrub-dominated, consisting of early successional shrub, graminoid, and forb vegetation in upland areas and typically scrub-shrub and emergent vegetation in wetlands. Broadly, the ROW traverses a variety of habitat types including hemlock-hardwood-pine, Appalachian oak-pine, and pine barren forested landscapes as well as developed urban and suburban areas.

Appendix C contains a summary of the existing conditions of the natural communities, including representative photographs of the ROW. The ROW crosses several wetlands and waterbodies including scrub-shrub and emergent wetlands associated with Turtle Pond, Mill Brook, Soucook River, Merrimack River, and Bow Bog Brook and the associated floodplain wetlands. In most upland areas, the ROW is traversed by existing unpaved roads and trails that are used periodically for access and maintenance to the existing infrastructure. Vegetation in the ROW is maintained on an approximately 4–5-year cycle to remove capable tree species from interfering with the overhead conductor (powerlines). Vegetation maintenance (i.e., mowing) of the ROW began in 2022 under the approved P145 project and BMPs and is anticipated to be completed by March 2023. Unauthorized activities, including off-road vehicle use (e.g., ATVs) and illicit dumping of waste and debris, occur in portions of the ROW.

3.0 PROPOSED CONDITIONS

Work is anticipated to begin in Spring 2023 and continue until approximately Fall 2024. The Project includes replacing 141 structures and removing 1 structure in the Project area. In most instances, the new structures will be placed within approximately 15 feet of the existing wood structure being subsequently removed. There are limited areas where the new structure will be placed at a greater distance than the existing structure, and there are three instances where the new structure will be placed 70–120 feet away from the existing structure due to the removal of an existing structure or another constraint. To accommodate construction, the structure replacement work includes the following and will utilize the previously permitted P145 project access routes and work areas to the extent practicable:

- Improvement of access roads: Existing access roads and trails will be utilized to complete the structure replacement work. Access roads through upland areas will require improvements in most areas to create a durable travel surface and maintain widths sufficient for the anticipated construction equipment. The permanent improvements include widening to a width of approximately 12–15 feet, minor grading and leveling, and additions of gravel and cobble aggregate.
- Creation of new access roads: New access roads will be created where existing access roads and trails do not exist or where improvements are not feasible. New access roads in upland areas



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will consist of a permanent, unpaved gravel road, approximately 12–15 feet wide, consistent with the existing access roads that will be improved.

- Creation of temporary access roads: In wetlands and other sensitive resource areas, temporary access roads will be constructed using temporary construction mats (i.e., timber mats). The temporary access roads will be left in place for only as long as necessary to complete the associated work. Wetland matting will not be left in place for more than one growing season.
- Creation of permanent work pads: Replacement of most structures in upland areas will consist of the creation of a permanent gravel work pad around the base of the structure. The work pad is required to create a stable and level surface for construction equipment to work from. The work pads will be approximately 100-feet by 100-feet (10,000 square feet) during the structure replacement work. After completion for the structure replacement, the outer portions of the work pad area will be restored through replacement of stockpiled topsoil and seeding and an approximately 60-foot by 30-foot permanent work pad will remain at the base of the structure.
- Creation of temporary work pads: Timber matting will be used to create temporary work pads, measuring approximately 100-feet by 100-feet, to facilitate the replacement of structures in wetlands and sensitive resource areas. Temporary work pads will be in place for only as long as needed to complete the associated work.

Sediment and erosion control measures will follow the New Hampshire Department of Environmental Services (NHDES) Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire (March 2019; Utility BMP Manual).

4.0 WILDLIFE PROTECTION MEASURES

Based on the NHB DataCheck results letters, 17 state- and federally listed wildlife species have been documented within and proximal to the ROW. In addition to the species identified in the NHB DataCheck letters, NHFG indicated that Edward's hairstreak (*Satyrium edwardsii*), a species listed as Special Concern in New Hampshire, has also been documented from within the ROW. These are summarized in Table 1. This section presents the proposed protection measures that have been developed through coordination with NHFG and which will be implemented during construction of the Project, including maintenance of vegetation, in areas that contain or are likely to contain state- and federally listed species. Appendix A includes a matrix of applicable BMPs per structure.



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Table 1. Summary of NHB DataCheck Results

Group	Species	Rarity Status	Town			Associated Habitat
			Bow (NHB22-3399)	Concord (NHB22-3396)	Pembroke (NHB22-3395)	
Amphibian	Fowler's toad (<i>Anaxyrus fowleri</i>)	Threatened (State)	X	X	X	Sandy areas such as river valleys, floodplains, lakeshores, and agricultural areas; also in pine forests, fields, and lawns.
Amphibian	Northern leopard frog (<i>Lithobates pipiens</i>)	Special Concern (State)	X	X	X	Found in slow streams, marshes, bogs, or ponds. During summer most often found in wet meadows or fields associated with river floodplains.
Bird	Common nighthawk (<i>Chordeiles minor</i>)	Endangered (State)		X	X	Use pine barrens, openings in Appalachian oak-pine forests, rocky ridges, and urban habitats.
Bird	Peregrine falcon (<i>Falco peregrinus anatum</i>)	Threatened (State)	X			Variety of habitats, most with cliffs for nesting and open areas for foraging. Also found in large cities where it nests on buildings.
Invertebrate	Barrens itame (<i>Speranza exonerata</i>)	Special Concern (State)		X	X	Occupies pine barrens, woodlands dominated by pitch pine (<i>Pinus rigida</i>) and scrub oak (<i>Quercus ilicifolia</i>); also occur in oak-pine woodlands composed of a dense scrub oak understory and greater canopy closure. Larval host plants include typical pine barrens plant species such as scrub oak, various heath species (Family: Ericaceae) and less common plants such as New Jersey tea (<i>Ceanothus americanus</i>).
Invertebrate	Barrens xylotype (<i>Xylotype capax</i>)	Special Concern (State)		X	X	Occupies pine barrens, woodlands dominated by pitch pine and scrub oak; also occur in oak-pine woodlands composed of a dense scrub oak understory and greater canopy closure. Larval host plants include typical pine barrens plant species such as scrub oak, various heath species and less common plants such as New Jersey tea.



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Group	Species	Rarity Status	Town			Associated Habitat
			Bow (NHB22-3399)	Concord (NHB22-3396)	Pembroke (NHB22-3395)	
Invertebrate	Edwards's hairstreak (<i>Satyrium edwardsii</i>)	Special Concern (State)		X*		Occupies pine barrens, woodlands dominated by pitch pine and scrub oak; also occur in oak-pine woodlands composed of a dense scrub oak understory and greater canopy closure. Larval host plants include typical pine barrens plant species such as scrub oak, various heath species and less common plants such as New Jersey tea.
Invertebrate	Karner blue butterfly (<i>Plebejus melissa samuelis</i>)	Endangered (State); Endangered (Federal)		X	X	Dependent on pine barrens with wild lupine (<i>Lupinus perennis</i>).
Invertebrate	Phyllira tiger moth (<i>Grammia phyllira</i>)	Special Concern (State)		X	X	Occupies pine barrens, woodlands dominated by pitch pine and scrub oak; also occur in oak-pine woodlands composed of a dense scrub oak understory and greater canopy closure. Larval host plants include typical pine barrens plant species such as scrub oak, various heath species and less common plants such as New Jersey tea.
Invertebrate	Pine barrens zanclognatha moth (<i>Zanclognatha martha</i>)	Special Concern (State)		X	X	Occupies pine barrens, woodlands dominated by pitch pine and scrub oak; also occur in oak-pine woodlands composed of a dense scrub oak understory and greater canopy closure. Larval host plants include typical pine barrens plant species such as scrub oak, various heath species and less common plants such as New Jersey tea.
Invertebrate	Rapids clubtail (<i>Gomphus quadricolor</i>)	Special Concern (State)	X	X	X	Moderate to large rivers with muddy to silty bottoms, sometimes but not always with interspersed riffles. Adults rest and forage in adjacent forested habitats.
Invertebrate	Sleepy duskywing (<i>Erynnis brizo brizo</i>)	Special Concern (State)		X	X	Occupies pine barrens, woodlands dominated by pitch pine and scrub oak; also occur in oak-pine woodlands composed of a dense scrub oak understory and greater canopy closure. Larval host plants include typical pine barrens plant species such as scrub oak, various heath species and less common plants such as New Jersey tea.



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Group	Species	Rarity Status	Town			Associated Habitat
			Bow (NHB22-3399)	Concord (NHB22-3396)	Pembroke (NHB22-3395)	
Reptile	Blanding's turtle (<i>Emydoidea blandingii</i>)	Endangered (State)	X	X	X	Wetland habitats with permanent shallow water and emergent vegetation such as marshes, swamps, bogs, and ponds. Use vernal pools extensively in spring and while traveling through the landscape. May use slow rivers and streams as mechanisms for dispersal between wetlands. Extensive use of terrestrial habitats for nesting and travel among wetlands.
Reptile	Eastern hognose snake (<i>Heterodon platirhinos</i>)	Endangered (State)	X	X	X	Requires sandy, gravelly soils such as open fields, river valleys, pine forests, and upland hillsides. Feeds predominately on toads; therefore, needs breeding habitat (e.g., wetlands, vernal pools) for amphibians.
Reptile	Northern black racer (<i>Coluber constrictor constrictor</i>)	Threatened (State)	X	X	X	Found in a variety of habitats including dry brushy pastures, powerline corridors, rocky ledges, and woodlands. Have large home ranges and require large patches of suitable habitat.
Reptile	Smooth green snake (<i>Opheodrys vernalis</i>)	Special Concern (State)		X	X	Found in upland grassy fields, pastures, meadows, blueberry barrens, and forest openings.
Reptile	Spotted turtle (<i>Clemmys guttata</i>)	Threatened (State)		X		Wetlands with shallow, permanent waterbodies and emergent vegetation. Marshes, vernal pools, wet meadows, swamps, ponds, and slow-moving streams and rivers all provide suitable habitats for spotted turtles. Terrestrial habitat used extensively while searching for suitable nesting sites, traveling among wetland habitats, and periods of inactivity during high temperatures.
Reptile	Wood turtle (<i>Glyptemys insculpta</i>)	Special Concern (State)	X	X	X	Slow-moving streams and channels with sandy bottoms. Extensive use of terrestrial habitats during summer, including floodplains, meadows, woodlands, fields, as well as wetlands.

*Not identified in NHB DataCheck letters but NHFG indicated that occurrences are known from the ROW in Concord.



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4.1 AMPHIBIANS

4.1.1 Fowler's Toad

Fowler's toad (*Anaxyrus fowleri*) has not been documented within the ROW per the NHB DataCheck results letters and NHFG indicated on a March 8, 2022, teleconference that there were no concerns of adverse impacts to this species as a result of the P145 project. No specific protection measures are proposed for Fowler's toad. The Project will require minimal temporary impacts to deep aquatic and emergent wetland habitats that may provide breeding habitat for Fowler's toad. Ground disturbing activities within vernal pools, including the installation and removal of construction matting in vernal pools, will not occur between April 1 and October 15 (note: work may occur throughout the year once access roads and work pads are in place).

Vegetation maintenance work will consist of hand cutting of incompatible species within vernal pools. The cut vegetation will be removed to areas outside of the vernal pool basin for chipping or mulching.

4.1.2 Northern Leopard Frog

Northern leopard frog (*Lithobates pipiens*) has not been documented within the ROW per the NHB DataCheck results letters. Further, the Project will require minimal temporary impacts to deep aquatic and emergent wetland habitats that may provide breeding habitat for Fowler's toad. Ground disturbing activities within vernal pools, including the installation and removal of construction matting, will not occur between April 1 and October 15 (note: work may occur throughout the year once access roads and work pads are in place). Vegetation maintenance work will consist of hand cutting of incompatible species within vernal pools. The cut vegetation will be removed to areas outside of the vernal pool basin for chipping or mulching.

No adverse impacts to northern leopard frog are anticipated, and no species-specific protection measures are proposed.

4.2 BIRDS

4.2.1 Common Nighthawk

Common nighthawk (*Chordeiles minor*) occurrences are known from nearby urban and barren areas in Concord. Common nighthawks may utilize small open ground areas of the ROW for breeding between May and August. NHFG indicated that the potential for common nighthawks to occur is greatest in the Steeplegate Mall area in Concord, i.e., Loudon Road south to Route 3. This includes the areas with existing structures 19–53 on the M108 line and structures 169–170 on the G146 line, except existing structures 38, 40, and 41 on the M108 line as these are located on industrial parcels with impervious surfaces that do not provide potential breeding habitat for common nighthawks.

Common Nighthawk BMPs

The following BMPs will be implemented to protect common nighthawk in the ROW:



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1. All Project contractors operating in Concord and Pembroke will be provided training on common nighthawk identification, habitat, and behavior; fact sheets of the species will be included as part of the construction documents for this Project.
2. To the extent possible, construction and vegetation maintenance between Loudon Road and Route 3 will be conducted after August 31 but prior to May 15 to avoid potential impacts to common nighthawk breeding. Note that existing structures 38, 40, and 41 on the M108 line are located on existing impervious parcels that do not provide potential nesting opportunities for common nighthawk and are therefore not included in the time of year considerations.
3. If Project activities, including structure replacements or vegetation management, are required during the May 15 to August 31 breeding period between Loudon Road and Route 3, a common nighthawk nesting survey will be conducted prior to initiating construction. Surveys will be conducted in accordance with New Hampshire Audubon's *Common Nighthawk Guide to Identification, Monitoring, and Behavior during Nesting* (April 7, 2020).² This approach includes multiple (i.e., at least two) survey events spaced at least 10 days apart in June and July. A separate survey plan will be submitted to NHFG prior to conducting field surveys.
4. At all work areas in Concord and Pembroke, observation of common nighthawk nesting activity shall be reported to NHFG immediately, whether observed incidentally or during targeted surveys. Construction activities will not occur within 200 feet of the approximate nest location to avoid nesting disturbances, and Eversource will consult further with NHFG on follow-up protection recommendations and construction schedules based on the site-specific nature of the observation.

4.2.2 Peregrine Falcon

Peregrine falcon (*Falco peregrinus anatum*) has been documented at the Granite Shore Power plant at the southern terminus of the H137 Line ROW near the Merrimack Substation. Based on discussions with NHFG during a March 8, 2022, teleconference regarding the P145 project, no adverse impacts to peregrine falcon are anticipated and no species-specific protection measures are proposed.

4.3 INVERTEBRATES

4.3.1 Karner Blue Butterfly

Karner blue butterfly (*Plebejus melissa samuelis*) has been documented within the ROW. NHFG indicated that Karner blue butterfly occupies the ROW parcels associated with Praxair Surface Technologies, Inc. and New Hampshire Distributors, LLC from Pembroke Road to existing structure 42 on the M108 line, including existing structures 43, 44, 45, and 46. NHFG indicated that additional populations may be present within the ROW where populations of wild lupine (*Lupinus perennis*), the host plant of Karner blue butterfly, occur. A survey for wild lupine will be conducted by a qualified botanist, in coordination with NHFG, in May/June 2023 during the appropriate identification period for wild lupine. The results of the 2023 survey will be incorporated into the Project mapping and avoidance measures will be refined, if

² Available online: <https://nhbirdrecords.org/all-articles/Nighthawk%20Guide%204-7-20.pdf>



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necessary, through consultation with NHFG. Work will not proceed within the Karner blue butterfly area of the ROW until consultation with NHFG is complete. If necessary, the BMPs below will be refined following the 2023 survey and NHFG consultation.

Karner Blue Butterfly BMPs

Structure Replacement Work

The following BMPs will be implemented to protect Karner blue butterfly from Pembroke Road to existing structure 86 during structure replacement work and associated vegetation maintenance:

1. A survey for wild lupine was conducted within the Project ROW prior to the start of construction on the P145 line in 2022 at the request of NHB from existing structures 41 to 109 on the P145 line. Populations of wild lupine observed during the survey were located with a GPS capable of submeter accuracy and their locations will be re-flagged prior to the start of construction of the Project. See above for information on 2023 surveys to be conducted prior to the start of work.
2. Eversource has reviewed and configured the work areas to avoid direct impacts to wild lupine to the extent possible.
3. Between Pembroke Road and existing structure 42 on the M108 line, all construction activities, including structure replacement and equipment travel, will be conducted between November 1 and March 31 and will be conducted from temporary timber mats. Ground disturbing activities will be limited to drilling activities associated with structure installations and guy wire anchor installations. Eversource is evaluating the potential need for counterpoise measures for structures in this area through ground resistivity analyses. Should counterpoise (i.e., structure grounding systems) be needed, a narrow trench extending approximately 50 feet from the base of the structures and approximately 18 inches deep will be needed to bury the counterpoise wire. The minor ground disturbing activities will be sited to avoid direct impacts to wild lupine plants. No additional grubbing of vegetation or grading of soil in this area. Temporary timber mats will be placed on or after November 1 and removed no later than March 31. Mowing of woody vegetation necessary to accommodate the placement of timber mats will be done by hand as needed prior to their placement. Any use of wheeled or tracked equipment to conduct mowing of woody vegetation for the purposes of preparing timber mat placement areas will be conducted from temporary timber mats. The cut woody stems will be removed and disposed of at an off-site location.
4. A pre-construction contractor orientation session will be led by a biologist to inform on-site workers on the protection measures to be implemented within the Karner blue butterfly habitat area. The biologist will remain on-site for the duration of the work site preparation and timber mat placement work to monitor the implementation of the Karner blue butterfly BMPs.
5. Weekly construction observation monitoring will then be conducted by a biologist to review implementation of the BMPs during the course of the construction period. Deficiencies will be noted and Eversource will work with the contractor and biologist to correct any deficiencies observed.



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6. A final monitoring inspection will be conducted by the biologist following the completion of the work to document the observed conditions. Recommendations will be made as appropriate for potential remedial actions.
7. A summary report will be provided to NHFG within 30 days following the final monitoring inspection.

Other observed wild lupine populations (e.g., on the New Hampshire National Guard training facility in Pembroke) will be avoided by the Project.

Vegetation Maintenance

ROW vegetation maintenance within Karner blue butterfly habitat areas between Pembroke Road and existing structure 42 on the M108 line will be done in consideration with NHFG's draft *Best Management Practices: ROW Vegetation Management in Pitch Pine / Scrub oak Barren Habitat* (provided to Stantec by NHFG on February 17, 2022; Appendix B). These BMPs include:

1. A pre-work contractor orientation session will be led by a biologist to inform on-site workers on the scrub oak protection and management measures to be implemented within the Karner blue butterfly habitat area.
2. Select removal of only those tree species that are capable of interfering with overhead conductor wires.
3. Conducting vegetation removal using wheeled or tracked equipment only during periods of significant snow coverage (e.g., 2 feet or more). Eversource will consult with NHFG prior to initiating vegetation removal to confirm conditions for mechanized mowing in Karner blue butterfly habitat are appropriate. Hand removal of vegetation may be done between November 1 and March 31.
4. Maintaining scrub oak communities within the ROW; targeting protection of taller and more mature scrub oak specimens, up to 15 feet in height, to protect potential ovipositing sites while maintaining compliance with standard vegetation safety clearances.
5. Avoiding mowing of interstitial grassland and heath patches to the extent possible.

In addition, Eversource will work collaboratively with the New Hampshire Army National Guard where the ROW traverses the Edward Cross Training Center to address Karner blue butterfly habitat management goals and objectives as part of the ROW vegetation maintenance program.

4.3.2 Pine Barren Lepidoptera

In addition to Karner blue butterfly, several other species of butterflies and moths listed as Special Concern by NHFG occur within the pine barren region traversed by the ROW in Concord and Pembroke. These species include barrens itame (*Speranza exonerata*), barrens xylotype (*Xylotype capax*), Edward's hairstreak, phyllira tiger moth (*Grammia phyllira*), pine barrens zanclognatha moth (*Zanclognatha martha*), and sleepy duskywing (*Erynnis brizo brizo*). These species are strongly associated with habitats supporting pitch pine (*Pinus rigida*) and scrub oak (*Quercus ilicifolia*).



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Based on Stantec's field observations in 2021 and 2022, scrub oak occurs with varying levels of abundance in the upland habitats in the ROW from near existing structure 74 (proposed structure 17) on the C189 line north of Curtisville Road south to near existing structure 5 on the M108 line south of Garvin's Falls Road. This excludes existing structures 38, 40, and 41 on the M108 line, which are located in commercial developments with impervious areas.

Lepidoptera BMPs

The following best management practices are proposed as part of the structure rebuild Project and vegetation management within scrub oak-dominated habitats (excluding those areas described in Section 4.3.1 associated with known Karner blue butterfly locations). These are based on NHFG's draft *Best Management Practices: ROW Vegetation Management in Pitch Pine / Scrub oak Barren Habitat* (provided to Stantec by NHFG on February 17, 2022; Appendix B).

Structure Replacement Work

1. A pre-construction contractor orientation session will be led by a biologist to inform on-site workers on the scrub oak protection and management measures to be implemented within the scrub oak habitat area.
2. Structure replacement activities will utilize existing access roads and trails to the extent possible through scrub oak habitats in the ROW to minimize removal of scrub oak.
3. Constructing access roads and work pads between October 15 and April 15 to the extent possible (note: work may occur throughout the year once access roads and work pads are in place).
4. Limiting removal of scrub oak to only that necessary to provide access to the structures and creation of a stable work platform. If practicable, scrub oak will be cut at ground level and matting will be placed atop scrub oak stumps where impacts cannot be avoided to allow regeneration of scrub oak following construction.
5. Avoiding placement or staging of equipment in scrub oak populations to the greatest extent practicable.

Vegetation Maintenance

Vegetation maintenance of the ROW was conducted in 2022 and is not anticipated for another 4 or 5 years.

4.3.3 Rapids Clubtail

Rapids clubtail has been documented in the Merrimack River below Garvin's Falls based on the NHB DataCheck letter. No Project activities are proposed within the Merrimack River, and NHFG indicated that there were no concerns for adverse impacts to this species as a result of the Project during a March 8, 2022, teleconference regarding the P145 project. As such, no protection measures are proposed specific to rapids clubtail.



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4.4 REPTILES

Blanding's turtle (*Emydoidea blandingii*), spotted turtle (*Clemmys guttata*), wood turtle (*Glyptemys insculpta*), eastern hognose snake (*Heterodon platirhinos*), northern black racer (*Coluber constrictor constrictor*), and smooth green snake (*Opheodrys vernalis*) have been documented in several areas in and near the ROW according to the NHB DataCheck letters and discussions with NHFG.

The ROW provides suitable terrestrial and aquatic habitat for state-listed turtle and snake species throughout its length, and construction activities are anticipated to be ongoing within and adjacent to potentially suitable habitats during both the species active and inactive periods. The following BMPs will be implemented to protect state-listed reptile species within the Project ROW.

Reptile BMPs

Structure Replacement Work

1. All contractors will be trained by a qualified herpetologist in the identification and response protocols for observations of the target reptile species. A copy of the training material that includes photos, habitat descriptions, response protocol for observed species, and a training log that will be provided to NHFG.
2. All structure replacement work in the ROW between M108 structure 38 near Regional Drive in Concord south to M108 structure 4 north of the Merrimack River, including G146 structures 19 to 184, will be conducted between October 15 and March 31. Elsewhere, structure replacement work will similarly be conducted between October 15 and March 31 to the extent feasible.
3. In accordance with Eversource's BMP manual for erosion and sedimentation (E&S) controls, only biodegradable E&S controls (with the exception of silt fence which will be removed post-construction) will be utilized. No nylon, welded plastic, or photodegradable E&S controls shall be permitted for use on the Project.
4. At least one biological monitor shall be on-site at the start of daily civil construction activities within areas subject to state-listed reptile BMPs during their associated active season (i.e., between April 1 and October 31³). Civil construction activities include work site preparations including vegetation clearing, grubbing, grading, placement of gravel or stone, and matting associated with access road creation or improvements and work pad creation. A biological monitor will be someone with training and experience in turtle and reptile identification, habitat preferences, life history, and handling techniques and shall operate under the guidance of a qualified herpetologist. A qualified herpetologist will be a wildlife biologist well versed on and with extensive experience in reptile identification, life history, habitat preference, handling, and documentation (activity, sexing, aging, etc.).

The qualified herpetologist shall be responsible for:

³ These dates are estimated and are subject to change based on seasonal conditions.



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- Instructing and guiding the biological monitor on matters pertaining to reptiles.
- Confirming proper documentation and handling techniques are abided to by the construction personnel and the biological monitor.
- At the end of the Project, the qualified herpetologist shall provide a report to NHFG, which includes a summary of observations, reporting logs documenting any documented state-listed species, and mapping and spatial data files showing the location of any observed state-listed species.

The biological monitor shall:

- Search, identify, document, report, and relocate state-listed reptiles observed within work areas immediately prior to civil construction work including vegetation clearing or grubbing and the placement of gravel and/or matting.
 - Inspect work areas on a routine (e.g., weekly) basis for implementation of erosion and sedimentation controls and state-listed species protection measures as well as to document compliance with environmental regulations and permit conditions.
 - Maintain regular contact with the qualified herpetologist on all matters pertaining to reptile protection and surveys.
 - Serve as the primary contact between the contractor and Eversource staff.
 - Report observations of state-listed species immediately to Eversource staff who shall in turn report those observations to NHFG.
 - Document field activities and observations.
5. Between April 1 and October 15, work/pull pad areas and staging areas shall be inspected by the biological monitor immediately prior to mowing, grading or grubbing, gravel or mat placement, or equipment staging. In the event a threatened or endangered species is observed on the Project site during the term of the applicable permits, the species shall not be disturbed, handled, or harmed in any way prior to consultation with NHFG and implementation of corrective actions recommended by NHFG. Site operators shall be allowed to relocate wildlife encountered if discovered within the active work zone and if in direct harm from Project activities. Wildlife shall be relocated in close proximity to the capture location but outside the work zone and in the direction the individual was heading. NHFG shall be contacted immediately if this action occurs. Wildlife exclusion silt fencing should be installed around all staging areas.
 6. Any turtle (common or state-listed) observed to be nesting or attempting to nest or any turtle nest shall not be disturbed, handled, or harmed in any way prior to consultation with NHFG.
 7. No equipment shall be permitted outside the established access roads, work pads, pull pads or other designated construction areas, as shown on the plan sheets, at any time.
 8. Work and pull pads shall be minimized to the greatest extent possible as determined in the field based on site conditions.



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9. NHFG will be notified immediately of any observed injury or mortality to state-listed reptile or any nesting turtle.

Access Roads

Prior to the installation of new gravel and matted access roads or top dressing of existing access roads within the ROW conducted during the active season (April 1 to October 15) the following shall apply:

1. For new matted access roads:
 - Prior to the start of matting installation, the access road area shall be inspected by a biological monitor immediately prior to mowing and matting placement. In the event a threatened or endangered species is observed on the Project site during the term of the applicable permits, the species shall not be disturbed, handled, or harmed in any way prior to consultation with NHFG and implementation of corrective actions recommended by NHFG. Site operators shall be allowed to relocate wildlife encountered if discovered within the active work zone and if in direct harm from Project activities. Wildlife shall be relocated in close proximity to the capture location but outside the work zone and in the direction the individual was heading. NHFG shall be contacted immediately if this action occurs.
 - Avoid placing matting through areas of exposed, friable, and sparsely vegetated soils between May 15 and September 15 as these areas may support turtle nests.
 - Bridge matting shall be installed with gaps which facilitate travel by turtles, snakes and other wildlife. Gaps should be created roughly every 30 feet. Elevating matting will also help to minimize the potential for turtles and other wildlife to cross the travel surface.
2. For new gravel access roads:
 - Prior to the start of grading, grubbing, and gravel installation, the access road area shall be inspected by a biological monitor immediately prior to grading, grubbing, and gravel placement. In the event a threatened or endangered species is observed on the Project site during the term of the applicable permits, the species shall not be disturbed, handled, or harmed in any way prior to consultation with NHFG and implementation of corrective actions recommended by NHFG. Site operators shall be allowed to relocate wildlife encountered if discovered within the active work zone and if in direct harm from Project activities. Wildlife shall be relocated in close proximity to the capture location but outside the work zone and in the direction the individual was heading. NHFG shall be contacted immediately if this action occurs.
 - Avoid constructing existing roads through areas of exposed, friable, and sparsely vegetated soils between May 15 and September 15 as these areas may support turtle nests.
3. For top-dressing of existing access roads with gravel:
 - To prevent turtles from nesting in existing access roads, all access roads within suitable nesting habitat (i.e., sandy, friable soils) shall be top dressed with processed stone and/or gravel and compacted in such a way to make the roads unsuitable for nesting.



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- In so far as possible, avoid top dressing of existing roads with exposed and friable soil between May 15 and September 15 as these areas may support turtle nests.
 - Prior to the placement of gravel, the area shall be inspected and swept by a trained individual to observe the presence of state-listed reptiles within the roadway. A trained individual shall be any contractor who has gone through the state-listed species protection training noted herein. In the event a threatened or endangered species is observed on the Project site during the term of the applicable permits, the species shall not be disturbed, handled, or harmed in any way prior to consultation with NHFG and implementation of corrective actions recommended by NHFG. Site operators shall be allowed to relocate wildlife encountered if discovered within the active work zone and if in direct harm from Project activities. Wildlife shall be relocated in close proximity to the capture location but outside the work zone and in the direction the individual was heading. NHFG shall be contacted immediately if this action occurs.
4. Once established, access roads and work pads shall be inspected by a trained individual or the biological monitor prior to road or work pad being utilized by construction equipment for the day.
 5. Wildlife protection signage shall be placed along all access roads (new and existing) to serve as a reminder to construction traffic to maintain a low rate of speed and to look for turtles and snakes that may enter the roadway. Any observed turtles and/or snakes shall be reported to the foreman who shall in turn alert the biological monitor for communication via Eversource to NHFG.

Vegetation Management

Vegetation maintenance of the ROW was conducted in 2022 and is not anticipated for another 4 or 5 years. In addition to the above BMPs, the following additional BMPs will be implemented in specific reptile habitat types:

Reptile BMP A

For work in permanently inundated wetlands, vernal pools (VP) and VP envelopes (e.g., areas 100 feet from a VP) that are suitable for:

- **Hibernating spotted, wood, and Blanding's turtles**
- **Active spotted, wood, and Blanding's turtles**

Overwintering and active season habitat for Blanding's, wood, and spotted turtles includes permanently inundated wetlands with deeper water and suitable substrate/subsurface features to facilitate hibernation.

1. To protect potentially hibernating Blanding's and spotted turtles, civil work (matting placement) should not be undertaken in permanently inundated wetlands during the dormant season (September 15 through March 31).
2. If work areas are within the VP or VP envelope, matting (for wetland areas) or gravel (for upland areas) should be placed between October 15 and April 1 or following seasonal drying of the VP. For deeper VPs that may be permanently inundated and capable of supporting rare turtles through winter, matting placement should not be undertaken between October 15 and March 31.



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- a. Vernal pools and potential vernal pools shall be flagged prior to work. Impacts to vernal pools, potential vernal pools, and a 50-foot no disturb vegetative buffer shall be avoided wherever possible. NHFG will be provided information about proposed impacts to vernal pools, potential vernal pools, and the 50-foot no disturb vegetative buffers prior to work for further coordination.
3. Immediately prior to the clearing of vegetation and placement of matting or gravel, a biological monitor shall inspect the area and relocate any turtles or snakes which could be impacted by the matting or gravel placement. Only after the area has been cleared by the biological monitor can the matting or gravel be placed.

Matting shall be placed with gaps (i.e., bridge matting) approximately every 30 feet to facilitate travel beneath and between the matting from one side to another within the wetland. This will require at least two layers of matting, which will also limit access by spotted, wood, and Blanding's turtles. Silt fence may also be secured to edge of the work pad matting if deemed necessary by the biological monitor or lead herpetologist based on repeated observations of nearby reptiles, repeated entry of reptiles into the work area, or professional judgement. Additional means and methods may be used to secure the silt fence, so long as it prevents gaps that could allow reptile entry. Any materials used to weigh down the silt fence, as a substitute for trenching, shall be placed on the inside/work area side of the silt fence. NHFG shall be notified for further consultation wherever exclusionary silt fence cannot be trenched into the ground.

- 4.
5. During construction, the work area shall be inspected prior to the start of work by a trained individual.

Reptile BMP B

For work in and adjacent to wetlands that are likely:

- ***Unsuitable for winter use (hibernation) by Blanding's, wood, and spotted turtles***
- ***Suitable for active season use by Blanding's, wood, and spotted turtles***

These areas shall include work areas located in and within 100 feet of wetlands where hydrology and habitat are unlikely to be suitable to support overwintering Blanding's, wood, and spotted turtles. Work within adjacent uplands will be focused on avoiding impacts to suitable nesting areas, which include sandy/friable soils generally free of dense vegetation, between May 15 and September 15. For all civil work (work pad, pull pad, and access road establishment) in these areas to be conducted during the active season (April 1–October 15) the following shall apply:

1. For matted work and pull pads:
 - The work area shall be inspected by the biological monitor immediately prior to mowing and/or matting placement. In the event a threatened or endangered species is observed on the Project site during the term of the applicable permits, the species shall not be disturbed, handled, or harmed in any way prior to consultation with NHFG and implementation of corrective actions recommended by NHFG. Site operators shall be allowed to relocate wildlife encountered if discovered within the active work zone and if in direct harm from Project activities. Wildlife shall



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be relocated in close proximity to the capture location but outside the work zone and in the direction the individual was heading. NHFG shall be contacted immediately if this action occurs.

Matting shall be placed with gaps (i.e., bridge matting) approximately every 30 feet to facilitate travel beneath and between the matting from one side to another within the wetland. This will require at least two layers of matting, which will also limit access by turtles. At least two layers of matting should be used in wetland areas to reduce impacts to the wetland surface, and help create a barrier for reptiles, such as turtles, and prevent their entry into the work pad. Silt fence may also be secured to edge of the work pad matting if deemed necessary by the biological monitor or lead herpetologist based on repeated observations of nearby reptiles, repeated entry of reptiles into the work area, or professional judgement. Additional means and methods may be used to secure the silt fence, so long as it prevents gaps that could allow reptile entry. Any materials used to weigh down the silt fence, as a substitute for trenching, shall be placed on the inside/work area side of the silt fence. NHFG shall be notified for further consultation wherever exclusionary silt fence cannot be trenched into the ground.

- During construction, the work area shall be inspected prior to the start of daily work by a trained individual or the biological monitor.

2. For gravel work and pull pads:

- Minimize pad size to the greatest extent practicable.
- The work area shall be inspected by the biological monitor immediately prior to mowing and gravel placement. In the event a threatened or endangered species is observed on the Project site during the term of the applicable permits, the species shall not be disturbed, handled, or harmed in any way prior to consultation with NHFG and implementation of corrective actions recommended by NHFG. Site operators shall be allowed to relocate wildlife encountered if discovered within the active work zone and if in direct harm from Project activities. Wildlife shall be relocated in close proximity to the capture location but outside the work zone and in the direction the individual was heading. NHFG shall be contacted immediately if this action occurs.
- Topsoil shall be removed, stockpiled nearby, and surrounded by properly installed silt fence to prevent access by wildlife, for later replacement in the work area post-construction.
- Once topsoil has been stripped, the area can be graded and gravel installed.
- During construction, the work area shall be inspected prior to the start of daily work by a trained individual or the biological monitor.
- Installation of an exclusionary barrier around the work area will be installed in upland areas to further limit entry by reptiles into the work area. Silt fence installed for wildlife exclusion shall fully enclose the site and should be buried to a depth of no less than 6 to 8 inches and 18 inches above grade. The silt fence shall be installed with the wood stakes exposed on the interior side of the work zone. If a work pad consists of both upland gravel, and wetland matting, the silt fence shall be installed across the upland-wetland mat transition and stapled to the matting at intervals that prevent gaps at the base of the silt fence. Additional means and methods may be used to secure the silt fence, so long as it prevents gaps that could allow reptile entry. Any materials used



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to weigh down the silt fence, as a substitute for trenching, shall be placed on the inside/work area side of the silt fence. NHFG shall be notified for further consultation wherever exclusionary silt fence cannot be trenched into the ground.

- Once construction is complete, the stockpiled topsoil shall be replaced and lightly graded in the work pad area post-construction. The area may be mulched to prevent erosion.

Reptile BMP C

For work in uplands that is suitable habitat for:

- ***Blanding's, wood, and spotted turtle nesting and foraging***
- ***Eastern hognose, northern black racer, and smooth green snake***

Work within uplands will be focused primarily on avoiding impacts to suitable nesting areas, which include sandy/friable soils generally free of dense vegetation, between May 15 and September 15. For all civil work (work pad, pull pad, and access road establishment) conducted during the active season (April 1 – October 31) the following shall apply:

1. For matted work pads:

- The work area shall be inspected by the biological monitor immediately prior to mowing and/or matting placement. In the event a threatened or endangered species is observed on the Project site during the term of the applicable permits, the species shall not be disturbed, handled, or harmed in any way prior to consultation with NHFG and implementation of corrective actions recommended by NHFG. Site operators shall be allowed to relocate wildlife encountered if discovered within the active work zone and if in direct harm from Project activities. Wildlife shall be relocated in close proximity to the capture location but outside the work zone and in the direction the individual was heading. NHFG shall be contacted immediately if this action occurs.
- Matting shall be placed with gaps (i.e., bridge matting) approximately every 30 feet to facilitate travel beneath and between the matting from one side to another within the wetland. This will require at least two layers of matting which will also limit access by spotted, wood, and Blanding's turtles.
- If two layers of matting cannot be accommodated, such as during the use of plastic matting in maintained lawns and field, the work pad shall be surrounded by silt fence stapled to, or tucked under, the sides of the matting to prevent access by climbing turtles and snakes. Additional means and methods may be used to secure the silt fence, so long as it prevents gaps that could allow reptile entry. Any materials used to weigh down the silt fence, as a substitute for trenching, shall be placed on the inside/work area side of the silt fence. If only one layer of matting is used, NHFG will be notified to discuss the location of the matting and any additional exclusionary BMPs that may be necessary. NHFG shall be notified for further consultation wherever exclusionary silt fence cannot be trenched into the ground.
- During construction, the work area shall be inspected prior to the start of daily work by a trained individual or the biological monitor.



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2. For gravel work pads:

- Minimize pad size to the greatest extent practicable.
- The work area shall be inspected by the biological monitor immediately prior to mowing and gravel placement. In the event a threatened or endangered species is observed on the Project site during the term of the applicable permits, the species shall not be disturbed, handled, or harmed in any way prior to consultation with NHFG and implementation of corrective actions recommended by NHFG. Site operators shall be allowed to relocate wildlife encountered if discovered within the active work zone and if in direct harm from Project activities. Wildlife shall be relocated in close proximity to the capture location but outside the work zone and in the direction the individual was heading. NHFG shall be contacted immediately if this action occurs.
- Topsoil shall be removed, stockpiled nearby and surrounded by properly installed silt fence to prevent access by wildlife, for later replacement in the work area post-construction.
- Once topsoil has been stripped, the area can be graded and gravel installed.
- The work/pull pad shall then be surrounded with properly installed silt fence to prevent access by turtles and snakes. Silt fence installed for wildlife exclusion shall fully enclose the site and should be buried to a depth of no less than 6 to 8 inches and 18 inches above grade. The silt fence shall be installed with the wood stakes exposed on the interior side of the work zone.
- During construction, the work area shall be inspected prior to the start of work by a trained individual or the biological monitor.
- Once construction is complete, the stockpiled topsoil shall be replaced and lightly graded in the work pad area post-construction. The area may be mulched to prevent erosion.

5.0 ADAPTIVE MANAGEMENT

The BMPs provided herein are not intended to be static practices. Modifications to these BMPs may be made to reflect changing conditions, additional information, lessons learned, or other site-specific characteristics. Modifications to the BMPs will be done in consultation with NHFG and will provide equal or better levels of protection to the target species of concern.



APPENDICES

Appendix A BMP MATRIX

Appendix A: C189, M108, H137, and G146 Lines Replacement Project: Wildlife Protection BMPs

Existing Structure No.	New Structure No.	Applicable BMP	Time of Year Comments
Farmwood S/S			
C189-110	C189-53	Reptile BMP B	Minimize civil work between April 1–October 31
C189-108	C189-51	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-107	C189-50	Reptile BMP B	Minimize civil work between April 1–October 31
C189-106	C189-49	Reptile BMP B	Minimize civil work between April 1–October 31; No activity within PVP between April 1–October 15
C189-105	C189-48	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-104	C189-47	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-103	C189-46	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-102	C189-45	Reptile BMP B	Minimize civil work between April 1–October 31
C189-101	C189-44	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-100	C189-43	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-99	C189-42	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-98	C189-41	Reptile BMP B	Minimize civil work between April 1–October 31
C189-97	C189-40	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-96	C189-39	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-95	C189-38	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-94	C189-37	Reptile BMP C	Minimize civil work between April 1 and October 31; Avoid open, friable, and sandy soil areas between May 15–September 17; No activity within PVP between April 1–October 15
C189-93	C189-36	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-92	C189-35	Reptile BMP B	Minimize civil work between April 1–October 31

Existing Structure No.	New Structure No.	Applicable BMP	Time of Year Comments
C189-90	C189-33	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-89	C189-32	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-88	C189-31	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-87	C189-30	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-86	C189-29	Reptile BMP A	Avoid mat placement between September 15–March 31
C189-83	C189-26	Reptile BMP B	Minimize civil work between April 1–October 31
C189-82	C189-25	Reptile BMP B	Minimize civil work between April 1–October 31
C189-81	C189-24	Reptile BMP A	Avoid mat placement between September 15–March 31
C189-80	C189-23	Reptile BMP A	Avoid mat placement between September 15–March 31
C189-79	C189-22	Reptile BMP B	Minimize civil work between April 1–October 31
C189-78	C189-21	Reptile BMP B	Minimize civil work between April 1–October 31
C189-77	C189-20	Reptile BMP B	Minimize civil work between April 1–October 31
C189-76	C189-19	Reptile BMP B	Minimize civil work between April 1–October 31
C189-75	C189-18	Reptile BMP B	Minimize civil work between April 1–October 31
C189-74	C189-17	Reptile BMP C; Lepidoptera BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-73	C189-16	Reptile BMP C; Lepidoptera BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-72	C189-15	Reptile BMP C; Lepidoptera BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-71	C189-14	Reptile BMP C; Lepidoptera BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-70	C189-13	Reptile BMP C; Lepidoptera BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-69	C189-12	Reptile BMP B; Lepidoptera BMP	Minimize civil work between April 1–October 31
C189-68	C189-11	Reptile BMP B; Lepidoptera BMP	Minimize civil work between April 1–October 31
C189-67	C189-10	Reptile BMP C; Lepidoptera BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15

Existing Structure No.	New Structure No.	Applicable BMP	Time of Year Comments
C189-66	C189-9	Reptile BMP C; Lepidoptera BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-65	C189-8	Reptile BMP C; Lepidoptera BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-64	C189-7	Reptile BMP C; Lepidoptera BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-63	C189-6	Reptile BMP C; Lepidoptera BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
C189-62	C189-5	Reptile BMP C; Lepidoptera BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
Curtisville S/S			
M108-61	M108-61	Reptile BMP C; Lepidoptera BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
M108-60	M108-60	Reptile BMP B	Minimize civil work between April 1–October 31; No activity within PVP between April 1–October 15
M108-59	M108-59	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
M108-58	M108-58	Reptile BMP B	Minimize civil work between April 1–October 31
M108-57	M108-57	Reptile BMP C; Lepidoptera BMP	Minimize civil and vegetation management work between April 1 and October 31; Avoid open, friable, and sandy soil areas between May 15– September 15
M108-53	M108-53	Reptile BMP C; Lepidoptera BMP; Common nighthawk BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15; Conduct common nighthawk surveys for work between May 15– August 31
M108-52	M108-52	Reptile BMP C; Lepidoptera BMP; Common nighthawk BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15; Conduct common nighthawk surveys for work between May 15– August 31
M108-51	M108-51	Reptile BMP C; Lepidoptera BMP; Common nighthawk BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15; Conduct common nighthawk surveys for work between May 15– August 31
M108-50	M108-50	Reptile BMP C; Lepidoptera BMP; Common nighthawk BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15; Conduct common nighthawk surveys for work between May 15– August 31

Existing Structure No.	New Structure No.	Applicable BMP	Time of Year Comments
M108-49	M108-49	Reptile BMP C; Lepidoptera BMP; Common nighthawk BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15; Conduct common nighthawk surveys for work between May 15–August 31
M108-48	M108-48	Reptile BMP C; Lepidoptera BMP; Common nighthawk BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15; Conduct common nighthawk surveys for work between May 15–August 31
M108-47	M108-47	Reptile BMP C; Lepidoptera BMP; Common nighthawk BMP	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15; Conduct common nighthawk surveys for work between May 15–August 31
M108-46	M108-46	Karner Blue Butterfly BMP	All work to be conducted between November 1–March 31 if wild lupine are present in work limits. Vegetation maintenance to be done by hand and avoid use of wheeled or tracked equipment when less than 2 feet of snow cover.
M108-45	M108-45	Karner Blue Butterfly BMP	All work to be conducted between November 1–March 31 if wild lupine are present in work limits. Vegetation maintenance to be done by hand and avoid use of wheeled or tracked equipment when less than 2 feet of snow cover.
M108-44	M108-44	Karner Blue Butterfly BMP	All work to be conducted between November 1–March 31 if wild lupine are present in work limits. Vegetation maintenance to be done by hand and avoid use of wheeled or tracked equipment when less than 2 feet of snow cover.
M108-43	M108-43	Karner Blue Butterfly BMP	All work to be conducted between November 1–March 31 if wild lupine are present in work limits. Vegetation maintenance to be done by hand and avoid use of wheeled or tracked equipment when less than 2 feet of snow cover.
M108-42	M108-42	Karner Blue Butterfly BMP	All work to be conducted between November 1–March 31 if wild lupine are present in work limits. Vegetation maintenance to be done by hand and avoid use of wheeled or tracked equipment when less than 2 feet of snow cover.
M108-41	M108-41	Standard Utility Manual BMP	Located in active, industrial area.
M108-40	M108-40	Standard Utility Manual BMP	Located in active, industrial area.
M108-38	M108-38	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-37	M108-37	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-36	M108-36	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-35	removal only	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-34	M108-34	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-33	M108-33	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-32	M108-32	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-31	M108-31	Priority reptile habitat BMP	All work performed between October 15–March 31

Existing Structure No.	New Structure No.	Applicable BMP	Time of Year Comments
M108-29	M108-29	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-27	M108-27	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-169	G146-169	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-19	M108-19	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-170	G146-170	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-171	G146-171	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-17	M108-17	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-172	G146-172	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-16	M108-16	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-173	G146-173	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-15	M108-15	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-174	G146-174	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-175	G146-175	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-13	M108-13	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-176	G146-176	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-12	M108-12	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-11	M108-11	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-177	G146-177	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-178	G146-178	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-10	M108-10	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-9	M108-9	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-179	G146-179	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-8	M108-8	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-180	G146-180	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-7	M108-7	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-181	G146-181	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-182	G146-182	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-5	M108-5	Priority reptile habitat BMP	All work performed between October 15–March 31
M108-4	M108-4	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-183	G146-183	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-184	G146-184	Priority reptile habitat BMP	All work performed between October 15–March 31
G146-185	G146-185	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
M108-2	M108-2	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
G146-186	G146-186	Reptile BMP B	Minimize civil work between April 1–October 31
M108-1	M108-1	Reptile BMP B	Minimize civil work between April 1–October 31
Garvins S/S			
H137-32	H137-32	Reptile BMP B	Minimize civil work between April 1–October 31

Existing Structure No.	New Structure No.	Applicable BMP	Time of Year Comments
H137-31	H137-31	Reptile BMP B	Minimize civil work between April 1–October 31
H137-30	H137-30	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-29	H137-29	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-28	H137-28	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-27	H137-27	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-26	H137-26	Reptile BMP B	Minimize civil work between April 1–October 31
H137-25	H137-25	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-24	H137-24	Reptile BMP B	Minimize civil work between April 1–October 31; No activity within PVP between April 1–October 15
H137-23	H137-23	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-22	H137-22	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-20	H137-20	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-19	H137-19	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-17	H137-17	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-16	H137-16	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-15	H137-15	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-14	H137-14	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-13	H137-13	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-11	H137-11	Reptile BMP B	Minimize civil work between April 1–October 31
H137-10	H137-10	Reptile BMP B	Minimize civil work between April 1–October 31
H137-9	H137-9	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15

Existing Structure No.	New Structure No.	Applicable BMP	Time of Year Comments
H137-8	H137-8	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-7	H137-7	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-6	H137-6	Reptile BMP C	Minimize civil work between April 1–October 31; Avoid open, friable, and sandy soil areas between May 15–September 15
H137-4	H137-4	Reptile BMP A	Avoid mat placement between September 15– March 31
H137-3	H137-3	Reptile BMP A	Avoid mat placement between September 15– March 31
H137-2	H137-2	Reptile BMP B	Minimize civil work between April 1–October 31
H137-1	H137-1	Reptile BMP B	Minimize civil work between April 1–October 31
Merrimack S/S			

Appendix B NHFG PINE BARREN BMPS

BEST MANAGEMENT PRACTICES:
ROW Vegetation Management in Pitch Pine/Scrub oak Barrens Habitat

Pitch pine-scrub oak barrens (hereafter “Barrens”) are among the rarest and most endangered ecological communities in the United States. They occur most frequently on glacial deposits such as outwash plains and large river deltas and are characterized by acidic, sandy, nutrient-poor, excessively drained soils. They are fire dependent, fire prone and threatened by the exclusion of fire and residential/industrial development.

Barrens that support the greatest number of protected plant and animal species are open shrublands with an open canopy of pitch pine and tree oaks and an often dense understory mosaic of scrub oaks, huckleberry and other heaths. Grasslands and heathlands are frequently intermixed with barrens. Among other state-listed species, there are several species of butterflies and moths that depend on scrub oak/pitch pine habitats, and some of these Lepidoptera require extensive areas with enough larval food plants or successional stages to support their populations long-term.

Transmission lines have been managed with repeated mowing which has resulted in the creation and maintenance of important barrens refugia that would disappear without continued utility company vegetation management.

Management Goal

Maintain a diverse early-successional Barrens community supportive of State-listed and other species of conservation concern, while simultaneously achieving the goals of utility rights-of-way management (i.e. safe, reliable, power).

Ideally, utility vegetation management will create and maintain a diverse Barrens community, with up to 50% cover of scrub oak, patchily distributed throughout the right-of-way. Depending on the site, areas between scrub oak patches will consist of a mix of grassy patches and areas dominated by low-growing herbaceous plants and shrubs (e.g. lupine, blueberry, huckleberry). Over time, this management regime may lower the density of tree species that can conflict with the operation of the transmission facilities in the ROW, and an increase in low maintenance scrub/heath communities potentially resulting in less impact during maintenance efforts and cost-savings. If done appropriately, managing the Barrens vegetation will result in a healthier Barrens Habitat for the state-listed species that depend upon this ecological community type.

The following objectives will be applied using acceptable practices listed below:

1. Reduce/eliminate Pitch Pine cover and height;
2. Reduce species that interfere with transmission line maintenance objectives;
3. Manage to attain and maintain scrub oak cover to approximately +/-40-50% patchily distributed (see diagrams);

4. Reduce the height and age of the existing scrub oak by seeking, over time, to eliminate most scrub oak plants over eight (8) feet in height, because many listed Lepidoptera prefer young oak leaves
5. Encourage grasses, forbs, scrub and heaths, while maintaining adequate scrub oak cover.

Treatment Cycles

The treatment cycles will be set at a three to four-year interval as the remaining sections of the right-of-way will require mowing of taller stems at that time.

Treatment Practices

When managing scrub oak, the following treatment practices must be implemented within sections of ROW indicated as “Barrens Habitat” or “Habitat for the Karner Blue Butterfly” (KBB) on maps and/or shapefiles provided by the New Hampshire Fish and Game. In accordance with approved vegetation management plans, vegetation control will use a combination of manual cutting and/or mowing (for the immediate future) in Barrens following the guidelines below:

General Guidelines:

1. There are no restrictions on the species of woody vegetation (tall growing trees) or noxious vegetation including invasive species in the Barrens or habitat areas that are removed;
2. All target vegetation, including scrub oak, may be managed as needed to maintain clearance around structures, guy points and access roads, most notably TVM standards must be maintained in the wire zone;
3. If necessary to cut during the next treatment cycle, alternate cut scrub oak patches (maintaining the end result of +/- 40-50% coverage);
4. Perform all manual cutting after the active growing season (Oct 15th) and preferably when snow cover is 2 feet for mowing;
5. During the growing season prior to the mowing, meet with NH F&G to review possible KBB areas and/or other known sensitive natural resources (e.g., hognose snake hibernacula) and flag these areas to be hand cut and not mowed with minimal ground disturbance;
6. Do not leave cut vegetation or chips (woody debris) within the limits of the designated KBB areas.

Estimating Scrub Oak Cover within the Management Unit

The first action to be employed is to visually estimate the percent cover of scrub oak within the one pole-span management unit. To do so, walk through each ¼ pole span within the unit and record the % cover of scrub oak and the % cover of scrub oak >8 ft tall within each of the four ¼ pole-spans within the management unit.

Mechanical Only Treatments:

1. Up to 50% of the scrub oak present within the one-span management unit may be cut or mowed during a given treatment cycle. It is recommended that taller, older scrub oak plants be targeted for cutting (particularly scrub oaks >8ft tall). It is recommended, though not required, that the scrub oak be cut in patches to create a mosaic of scrub oak of varying ages/heights throughout the management unit (see graphic).
2. All target vegetation, including scrub oak, may be managed as needed to maintain clearance around structures, guy points and access roads.
3. Do not mow interstitial grassland and heath patches, except when the patches are too small to avoid in areas of dense, over scrub oak.
4. During the next treatment cycle (i.e. 3-5 yrs later) up to 50% of the scrub oak present may be cut, with an effort made to cut the taller, older scrub oak that was not cut during the previous treatment cycle.

Data Collection & Reporting

As described above, the pretreatment scrub oak cover will be estimated for each ¼ span section of the one-span management unit. The cover of scrub oak >8 ft high will also be visually estimated. During and after treatment, the manager should record the estimated percentage of scrub oak treated both mechanically. In addition, a rough sketch should be prepared showing the approximate distribution of the scrub oak patches/areas that were treated. This will facilitate treating the scrub oak on a rotation if the utility company elects to treat scrub oak during a subsequent treatment cycle. This information will be reported to the NHESP on an annual basis along with other basic information including the locations and dates of treatment, and names of contractors and project managers.

Appendix C EXISTING CONDITIONS

APPENDIX C: EXISTING CONDITIONS

For the purposes of this existing conditions summary, the Project has been divided into 11 segments. The 11 segments are as follows:

- **Area A:** Line C189 existing structures 110–95 (Farmwood Substation to Shaker Road in Concord; approximately 1.7 miles)
- **Area B:** Line C189 existing structures 94–87 (Shaker Road to Oak Hill Road in Concord; approximately 0.7 miles)
- **Area C:** Line C189 existing structures 86–80 (Oak Hill Road to Appleton Street in Concord; approximately 0.6 miles)
- **Area D:** Line C189 existing structures 79–72 (Appleton Street to Curtisville Road in Concord; approximately 0.7 miles)
- **Area E:** Line C189 existing structures 71–62 AND Line M108 existing structures 61–59 (Curtisville Road to Portsmouth Street in Concord; approximately 1 mile)
- **Area F:** Line M108 existing structures 58–54 (Interstate (I)-393 to Loudon Road in Concord; approximately 0.4 miles)
- **Area G:** Line M108 existing structures 53–34 (Loudon Road in Concord to Antrim Avenue in Pembroke; approximately 1.6 miles)
- **Area H:** Line M108 existing structures 33–18 AND Line G146 existing structures 169–170 (Antrim Avenue to Pembroke Street in Pembroke; approximately 1.6 miles)
- **Area I:** Line M108 existing structures 17–3 AND Line G146 existing structures 171–184 (Pembroke Street in Pembroke to Merrimack River in Concord; approximately 1.3 miles)
- **Area J:** Line M108 existing structures 2–1 AND G146 existing structures 185–186 AND Line H137 existing structures 32–13 (Merrimack River to Ferry Road in Bow; approximately 1.8 miles)
- **Area K:** Line H137 existing structures 12–1 (Ferry Road to Merrimack Substation in Bow; approximately 1.1 miles)

Representative photographs are provided as Attachment A.

AREA A: FARMWOOD SUBSTATION TO SHAKER ROAD

From the Farmwood Substation, Area A traverses southeasterly across suburban residential properties nestled within an undeveloped forested landscape with rolling topography before ending at Shaker Road.

Upland Habitats

Upland communities of Area A consist of an open maintained ROW dominated by common shrub, sapling, and herb species with moderately well drained to well drained soil. Shrubs cover approximately 75% of the area and are generally 2 to 4 feet tall. Characteristic shrub and sapling species include sweet-fern (*Comptonia peregrina*), gray birch (*Betula populifolia*), maleberry (*Lyonia ligustrina*), sheep-laurel (*Kalmia angustifolia*), broad-leaf meadowsweet (*Spiraea latifolia*), fire cherry (*Prunus pensylvanica*), quaking aspen (*Populus tremuloides*), northern red oak (*Quercus rubra*), Allegheny blackberry (*Rubus allegheniensis*), black huckleberry (*Gaylussacia baccata*), eastern white pine (*Pinus strobus*), and glossy false buckthorn (*Frangula alnus*). Herbaceous plants include little bluestem (*Schizachyrium scoparium*), wintergreen (*Gaultheria procumbens*), wrinkle-leaf goldenrod (*Solidago rugosa*), bristly dewberry (*Rubus*

hispidus), bracken fern (*Pteridium aquilinum*), and Pennsylvania sedge (*Carex pensylvanica*). Invasive species are generally low in overall abundance with only scattered occurrences of glossy false buckthorn. The adjacent forests are mixed forests dominated by northern red oak and eastern white pine in the canopy.

Wetland and Aquatic Habitats

Area A includes several, predominantly shrub-dominated wetlands. Characteristic shrub species include highbush blueberry (*Vaccinium corymbosum*), maleberry, broad-leaf meadowsweet, common winterberry (*Ilex verticillata*), and speckled alder (*Alnus incana*). Characteristic herbaceous species include cottongrass bulrush (*Scirpus cyperinus*), bristly dewberry, cinnamon fern (*Osmundastrum cinnamomeum*), sensitive fern, and broad-leaf cat-tail (*Typha latifolia*). Hydrology ranges from seasonally saturated to permanently inundated. Invasive species are generally low in overall abundance with purple loosestrife (*Lythrum salicaria*) occurring sporadically in the wetlands. A summary of the wetlands associated with Area A are provided in Table 1 with further details of the larger and more notable wetland systems provided below.

Wetlands W01 and W02a are scrub-shrub wetlands that are part of a larger forested peatland that extends northerly off-site. Each wetland contains hummocks of shrubs with evidence of seasonal inundation such as water marks and scour lines, indicating that these areas provide potential ephemeral vernal pool habitat (i.e., PVP01 and PVP02). PVP01 and PVP02 are generally large basins that extend throughout the wetland in the ROW.

Wetland W03 is a large scrub-shrub and emergent wetland located along an unnamed tributary of the Merrimack River. The tributary has been impounded by beaver (*Castor canadensis*), creating an approximately 1.3-acre impounded waterbody within the ROW. Vegetation is diverse within the ROW with emergent graminoid-dominated communities proximal to the impounded waterbody that transition to a scrub-shrub community to the south. Evidence of groundwater discharge was observed through permanently saturated soils within most of the wetland area. A small potential vernal pool is located in the southern portion of the wetland (PVP03).

Table 1. Area A Wetland Summary

Wetland Resource Identifier	Wetland Classification ¹	Dominant and Characteristic Vegetation	Wetland Hydrology	Priority Resource Area (PRA)	Additional Comments
W01	PSS	Shrubs: highbush blueberry (<i>Vaccinium corymbosum</i>), maleberry (<i>Lyonia ligustrina</i>), common winterberry (<i>Ilex verticillata</i>), leatherleaf (<i>Chamaedaphne calyculata</i>). Herbs: cottongrass bulrush (<i>Scirpus cyperinus</i>), bristly dewberry (<i>Rubus hispidus</i>), cinnamon fern (<i>Osmundastrum cinnamomeum</i>)	Seasonally inundated and permanently saturated	Yes—adjacent to mapped peatland	Includes potential vernal pool PVP01
W02a	PSS	Shrubs: highbush blueberry, red maple (<i>Acer rubrum</i>), sheep-laurel (<i>Kalmia angustifolia</i>) Herbs: cinnamon fern, cottongrass bulrush, shallow sedge (<i>Carex lurida</i>), hoary sedge (<i>Carex canescens</i>), peatmoss (<i>Sphagnum</i> spp.)	Seasonally inundated and permanently saturated	Yes—adjacent to mapped peatland	Includes potential vernal pool PVP02
W02	PSS	Shrubs: maleberry, highbush blueberry Herbs: bristly dewberry, cottongrass bulrush, cinnamon fern, sensitive fern (<i>Onoclea sensibilis</i>), wrinkle-leaved goldenrod (<i>Solidago rugosa</i>), broad-leaf meadowsweet (<i>Spiraea latifolia</i>)	Seasonally saturated	No	
W03	PEM / PSS / PUB	Shrubs: leatherleaf, broad-leaf meadowsweet, common winterberry Herbs: uptight sedge (<i>Carex stricta</i>), three-way sedge (<i>Dulichium arundinaceum</i>), broad-leaf cat-tail (<i>Typha latifolia</i>), bluejoint (<i>Calamagrostis canadensis</i>), smooth goldenrod (<i>Solidago gigantea</i>), eastern marsh fern (<i>Thelypteris palustris</i>), sensitive fern	Permanently inundated and permanently saturated	Yes—floodplain	Includes potential vernal pool PVP03 and perennial stream S01; portion impounded by beaver (<i>Castor canadensis</i>)
W04	PSS	Shrub: broad-leaf meadowsweet, maleberry, common winterberry, gray birch (<i>Betula populifolia</i>) Herbs: parasol white-top (<i>Doellingeria umbellata</i>), sensitive fern, eastern marsh fern, cinnamon fern, wrinkle-leaf goldenrod	Permanently saturated	No	Narrow wetland swales across ROW
W05	PEM	Herbs: wrinkle-leaf goldenrod, deer-tongue rosette grass (<i>Dichanthelium clandestinum</i>), lamp rush (<i>Juncus effusus</i>), shallow sedge, nodding sedge (<i>Carex gynandra</i>), creeping bent (<i>Agrostis stolonifera</i>), broad-leaf meadowsweet, bristly dewberry	Seasonally saturated	No	Small wet depression at base of slope
W06	PSS	Shrubs: speckled alder (<i>Alnus incana</i>), broad-leaf meadowsweet, common winterberry, gray willow (<i>Salix bebbiana</i>), maleberry Herbs: melic manna grass (<i>Glyceria melicaria</i>), sensitive fern, cinnamon fern, broad-leaf cat-tail, bristly dewberry, arrow-leaved tearthumb (<i>Persicaria sagittata</i>)	Permanently saturated	No	Includes intermittent stream S02

¹ Federal Geographic Data Committee. 2013. Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.

AREA B: SHAKER ROAD TO OAK HILL ROAD

From Shaker Road to Oak Hill Road, Area B traverses a mixed forested upland landscape with rolling topography and a few residential properties with a primary land use of forestry and agriculture.

Upland Habitats

The upland habitats in Area B include a shrub-dominated ROW containing species similar to Area A, such as sweet-fern, red oak saplings, gray birch saplings, and sheep-laurel. Herbaceous plants include little bluestem, early goldenrod (*Solidago juncea*), wrinkle-leaf goldenrod, wintergreen, bracken fern, Pennsylvania sedge, bristly dewberry, and eastern hay-scented fern (*Dennstaedtia punctilobula*). Soils are well drained.

A small open field between C189 structures 88 and 91 is dominated by herbaceous plants, such as little bluestem and flattened wild oat grass (*Danthonia compressa*) with scattered shrubs such as maleberry and red oak.

Invasive species are low in overall abundance.

Wetland and Aquatic Habitats

Several small scrub-shrub and emergent wetland areas are present in Area B and include three potential vernal pools and a perennial stream. Invasive species are low in overall abundance. Table 2 summarizes the wetland characteristics of Area B and further details of the large and notable wetland systems are provided below.

Wetlands W08 and W09 contain two small potential vernal pools (i.e., PVP04 and PVP05). PVP04 is a small ephemeral pool created as a result of past rutting through wetland W08. PVP05 is a naturally occurring pool with small hummocks of shrubs and semi-permanent hydrology.

Wetland W11 is a larger scrub-shrub wetland dominated by common winterberry, broad-leaf meadowsweet, and maleberry shrubs. It contains a potential vernal pool (PVP06) located halfway between C189 structure 92 and structure 91. It is an approximately 7,300-square-foot basin with semi-permanent hydrology dominated by hummocks of shrubs.

Wetland W14 is a permanently saturated scrub-shrub wetland adjacent to Oak Hill Road. Stream S03 is a small perennial stream that flows southeasterly from offsite into the ROW. The stream becomes impounded as it enters the ROW due to a clogged culvert under Oak Hill Road. The southwest portion of the ROW and the offsite forested wetland have become flooded as a result of the stream impoundment.

Table 2. Area B Wetland Summary

Wetland Resource Identifier	Wetland Classification	Dominant and Characteristic Vegetation	Wetland Hydrology	Priority Resource Area (PRA)	Additional Comments
W07	PEM	Shrubs: speckled alder, broad-leaf meadowsweet, gray willow Herbs: sensitive fern, cinnamon fern, bluejoint, wrinkle-leaf goldenrod	Seasonally saturated	No	
W08	PEM	Shrubs: broad-leaf meadowsweet Herbs: cinnamon fern, bristly dewberry, sensitive fern, eastern marsh fern, rattlesnake manna grass (<i>Glyceria canadensis</i>), parasol white-top, broad-leaf cat-tail	Seasonally to permanently saturated	No	Includes potential vernal pool PVP04
W09	PSS	Shrubs: common winterberry, broad-leaf meadowsweet, highbush blueberry, steeplebush (<i>Spirea tomentosa</i>), maleberry Herbs: sensitive fern, cinnamon fern, goldthread (<i>Coptis trifolia</i>), cottongrass bulrush	Seasonally to permanently saturated	No	Includes potential vernal pool PVP05
W10	PSS	Shrubs: broad-leaf meadowsweet, maleberry, sheep-laurel Herbs: sensitive fern, cinnamon fern, bluejoint, bristly dewberry	Seasonally saturated	No	
W11	PSS	Shrubs: common winterberry, broad-leaf meadowsweet, maleberry, red maple, gray willow Herbs: cinnamon fern, sheep-laurel, bristly dewberry, sensitive fern, cottongrass bulrush, melic manna grass	Seasonally to permanently saturated	No	Includes potential vernal pool PVP06
W12	PSS	Shrubs: speckled alder, broad-leaf meadowsweet, red maple Herbs: sensitive fern, cinnamon fern, royal fern (<i>Osmunda spectabilis</i>), wrinkle-leaves goldenrod, bristly dewberry	Seasonally to permanently saturated	No	
W13	PSS	Shrubs: speckled alder, red maple, broad-leaf meadowsweet Herbs: wrinkle-leaf goldenrod, bristly dewberry, sensitive fern, cinnamon fern	Seasonally to permanently saturated	No	
W14	PSS	Shrubs: speckled alder, broad-leaf meadowsweet, silky dogwood (<i>Cornus amomum</i>), red maple Herbs: sensitive fern, cinnamon fern, fringed sedge (<i>Carex crinita</i>), lakebank sedge (<i>Carex lacustris</i>), royal fern, uptight sedge	Permanently saturated	No	Includes perennial stream S03

AREA C: OAK HILL ROAD TO APPLETON STREET

From Oak Hill Road, Area C traverses a large wetland complex associated with Turtle Pond. Residential properties abut the western side of the ROW. The topography is generally flat with a few elevated areas of upland.

Upland Habitats

Area C includes minimal upland areas. Where uplands exist, they are shrub-dominated and consist of early successional species such as gray birch and quaking aspen saplings, broad-leaf meadowsweet, red maple (*Acer rubrum*), American hazelnut (*Corylus americana*), and Allegheny blackberry.

Wetland and Aquatic Habitats

Table 3 summarizes the wetlands in Area C and further details of notable wetland systems are discussed below.

Wetlands W15 and W16 are large wetland complexes associated with Turtle Pond. They include emergent, scrub-shrub, and open water components. Wetland W15 includes a large permanently saturated to permanently inundated marsh dominated by broad-leaf cat-tail with a periphery dominated by speckled alder and upright sedge (*Carex stricta*). The microtopography consists of hummocks with areas of inundation between the hummocks.

Wetland W16 similarly consists of an emergent marsh dominated by broad-leaf cattail, upright sedge, lakebank sedge, and northwest territory sedge (*Carex utriculata*) with a scrub-shrub perimeter. Large areas of inundated aquatic macrophyte beds are also present in the ROW and are dominated by American white water lily (*Nymphaea odorata*).

Invasive plants are sparse within wetlands and include scattered occurrences of purple loosestrife.

Table 3. Area C Wetland Summary

Wetland Resource Identifier	Wetland Classification	Dominant and Characteristic Vegetation	Wetland Hydrology	Priority Resource Area (PRA)	Additional Comments
W15	PSS / PEM	Shrubs: yellow birch (<i>Betula alleghaniensis</i>), speckled alder, common winterberry, red maple, highbush blueberry, broad-leaf meadowsweet, common buttonbush (<i>Cephalanthus occidentalis</i>), steeplebush Herbs: broad-leaf cat-tail, sensitive fern, cinnamon fern, bristly dewberry, bluejoint, royal fern, malic manna grass	Permanently saturated to permanently inundated	No	Large wetland on west end of Turtle Pond
W16	PSS / PUB	Shrubs: red maple, speckled alder, maleberry, common winterberry, steeplebush, broad-leaf meadowsweet Herbs: sensitive fern, uptight sedge, cinnamon fern, bristly dewberry, eastern marsh fern, flat-top goldentop (<i>Euthamia graminifolia</i>), lakebank sedge, broad-leaf cat-tail, northwest territory sedge (<i>Carex utriculata</i>), American white water-lily (<i>Nymphaea odorata</i>)	Permanently saturated to permanently inundated	No	Large wetland on west end of Turtle Pond

AREA D: APPLETON STREET TO CURTISVILLE ROAD

From Appleton Street, Area D traverses a largely undeveloped mixed forested landscape with rolling topography where the predominating land use is commercial forestry and agriculture with limited residential development.

Upland Habitats

Upland habitats are limited with the ROW between Appleton Street and C189 structure 74. Where present, the uplands are mesic and dominated by shrubs and small saplings approximately 4 to 5 feet tall with approximately 95% cover. Characteristic species include speckled alder, silky dogwood (*Cornus amomum*), red maple, broad-leaf meadowsweet, Allegheny blackberry, staghorn sumac (*Rhus hirta*), fire cherry, and gray birch. Invasive species include occasional occurrences of oriental bittersweet (*Celastrus orbiculatus*).

Between C189 structure 74 and Curtisville Road, the uplands transition to a scrub oak-dominated community. The community is drier and dominated by dry, well drained sandy loam soils. Additional characteristic dry-site species include red oak saplings, sweet-fern, eastern white pine, sheep laurel, black huckleberry, bracken fern, eastern hay-scented fern, wintergreen, Pennsylvania sedge, little bluestem, and Allegheny blackberry. Scrub oak occupies approximately 50% of the ROW from C189 structure 74 to Curtisville Road.

Wetland and Aquatic Habitats

There is one wetland present in Area D and is summarized in Table 4. It is a large wetland complex associated with Mill Brook and an unnamed tributary to Mill Brook (stream S05). It includes scrub-shrub, emergent, and open water areas. Emergent graminoid marshes dominated by lakebank sedge border Mill Brook and stream S05. These areas are hummocky with areas of inundation. Beaver activity is prevalent and a portion of stream S05 has been impounded to create a ponded area with emergent vegetation. Mill Brook is a slow-flowing meandering stream that flows south and then west through the ROW. It has bank widths up to 20 feet and a mucky and sandy substrate. Stream S05 is similarly slow-flowing and meandering with bank widths to four feet and a mucky substrate.

Table 4. Area D Wetland Summary

Wetland Resource Identifier	Wetland Classification	Dominant and Characteristic Vegetation	Wetland Hydrology	Priority Resource Area (PRA)	Additional Comments
W17	PSS / PEM / PUB	Shrubs: speckled alder, broad-leaf meadowsweet, gray birch, red maple, steeplebush, maleberry, sheep-laurel Herbs: cinnamon fern, lakebank sedge, sensitive fern, wrinkle-leaf goldenrod, lamp rush, bluejoint, royal fern, cottongrass bulrush, bristly dewberry, uptight sedge, parasol white-top, northern long sedge (<i>Carex folliculata</i>)	Permanently saturated to permanently inundated	Yes—included within and adjacent to mapped floodplain	Associated with Mill Brook (S04) and small tributary (S05); portions of wetland have been impounded by beaver; includes potential vernal pool PVP07

AREA E: CURTISVILLE ROAD TO PORTSMOUTH STREET

From Curtisville Road, Area E traverses a primarily mixed forested and undeveloped landscape with rolling topography southeasterly to Portsmouth Street. The southern portion of the ROW includes public hiking and biking trails as part of the Broken Ground Trail network in Concord.

Upland Habitats

Upland habitats in Area E are dominated by scrub oak with scrub oak areal coverages varying between approximately 20% and 40%. Additional dry-site associates include sweet-fern, little bluestem, Pennsylvania sedge, late lowbush blueberry (*Vaccinium angustifolium*), sheep-laurel, black huckleberry, wintergreen, and bracken fern. The soil is well drained sandy loam to loamy sand. Glossy false buckthorn, a non-native invasive species, becomes prevalent in the southern portion of Area E.

Wetland and Aquatic Habitats

There are two scrub-shrub wetland complexes present in Area E (Table 5). Wetland W18 is dominated by broad-leaf meadowsweet, maleberry, sheep-laurel, and saplings of gray birch and has seasonally saturated to seasonally inundated hydrology. This wetland contains an approximately 8,500-square-foot potential vernal pool (PVP08) with semi-permanent hydrology and hummocks of common winterberry and broad-leaf meadowsweet. An additional smaller potential vernal pool (PVP09) occurs in ruts within an existing access road through the southern portion of the wetland.

Located near M108 structure 60, Wetland W19 is dominated by glossy false buckthorn around its periphery with gray birch saplings, maleberry, broad-leaf meadowsweet, steeplebush (*Spiraea tomentosa*), and sheep-laurel shrubs also present. The interior of the wetland is fen-like with a graminoid marsh dominated by northwest territory sedge, upright sedge, and steeplebush. Large cranberry (*Vaccinium macrocarpon*) is also abundant in this area. The interior of the wetland is semi-permanently inundated and contains a potential vernal pool (PVP10). This is an approximately 0.76-acre area containing hummocky microtopography with areas of inundation. Flowing southeasterly into the wetland, there is a small intermittent stream (stream S06) that is approximately 3 feet wide with a sandy substrate.

Table 5. Area E Wetland Summary

Wetland Resource Identifier	Wetland Classification	Dominant and Characteristic Vegetation	Wetland Hydrology Indicators	Priority Resource Area (PRA)	Additional Comments
W18	PSS	Shrubs: common winterberry, broad-leaf meadowsweet, maleberry, sheep-laurel, red maple, gray birch, steeplebush, highbush blueberry Herbs: bristly dewberry, cinnamon fern, sensitive fern, soft-stem club-rush (<i>Schoenoplectus tabernaemontani</i>), sheep laurel, cottongrass bulrush	Permanently saturated to seasonally inundated	No	Includes potential vernal pools PVP08 and PVP09
W19	PSS	Shrubs: glossy false buckthorn (<i>Frangula alnus</i>), maleberry, gray birch, broad-leaf meadowsweet, pussy willow (<i>Salix discolor</i>), red maple, steeplebush, sheep-laurel Herbs: cottongrass bulrush, sensitive fern, wrinkle-leaf goldenrod, lamp rush, cinnamon fern, lakebank sedge, royal fern, large cranberry (<i>Vaccinium macrocarpon</i>), bristly dewberry, eastern marsh fern	Permanently saturated to permanently inundated	Yes—peatland in portion of wetland	Includes potential vernal pool PVP10 and intermittent stream S06

AREA F: I-393 TO LOUDEN ROAD

Area F is a short section of ROW between I-393 and Loudon Road. It traverses a landscaped area characterized by residential and commercial development interspersed by small blocks of forest with generally flat topography.

Upland Habitats

The upland habitats associated with Area F are primarily developed and consist primarily of a lawn and recreation area associated with the neighboring residential development complex.

Wetland and Aquatic Habitats

There is one wetland in Area F (W20; Table 6). It is a peatland dominated by dwarf shrubs of leatherleaf (*Chamaedaphne calyculata*) along with maleberry, steeplebush, broad-leaf meadowsweet, and highbush blueberry. Upright sedge dominates the herbaceous stratum. The wetland has permanently saturated hydrology and lacks open water components within the ROW.

Table 6. Area F Wetland Summary

Wetland Resource Identifier	Wetland Classification	Dominant and Characteristic Vegetation	Wetland Hydrology Indicators	Priority Resource Area (PRA)	Additional Comments
W20	PSS	Shrubs: leatherleaf, steplebush, maleberry, broad-leaf meadowsweet, highbush blueberry, setose blackberry (<i>Rubus setosus</i>) Herbs: uptight sedge	Permanently saturated	Yes-peatland	

AREA G: LOUDEN ROAD TO ANTRIM AVENUE

The ROW in Area G traverses an urban landscape dominated by commercial and residential development with generally flat microtopography. Small fragments of mixed forest are present adjacent to the ROW.

Upland Habitats

Upland habitats in Area G consist of dry scrub oak-dominated areas. Scrub oak occupies approximately 35% to 55% of the ROW. Additional dry-site associates include sweet-fern, New Jersey tea (*Ceanothus americanus*), gray birch, little bluestem, flax-leaved stiff-aster (*Ionactis linariifolia*), broad-leaf meadowsweet, and prairie willow (*Salix humilis*). Soils are sandy and excessively drained. The off-site forested areas traversed by the ROW support red oak–pitch pine communities. Non-native invasive species are low in overall abundance within the upland habitats. Off-road vehicle use is evident in some areas of the ROW, including within an open sand pit area at the southern end of Area G at Antrim Avenue.

Wetland and Aquatic Habitats

Wetlands in Area G are limited and consist of a single emergent and impounded wetland adjacent to existing commercial development (Table 7). Species such as broad-leaf cat-tail, red tinged bulrush (*Scirpus microcarpus*), and reed canary grass (*Phalaris arundinacea*) are present along the edge of the open water. The wetland has been historically impounded by beaver, resulting in an approximately 0.2-acre impoundment with a mucky silt substrate. A small stream flows southerly off-site beginning at a downstream beaver dam.

Table 7. Area G Wetland Summary

Wetland Resource Identifier	Wetland Classification	Dominant and Characteristic Vegetation	Wetland Hydrology Indicators	Priority Resource Area (PRA)	Additional Comments
W21	PEM / PUB	Herbs: broad-leaf cat-tail, red-tinged bulrush (<i>Scirpus microcarpus</i>), common spike rush (<i>Eleocharis palustris</i>), reed canary grass (<i>Phalaris arundinacea</i>), Simpler's joy (<i>Verbena hastata</i>), broad-leaf pond weed (<i>Potamogeton natans</i>)	Permanently inundated	No	Historic beaver impoundment; includes stream S07

AREA H: ANTRIM AVENUE TO PEMBROKE STREET

From Antrim Avenue, the ROW continues south and traverses an undeveloped forested block associated with the riparian areas of the Soucook River. The ROW soon re-enters a landscape associated with commercial development and rolling topography south of the Soucook River to Pembroke Street.

Upland Habitats

The upland habitats of Area H are dominated by scrub oak and other dry sandy site associates such as little bluestem, sweet-fern, black huckleberry, late lowbush blueberry, downy goldenrod (*Solidago puberula*), and gray birch. Wild lupine (*Lupinus perennis*) was observed in a portion of the ROW, but this area will not be affected by construction associated with this Project. The adjacent forests are dominated by red oak and white pine.

Wetland and Aquatic Habitats

Wetlands are limited in Area H and include three small scrub-shrub wetland depressions near the Soucook River (Table 8). Wetland W24 contains a potential ephemeral vernal pool (PVP11) that is approximately 2,000 square feet in area.

The Soucook River is a large watercourse with run-glide-riffle habitat within the ROW. The substrate consists of boulders, sand, cobble, and gravel with steep, nearly vertical banks and bank widths of approximately 60 feet.

A small perennial stream flows westerly across the ROW adjacent to a commercial landscaping facility. It has a sand, boulder, and cobble substrate and bank widths to approximately four feet.

Table 8. Area H Wetland Summary

Wetland Resource Identifier	Wetland Classification	Dominant and Characteristic Vegetation	Wetland Hydrology Indicators	Priority Resource Area (PRA)	Additional Comments
W22	PSS	Shrubs: speckled alder, yellow birch, broad-leaf meadowsweet, steplebush, common winterberry Herbs: bluejoint, sensitive fern, cottongrass bulrush, bristly dewberry	Seasonally saturated	No	
W23	PSS	Shrubs: maleberry, silky dogwood, broad-leaf meadowsweet Herbs: deer-tongue rosette grass, bristly dewberry, uptight sedge	Seasonally saturated	No	
W24	PSS	Shrubs: common winterberry, broad-leaf meadowsweet, silky dogwood, steplebush, red maple Herbs: cottongrass bulrush, sensitive fern, fringed sedge, hop sedge (<i>Carex lupulina</i>), harlequin blueflag (<i>Iris versicolor</i>)	Seasonally saturated to seasonally inundated	Yes—in mapped floodplain	Includes potential vernal pool PVP11

AREA I: PEMBROKE STREET TO MERRIMACK RIVER

From Pembroke Street, the ROW traverses a primarily undeveloped upland landscape with flat to rolling topography. It crosses the Soucook River and Garvins Falls Road before reaching the Merrimack River.

Upland Habitats

The upland habitats in Area I beyond the Soucook River riparian areas are dominated by scrub oak with generally excessively drained sandy soils. Scrub oak cover ranges from approximately 40% areal cover between Pembroke Street and the Soucook River and up to 70% from the Soucook River south to Garvins Falls Road. The ROW supports several additional dry site associates such as little bluestem, flax-leaved stiff-aster, sweet-fern, broad-leaf meadowsweet, and wintergreen. Species such as New Jersey tea, pitch pine saplings, bush-clovers (*Lespedeza* spp.), and dwarf chinkapin oak (*Quercus prinoides*) are present in the ROW south of the Soucook River.

The riparian upland areas within the floodplain of the Soucook River are similarly shrub dominated but are slightly more mesic and include a dominance of broad-leaf meadowsweet, wrinkle-leaf goldenrod, Canada goldenrod (*Solidago canadensis*), quaking aspen saplings, and little bluestem with sandy soils and flat topography. Scrub oak is nearly absent in this area. Glossy false buckthorn is present in low abundance.

Scrub oak-dominated habitats continue south of Garvins Falls Road but early successional saplings such as quaking aspen and fire cherry become more prevalent in the ROW as hydrology becomes more mesic closer to the Merrimack River. American hazelnut covers approximately 70% of the ROW closer to the Merrimack River.

Wetland and Aquatic Habitats

Wetland habitats in Area I are limited to depressional scrub-shrub wetlands in the floodplain of the Soucook River and seepage wetlands near the Merrimack River (Table 9). Several wetlands are within oxbows of the Soucook River and are seasonally inundated, thereby providing potential vernal pool habitat.

The Soucook River has bank widths of approximately 70 feet, a sandy substrate, and glide habitat. A large sandbar is present on the north shore of the river in the ROW.

The banks of the Merrimack River support a narrow floodplain dominated by speckled alder. Exposed sandy depositional areas are located in the upper floodplain along the north shore of the river.

The Merrimack River is a large river with bank widths of approximately 600 feet. The ROW crosses the river approximately 850 downstream (east) of the Garvins Falls Dam.

Table 9. Area I Wetland Summary

Wetland Resource Identifier	Wetland Classification	Dominant and Characteristic Vegetation	Wetland Hydrology Indicators	Priority Resource Area (PRA)	Additional Comments
W25	PSS	Shrubs: broad-leaf meadowsweet, silky dogwood Herbs: stalked bulrush (<i>Scirpus pedicellatus</i>), sensitive fern, uptight sedge, wrinkle-leaf goldenrod	Permanently saturated	Yes—in mapped floodplain	Includes stream S10 recent beaver activity in wetland
W26	PSS	Shrubs: gray birch, gray willow, glossy false buckthorn, common winterberry, broad-leaf meadowsweet, steplebush Herbs: sensitive fern, cinnamon fern, royal fern	Seasonally inundated	No	Includes potential vernal pool PVP12
W27	PSS	Shrubs: buttonbush, common winterberry, broad-leaf meadowsweet, steplebush, yellow birch Herbs: sensitive fern, royal fern, cottongrass bulrush	Seasonally inundated	Yes—in mapped floodplain	Includes potential vernal pool PVP13
W28	PSS	Shrubs: silky dogwood, common buttonbush (<i>Cephalanthus occidentalis</i>) Herbs: sensitive fern	Seasonally inundated	No	Includes potential vernal pool PVP14
W29	PSS	Shrubs: broad-leaf meadowsweet Herbs: bristly dewberry, uptight sedge, white paniced American-aster (<i>Symphotrichum lanceolatum</i>)	Seasonally saturated	No	
W30	PSS	Shrubs: silly dogwood, broad-leaf meadowsweet, speckled alder Herbs: sensitive fern, fringed sedge, necklace sedge (<i>Carex projecta</i>), wrinkle-leaf goldenrod	Seasonally inundated	Yes—in mapped floodplain	Includes potential vernal pool PVP15; transitions to forested wetland off-site
W31	PSS	Shrubs: gray willow, steplebush, broad-leaf meadowsweet, red maple, silky dogwood Herbs: sensitive fern, cinnamon fern, wrinkle-leaf goldenrod	Seasonally inundated	Yes—includes protected species	Includes potential vernal pool PVP16; hollow Joe-pye weed (<i>Eutrochium fistulosum</i>) present on edge of wetland
W32	PSS	Shrubs: common winterberry, speckled alder, silky dogwood, broad-leaf meadowsweet Herbs: cinnamon fern, bristly dewberry, sensitive fern, wrinkle-leaf goldenrod	Permanently saturated	No	Narrow wetland swale fed by groundwater discharge
W33	PSS	Shrubs: speckled alder, common winterberry, gray birch, maleberry, quaking aspen (<i>Populus tremuloides</i>), broad-leaf meadowsweet, steplebush Herbs: sensitive fern, cinnamon fern, red-tinge bulrush, wrinkle-leaf goldenrod, eastern marsh fern Vines: river grape (<i>Vitis riparia</i>)	Permanently saturated	No	
W34	PSS	Shrubs: speckled alder, broad-leaf meadowsweet Herbs: wrinkle-leaf goldenrod, farewell-summer (<i>Symphotrichum lateriflorum</i>), sensitive fern, deer-tongue rosette grass	Seasonally saturated, occasionally inundated	Yes—in mapped floodplain	Adjacent to Merrimack River

AREA J: MERRIMACK RIVER TO FERRY ROAD

From the Merrimack River, the ROW traverses southeasterly on a terrace to the west of the Merrimack River through a rolling to flat landscape containing residential and commercial development as well as undeveloped forest blocks.

Upland Habitats

The western portion of Area J consists of dense early successional dry-mesic shrublands dominated by quaking aspen saplings along with Allegheny blackberry, oriental bittersweet, American hazelnut, gray birch, staghorn sumac, fire cherry, and red oak shrubs and saplings. Herbaceous plants consist commonly of eastern hay-scented fern, wrinkle-leaf goldenrod, black bent (*Agrostis gigantea*), little bluestem, and American pokeweed (*Phytolacca americana*). Soils are generally loamy sands. Invasive species such as oriental bittersweet and Morrow's honeysuckle (*Lonicera morrowii*) are present in low to moderate abundance.

Between H137 structures 21 and 17, the topography steeply rises to a sandy terrace characterized by sandplain grassland species such as scrub oak, sweet-fern, late lowbush blueberry, little bluestem, bracken fern, poverty grass (*Danthonia spicata*), bush-clovers, red oak, eastern hay-scented fern, pinweeds (*Lechea* spp.), and wrinkle-leaf goldenrod. The adjacent habitats are dominated by red oak and white pine and are largely undeveloped.

East of existing H137 structure 17 to a railroad crossing, the topography drops steeply to a low sandy terrace above the Merrimack River. Sandplain grassland habitat conditions continue with species such as staghorn sumac, little bluestem, and arching blackberry (*Rubus recurvicaulis*) present.

A sandplain grassland community dominated by little bluestem is present between the railroad tracks and Ferry Road. Shrubs including sweet-fern, gray birch, eastern red cedar (*Juniperus virginiana*), and broad-leaf meadowsweet are scattered along with herbs such as flax-leaved stiff aster and arching blackberry. The soils are sandy, and the topography is flat.

Wetland and Aquatic Habitats

Several scrub-shrub and emergent wet meadow wetlands are located in Area J (Table 10). Two small streams area also present.

Wetland W40 is the largest wetland in Area J. It is a scrub-shrub wetland that contains three potential vernal pools. Each potential vernal pool is seasonally to semi-permanently inundated with hummocks of graminoids and shrubs. They range in size from approximately 900 square feet to approximately 2,900 square feet and may have been historically excavated as part of past land use including original transmission line or railroad construction.

Stream S13 is an unnamed perennial stream with bank widths of approximately 5 to 6 feet and a coarse substrate consisting of sand, cobbles, boulders, and gravels. It has a moderate gradient and ultimately flows into the Merrimack River offsite. Stream S14 is a small ephemeral stream with hydrology provided by surface water runoff upslope. It soon dissipates into wetland W40.

Table 10. Area J Wetland Summary

Wetland Resource Identifier	Wetland Classification	Dominant and Characteristic Vegetation	Wetland Hydrology Indicators	Priority Resource Area (PRA)	Additional Comments
W35	PSS	Shrubs: pussy willow, silky dogwood Herbs: red-tinge bulrush, reed canary grass, purple loosestrife, sensitive fern, cinnamon fern, rattlesnake manna grass, broad-leaf cat-tail	Permanently saturated	No	Adjacent to railroad tracks
W36	PSS	Shrubs: pussy willow, silky dogwood, broad-leaf meadowsweet Herbs: sensitive fern, red-tinge bulrush, purple loosestrife, parasol white-top, broad-leaf cat-tail, flat-top goldentop	Seasonally saturated	No	
W37	PSS	Shrubs: silky dogwood, speckled alder, rambler rose (<i>Rosa multiflora</i>) Herbs: sensitive fern, cinnamon fern, lamp rush, purple loosestrife, broad-leaf cat-tail, narrow-panicle rush (<i>Juncus brevicaudatus</i>), parasol white-top	Seasonally saturated	No	
W38	PSS	Shrubs: silky dogwood, broad-leaf meadowsweet Herbs: lakebank sedge, ostrich fern (<i>Matteuccia struthiopteris</i>)	Seasonally saturated	No	Drainage swale at base of railroad embankment; along stream S13
W39	PSS	Shrubs: red maple, black elder (<i>Sambucus nigra</i>) Herbs: sensitive fern, purple-stem American-aster (<i>Symphotrichum puniceum</i>), Canada goldenrod (<i>Solidago canadensis</i>), northern lady fern (<i>Athyrium angustum</i>), king-of-the-meadow (<i>Thalictrum pubescens</i>), spotted touch-me-not (<i>Impatiens capensis</i>)	Seasonally saturated	No	Adjacent to stream S13
W40	PSS	Shrubs: red maple, speckled alder, gray willow, yellow birch, broad-leaf meadowsweet, common winterberry Herbs: sensitive fern, royal fern, cinnamon fern, broad-leaf cattail, bristly dewberry, wrinkle-leaf goldenrod	Seasonally saturated, Seasonally inundated	No	Includes potential vernal pools PVP17, PVP18, and PVP19
W41	PFO / PSS	Trees: red maple, quaking aspen, American elm (<i>Ulmus americana</i>) Shrubs: silky dogwood, black elder Herbs: sensitive fern, cinnamon fern wrinkle-leaf goldenrod, small-spike false nettle (<i>Boehmeria cylindrica</i>)	Seasonally saturated	No	
W42	PEM	Shrubs: Allegheny blackberry (<i>Rubus allegheniensis</i>) Herbs: uptight sedge, sensitive fern, wrinkle-leaf goldenrod	Seasonally saturated	No	
W43	PSS	Shrubs: broad-leaf meadowsweet, common winterberry, Allegheny blackberry Herbs: sensitive fern, wrinkle-leaf goldenrod, uptight sedge, setose blackberry	Seasonally saturated	No	

AREA K: FERRY ROAD TO MERRIMACK SUBSTATION

From Ferry Road, Area K traverses a flat terrace across property associated with the Granite Shore Power powerplant and Merrimack Substation. Bow Bog Brook flows northerly through the ROW for approximately 0.5 miles.

Upland Habitats

The upland habitats in Area K are early successional shrub and herb-dominated communities. From the railroad crossing of the ROW near H137 structure 9 to approximately H137 structure 6, the ROW is predominately dominated by herbaceous species such as wrinkle-leaf goldenrod, little bluestem, bristly dewberry, and Allegheny blackberry with scattered occurrences of common milkweed (*Asclepias syriaca*).

Elsewhere, the ROW uplands consist of dense early successional shrubs and saplings including gray birch, Morrow's honeysuckle, Allegheny blackberry, broad-leaf meadowsweet, quaking aspen, and American hazelnut along with herbs of wrinkle-leaf goldenrod, little bluestem, and deer-tongue rosette grass (*Dichanthelium clandestinum*). Soils consist of fine sandy loams.

Morrow's honeysuckle, an invasive shrub, is present in many areas within the ROW.

Wetland and Aquatic Habitats

Several wetland communities are present in Area K (Table 11). Most areas are dominated by shrubs such as broad-leaf meadowsweet, speckled alder, and silky dogwood. The larger and more notable wetlands are discussed below.

Wetland W46 is a scrub-shrub wetland within the floodplain of Bow Bog Brook. Shrub and emergent vegetation is dense throughout the wetland. A small potential vernal pool (PVP20) is present in the northern portion of the wetland in a small topographic depression. The wetland slopes westerly with areas of groundwater discharge evident where it meets Bow Bog Brook.

Wetland 50 is a large wetland complex consisting of open water, emergent, and scrub-shrub components. The open water community is present in the interior of the wetland. It consists of an approximately 2.5-acre ponded area containing dense beds of floating and submerged aquatic vegetation. The perimeter consists of shrubs and emergent species such as speckled alder, silky dogwood, common buttonbush (*Cephalanthus occidentalis*), northwest territory sedge, broad-leaf cat-tail, and common woolgrass (*Scirpus cyperinus*). A colony of common reed (*Phragmites australis*), a non-native species, is present in the southeastern portion of the wetland complex.

Bow Bog Brook is a large perennial stream with bank widths of approximately 35 to 40 feet. It has a sand, gravel, and boulder substrate and run-glide habitat. The banks are steep and nearly vertical in areas. Beaver activity is evident along this reach of stream. It flows into the Merrimack River off site.

Table 11. Area K Wetland Summary

Wetland Resource Identifier	Wetland Classification	Dominant and Characteristic Vegetation	Wetland Hydrology Indicators	Priority Resource Area (PRA)	Additional Comments
W44	PSS	Shrubs: silky dogwood, Allegheny blackberry, smooth arrow-wood (<i>Viburnum recognitum</i>), speckled alder, broad-leaf meadowsweet Herbs: cottongrass bulrush, uptight sedge, wrinkle-leaf goldenrod, sensitive fern, bluejoint, bristly dewberry	Seasonally saturated	No	
W45	PEM	Shrubs: speckled alder, silky dogwood Herbs: sensitive fern, uptight sedge, bluejoint, parasol white-top, wrinkle-leaf goldenrod	Seasonally saturated	Yes—mapped floodplain	
W46	PSS	Shrubs: nanny-berry (<i>Viburnum lentago</i>), broad-leaf meadowsweet, maleberry, common buttonbush, silky dogwood, Allegheny blackberry, fire cherry (<i>Prunus pensylvanica</i>) Herbs: lakebank sedge, uptight sedge, sensitive fern, bluejoint, cinnamon fern	Seasonally saturated, Seasonally inundated	Yes—mapped floodplain	Includes potential vernal pool PVP20
W47	PSS	Shrubs: speckled alder, silky dogwood, broad-leaf meadowsweet Herbs: uptight sedge, lamp rush, bluejoint	Occasionally inundated	Yes—mapped floodplain	Adjacent to Bow Bog Brook
W48	PEM	Shrubs: silky dogwood, broad-leaf meadowsweet Herbs: sensitive fern, wrinkle-leaf goldenrod, bluejoint, parasol white-top	Seasonally saturated	No	
W49	PSS	Shrubs: speckled alder, red maple, broad-leaf meadowsweet Herbs: wrinkle-leaf goldenrod, lakebank sedge, sensitive fern, cinnamon fern	Occasionally inundated	Yes—mapped floodplain	Adjacent to Bow Bog Brook
W50	PSS / PEM / PUB	Shrubs: speckled alder, silky dogwood, common winterberry Herbs: sensitive fern, uptight sedge, wrinkle-leaf goldenrod, bluejoint, common reed (<i>Phragmites australis</i>), purple loosestrife, lamp rush, eastern marsh fern, pickerelweed (<i>Pontederia cordata</i>), American white water-lily	Permanently saturated, Permanently inundated	No	Large wetland complex with open water
W51	PSS	Shrubs: silky dogwood, Morrow's honeysuckle (<i>Lonicera morrowii</i>) Herbs: sensitive fern, reed canary grass, fringed sedge, wrinkle-leaf goldenrod, northern lady fern	Seasonally saturated	No	
W52	PUB	Shrubs: speckled alder Herbs: pickerelweed, coon's-tail (<i>Ceratophyllum demersum</i>)	Permanently inundated	No	Ponded area, recent beaver activity; narrow fringe of speckled alder

ATTACHMENT A: REPRESENTATIVE PHOTOGRAPHS

Eversource C189, M108, H137, and G146 Structure Replacement Project

Area A: Farmwood Substation to Shaker Road

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 1. Potential vernal pool (PVP01) habitat in wetland W01. October 25, 2021.



Photo 2. Potential vernal pool (PVP02) habitat in wetland W02A. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 3. Row near C189 Structure 109, view to the south. November 8, 2021.



Photo 4. Wetland W03 impounded portion. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 5. Wetland W03 scrub-shrub and emergent portion. October 25, 2021.



Photo 6. Representative shrub-dominated ROW uplands near C189 Structure 105. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 7. Representative ROW uplands near C189 Structure 99. November 8, 2021.



Photo 8. Wetland W04. October 25, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 9. Representative ROW uplands near C189 Structure 96. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project

Area B: Shaker Road to Oak Hill Road

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 10. Shrub-dominated ROW from Shaker Road. November 8, 2021.



Photo 11. Potential vernal pool (PVP04) in wetland W08. October 25, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 12. Potential vernal pool (PVP05) in wetland W09. October 25, 2021.



Photo 13. Representative grass-dominated ROW uplands near C189 Structure 90. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 14. Wetland W14. October 26, 2021.



Photo 15. Impounded portion of stream S03 in W14. October 26, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project

Area C: Oak Hill Road to Appleton Street

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 16. Emergent wetland W15 from Oak Hill Road. November 8, 2021.



Photo 17. Wetland W15 scrub-shrub portion with Turtle Pond near C189 Structure 182. October 26, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 18. Wetland W16 scrub-shrub and emergent portion near C189 Structure 81. October 26, 2021.



Photo 19. Wetland W16 open water and emergent component north of Appleton Street. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project

Area D. Appleton Street to Curtisville Road

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 20. Mill Brook (stream S04) from Appleton Street. November 8, 2021.



Photo 21. Wetland W17 near C189 Structure 77. October 26, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 22. Wetland W17 open water impoundment near C189 Structure 78. November 8, 2021.



Photo 23. Wetland W17 emergent and scrub-shrub wetlands along stream S05. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 24. Potential vernal pool (PVP07) in W17 near C189 Structure 76. November 8, 2021



Photo 25. Shrub-dominated ROW near C189 Structure 74. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 26. Scrub oak near C189 Structure 74. November 8, 2021.



Photo 27. Scrub oak-dominated ROW near C189 Structure 73. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project

Area E: Curtisville Road to Portsmouth Street

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 28. Potential vernal pool (PVP08) in wetland W18. October 28, 2021.



Photo 29. Potential vernal pool (PVP08) in wetland W18. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 30. Wetland W18 near C189 Structure 69. November 8, 2021.



Photo 31. Potential vernal pool (PVP09) in W18 near C189 Structure 68. October 28, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 32. Shrub-dominated ROW uplands near C189 Structure 66. November 8, 2021.



Photo 33. Shrub-dominated ROW uplands near C189 Structure 66. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 34. Ribbon snake near C189 Structure 64. October 28, 2021.



Photo 35. Shrub-dominated ROW uplands near C189 Structure 62. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 36. Dry ROW dominated by little blue stem near C189 Structure 61. November 8, 2021.



Photo 37. Stream S06 in wetland W19. October 28, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 38. Wetland W19 cranberry bog component. October 28, 2021.



Photo 39. Wetland W19 emergent component and potential vernal pool (PVP10). October 28, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project

Area F: I-393 to Loudon Road

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 40. Wetland W20 dwarf shrub and graminoid bog. October 28, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project

Area G: Louden Road to Antrim Avenue

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 41. Dry shrub-dominated uplands near M108 Structure 50. October 26, 2021.



Photo 42. Dry shrub-dominated uplands near M108 Structure 48. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 43. Shrub-dominated ROW with pitch pine along ROW edge near M108 Structure 47.
November 8, 2021.



Photo 44. Shrub-dominated ROW uplands with scrub oak and pitch pine saplings near M108 Structure 46.
November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 45. Shrub-dominated ROW uplands with scrub oak and pitch pine saplings near M108 Structure 45. November 8, 2021.



Photo 46. Shrub-dominated ROW uplands with scrub oak near M108 Structure 44. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 47. Wetland W21 impounded area. October 26, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project

Area H: Antrim Avenue to Pembroke Street

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 48. Sand pit with off-road vehicle use in ROW near M108 Structure 33. November 8, 2021.



Photo 49. Shrub-dominated ROW and Soucook River south of M108 Structure 32. November 8, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 50. Sandy south-facing embankment north of Soucook River near M108 Structure 32.
November 8, 2021.



Photo 51. Soucook River. October 26, 2021

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 52. Potential vernal pool (PVP11) in wetland W24. October 27, 2021.



Photo 53. Sandy access trail in ROW near Soucook River. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 54. Scrub oak-dominated ROW near M108 Structure 31. November 9, 2021.



Photo 55. Shrub-dominated sandy uplands and existing access road near M108 Structure 30. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 56. Scrub oak and little bluestem-dominated ROW near M108 Structure 30. November 9, 2021.



Photo 57. Scrub oak and little bluestem-dominated ROW near M108 Structure 27. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 58. Wild lupine in ROW near M108 Structure 26. October 27, 2021.



Photo 59. Existing wild lupine protection area near M108 Structure 26. October 27, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 60. Scrub oak-dominated ROW uplands near M108 Structure 25. November 9, 2021.



Photo 61. Stream S09. October 27, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 62. Scrub oak-dominated ROW uplands near M108 Structure 19 and G146 Structure 169.
November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project

Area I: Pembroke Street to Merrimack River

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 63. Scrub oak and little bluestem-dominated ROW near M108 Structure 17 and G146 Structure 171. November 9, 2021.



Photo 64. Sandy scrub oak-dominated embankment near Soucook River. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 65. Stream S10 in wetland W25. October 29, 2021.



Photo 66. Potential vernal pool (PVP12) in wetland W26. October 29, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 67. Potential vernal pool (PVP13) in wetland W27. October 29, 2021.



Photo 68. Sandy floodplain terrace along Soucook River. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 69. Potential vernal pool (PVP14) in wetland W28. October 29, 2021.



Photo 70. Potential vernal pool (PVP15) in wetland W30. November 30, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 71. Soucook River and off-road vehicle use through sandy areas of ROW. November 9, 2021.



Photo 72. Potential vernal pool (PVP16) in wetland W31. October 29, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 73. Shrub-dominated ROW and sandy access trail near M108 Structure 10 and G146 Structure 178.
November 9, 2021.



Photo 74. Scrub oak-dominated ROW near M108 Structure 7 and G146 Structure 180.
November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 75. Shrub-dominated ROW and associated existing access road near M108 Structure 5 and G146 Structure 182. November 9, 2021.



Photo 76. Exposed sandy area in upper floodplain along Merrimack River. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project

Area J: Merrimack River to Ferry Road

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 77. Merrimack River. October 28, 2021.



Photo 78. Early-successional, shrub-dominated ROW near H137 Structure 29. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 79. Early-successional, shrub-dominated ROW near H137 Structure 27. November 9, 2021.



Photo 80. Stream S13. October 28, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 81. Old field in ROW near H137 Structure 135. November 9, 2021.



Photo 81. Potential vernal pool (PVP17) in wetland W40. October 28, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 82. Potential vernal pool (PVP18) in wetland W40. October 28, 2021.



Photo 83. Potential vernal pool (PVP19) in wetland W40. October 28, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 84. Early-successional, shrub-dominated ROW uplands near H137 Structure 22. November 9, 2021.



Photo 85. Representative ROW from H137 Structure 20. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 86. Shrub-dominated dry sandy ROW uplands near H137 Structure 19. November 9, 2021.



Photo 87. Sandy grassland area near H137 Structure 18. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 88. Sandy ROW uplands near H137 Structure 17. October 28, 2021.



Photo 89. Wetland W42. October 28, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 90. Sandy grassland area near H137 Structure 15. November 9, 2021.



Photo 91. Sandy grassland ROW area from Ferry Road. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project

Area K: Ferry Road to Merrimack Substation

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 92. Wetland W44. October 27, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 93. Wetland W46. October 27, 2021.



Photo 94. Early-successional, shrub-dominated ROW and existing access road near H137 Structure 10. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 95. Bow Bog Brook near H137 Structure 9. November 9, 2021.



Photo 96. Bow Bog Brook near H137 Structure 8. October 27, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 97. Early successional sandy shrub-dominated ROW near H137 Structure 5. November 9, 2021.



Photo 98. Emergent and aquatic wetland habitat near H137 Structure 4 in wetland 50. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 99. Emergent and aquatic wetland habitat near H137 Structure 3 in wetland 50. November 9, 2021.



Photo 100. Early successional ROW uplands near H137 Structure 3. November 9, 2021.

Eversource C189, M108, H137, and G146 Structure Replacement Project



Photo 101. Wetland W52 impoundment adjacent to Merrimack Substation. October 27, 2021.