



**NHDES Alteration of Terrain
Permit Application**

C189, M108, H137, and G146 Structure
Replacement Project
Concord, Pembroke, and Bow, New Hampshire

January 27, 2023

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1.0 PROJECT BACKGROUND AND PURPOSE

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 (Figures 1 and 2). The C189, M108, and H137 lines run within an existing right-of-way (ROW) between the Farmwood and Merrimack substations. The G146 line is co-located with C189, M108, and H137 lines from the Garvins Substation for approximately 1.8 miles before heading east in its own corridor; hereinafter referred to collectively as CHMG. Eversource has identified that all wooden structures will need to be replaced within the 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. Natural resource impacts have been minimized and avoided to the greatest extent practicable through careful siting of access roads and work pads.

The Project requires approximately 1,487,038 square feet (sf; 34.1 acres) of total ground area, including 273,776 sf (6.3 acres) of temporary wetland matting, 213,262 sf (4.9 acres) of upland matting, and 1,000,000 sf (23 acres) of ground disturbance. The total ground disturbance required for the proposed replacement Project is subject to the Alteration of Terrain (AoT) disturbance threshold (Env-Wq 1500 and RSA 485-A:17). The total ground disturbance for the Project will be collectively referred to hereinafter as the AoT project area (see Figure 4 – Alteration of Terrain Permitting Plans and Appendix A – Alteration of Terrain Permit Application Form).

The AoT project area described above for the CHMG lines are co-located within the same ROW as the P145 transmission line. The P145 Transmission Line Rebuild Project (P145 project) received AoT approval on August 12, 2022 (AoT-2205) and was amended on October 7, 2022 (AoT-2205A) to include several initial replacement structures on the C189, M108, and H137 lines. Since the projects occur within the same ROW, the avoidance and minimization practices, best management practices (BMPs), and other project processes or protection measures for the CHMG project largely mirror those developed and permitted for the P145 project. Construction of the P145 project is currently underway.

2.0 SITE INFORMATION

2.1 SITE LOCATION AND DESCRIPTION

The AoT project area includes the CHMG lines where they are co-located within the same ROW as the P145 project that runs through Concord, Pembroke, and Bow. The AoT project area is approximately 12.5 miles long and 250 to 350 feet (ft) wide.

The AoT project area crosses 9 streams: 6 perennial streams and 3 intermittent streams (see Figure 4 – Alteration of Terrain Permitting Plans). There are 24 wetlands located within the AoT project area. The AoT project area crosses 14 public roads with 21 access points off those public roads. There are an



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additional 17 private access points. The ground disturbance resulting from the Project is associated with establishment of access roads and work pads within uplands.

2.2 TAX MAP AND LOT INFORMATION

Eversource holds easements for, or is the landowner of, parcels located within the AoT project area (see Figure 4).

There are 112 abutting properties that contain pre-existing Eversource easements for the ROW within the AoT project area. Within the AoT project area, the ROW is considered the “subject property” because Eversource is the applicant/owner and only has control over the easement area. AoT project area abutters have been identified and are listed in Appendix B.

2.3 IDENTIFICATION OF NATURAL AND CULTURAL RESOURCES

Stantec Consulting Services Inc. (Stantec) was retained by Eversource to provide professional services related to natural resource identification and assessment for this Project. Heritage Consultants, LLC, is providing professional services related to cultural resource identification. Stantec is also preparing permit applications for natural resource impacts required to complete the Project. Stantec has conducted and coordinated field evaluations and corresponded with appropriate agencies to identify natural and cultural resources present within the vicinity of the AoT project area and CHMG lines.

2.3.1 Identification of Cultural and Historical Resources

The Project does not anticipate any adverse effects to cultural resources and is currently in consultation with the New Hampshire Division of Historical Resources (NHDHR) to identify and mitigate such impacts. Portions of the transmission line corridor from the Farmwood Substation to the Merrimack Substation were previously surveyed for archaeological resources during the Northern Pass Transmission Project. Sensitive areas were identified in proximity to proposed Project activities (Figure 4). Additional Phase IB archeological investigations were conducted in Spring 2022. Archeological sites were either identified or confirmed, and efforts will be made to avoid impacts to these areas. A Request for Project Review was sent to NHDHR on June 23, 2022, and again on August 19, 2022, to provide additional information as part of the P145 project. The NHDHR determined that there would be no adverse effects to archaeological or historic sites provided protective measures (upland matting) are utilized during establishment of access roads and work pads. Heritage Consultants, LLC, is currently performing additional archaeological surveys in sensitive areas that cannot be avoided by the CHMG structure replacement work. Once archaeological work is complete, an additional Request for Project review with applicable field reports will be sent to NHDHR. The NHDHR response will be forwarded to the New Hampshire Department of Environmental Services (NHDES) when received.

2.3.2 Identification of Jurisdictional Wetlands and Vernal Pools

Wetland delineations were originally conducted along portions of the CHMG ROW as part of survey efforts by others in 2010. Stantec verified the previously delineated wetland boundaries and delineated



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additional ROW areas in October and November 2021. The wetland delineation and verification was led and conducted by New Hampshire Certified Wetland Scientist Matt Arsenault (#278) using the technical criteria described in the United States Army Corps of Engineers (Corps) *Corps of Engineers Wetlands Delineation Manual*¹ and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2)*.² Anticipated federal and state jurisdictional determinations made during the wetland delineations were based on the criteria set forth in the NHDES Wetlands Bureau Administrative Rules. Wetland communities were classified according to the *Classification of Wetlands and Deepwater Habitats of the United States*.³ Previously delineated wetland boundaries were adjusted as necessary to reflect changes since the original delineation. The results of the wetland delineation and verification are shown on Figures 3 and 4.

Potential vernal pools were identified during the wetland delineations in October and November 2021 and based on the characteristics outlined in the *Identifying and Documenting Vernal Pools in New Hampshire*.⁴ Stantec wetland scientists identified 20 potential vernal pools within the AoT project area. The Project design will avoid most of the potential vernal pools. If pools cannot be avoided, installation and removal of wetland matting will be limited to outside the April 1 to October 15 time period when vernal pool dependent species may be present.

2.3.3 Identification of Surface Waters

Jurisdictional limits of surface waters of the State of New Hampshire were delineated and confirmed by Stantec in accordance with their definition in RSA 485-A:2 XIV and 482-A:4 II. Surface waters included wherever freshwater flows or stands and tidal waters. This includes, but is not limited to, rivers, perennial and intermittent streams, lakes, ponds, intertidal zones, and tidal waters. The limits of jurisdiction for surface waters were delineated as the top of bank (where a natural bank occurs) or its ordinary high-water mark (where a natural bank is not present). Streams identified during the delineations were identified based on the definitions in NHDES Certified Administrative Rules Env-Wt 406 as well as the technical guidance available from the Corps on the identification of an Ordinary High Water Mark⁵ and definition of a tributary as described in the Clean Water Act.⁶ Surface waters within the AoT project area include 2 named perennial riverine systems (Mill Brook/Turtle Pond Outlet and Bow Bog Brook), 4 unnamed perennial streams, and 3 unnamed intermittent or ephemeral streams.

¹ Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS.

² U.S. Army Corps of Engineers. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*, ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

³ 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.

⁴ Marchand, M. 2016. *Identifying and Documenting Vernal Pools in New Hampshire*. Third Edition, New Hampshire Fish and Game Department, Nongame and Endangered Wildlife Program.

⁵ U.S. Army Corps of Engineers. 2005. Regulatory Guidance Letter: Ordinary High Water Mark Identification. December 8, 2005. No. 05-05.

⁶ U.S. Army Corps of Engineers. 2015. 33 Code of Federal Regulations, Part 328, "Waters of the United States". June 29, 2015.



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2.3.4 Natural Heritage Bureau Results and Rare Species Consultation

A review completed by the Natural Heritage Bureau (NHB) through their DataCheck Tool determined that state-listed plant and animal species are present in the vicinity of the Project. The identified species and avoidance and minimization measures recommended by NHB and the New Hampshire Fish and Game Department (NHFG) are provided herein and utilize or follow the same BMPs developed for the P145 project. The NHB DataCheck results letters are included in Appendix C. Associated avoidance and minimization measures for botanical resources were determined through the correspondence with NHB, as part of the P145 project. Additional field surveys of state-listed plant species were conducted in spring and summer 2022 between Curtisville Road and the Merrimack River at the request of NHB. Based upon their review of the survey results, NHB provided avoidance and minimization construction techniques and BMPs to protect state-listed botanical resources during construction of the P145 project. These same BMPs will be followed for the co-located CHMG project and are described in the P145 threatened and endangered plant survey report (October 4, 2022) included in Appendix C.

Construction BMPs and protection measures for state- and federally listed wildlife species anticipated to occur in the AoT Project area have been developed through consultation with NHFG as part of the P145 project and based on the Summary of Existing Ecological Conditions Report prepared by Stantec in February 2022 (Appendix D; additional information also in Section 3.0 below). These BMPs and protection measures are summarized in the Wildlife Protection Plan, included in Appendix E, which has been updated to include the CHMG project area and follows the same approved BMPs and protection measures approved by NHFG for the P145 project. These measures include a combination of time of year restrictions, construction techniques (e.g., temporary matting), contractor training programs, and/or work area sweeps, isolations measures, and biological monitoring.

3.0 EXISTING CONDITIONS

The proposed structure replacement work is located within the existing and maintained CHMG ROW. The proposed AoT project area cross through portions of Concord, Pembroke, and Bow. Existing dirt, gravel, and/or grass access routes traverse many portions of the existing ROW, many of which are currently being used for the P145 project. The access roads used for the P145 project will be utilized as much as possible and some existing access routes will need to be improved using gravel and stone as part of the CHMG project. In areas where no existing access routes or trails are present to the CHMG structures, new gravel roads will be established. According to the Natural Resources Conservation Service (NRCS) soil survey for Merrimack County, New Hampshire, existing upland soils are generally sandy and suitable for construction of gravel access roads and work pads. The NRCS web soil survey report for the AoT project area is included in Appendix F.

The AoT project area includes uplands and wetlands located in rural, residential, and industrial areas. Upland communities consist of an open maintained ROW dominated by common shrub, sapling, and herb species with moderately well drained to well-drained soil. 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*



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pensylvanica), quaking aspen (*Populus tremuloides*), northern red oak (*Quercus rubra*), Allegheny blackberry (*Rubus allegheniensis*), black huckleberry (*Gaylussacia baccata*), late lowbush blueberry (*Vaccinium angustifolium*), and eastern white pine (*Pinus strobus*). Herbaceous plants include little bluestem (*Schizachyrium scoparium*), wintergreen (*Gaultheria procumbens*), wrinkle-leaf goldenrod (*Solidago rugosa*), bristly dewberry (*Rubus hispida*), bracken fern (*Pteridium aquilinum*), eastern hay-scented fern (*Dennstaedtia punctilobula*), and Pennsylvania sedge (*Carex pensylvanica*). Invasive species are generally low in overall abundance, with scattered occurrences of glossy false buckthorn (*Frangula alnus*) and Asiatic bittersweet (*Celastrus orbiculatus*). The adjacent forests are mixed forests dominated by northern red oak and eastern white pine in the canopy. A summary report of the existing ecological conditions, provided to NHFG for the P145 project, is included in Appendix D. The existing conditions and areas described in Appendix D also directly describe the CHMG project areas, since they are co-located with the P145 project.

Routine vegetation maintenance is performed along the ROW on an approximate 4-year cycle. Trees and shrub species capable of growing to heights that could interfere with conductors are mowed and allowed to regenerate until the next maintenance cycle. Vegetation maintenance was performed on many portions of the ROW in 2022, prior to construction of the P145 project.

AoT screening layers were requested from NHDES for each town within the AoT project area and are shown on Figure 3 – Surface Water and Groundwater Overlay Plans if they fall within the vicinity. AoT screening layers include the following:

- Coastal and Great Bay Communities
- Groundwater Protection Areas (Groundwater Classification Areas GA1, Groundwater Classification Areas GA2)
- Wellhead Protection Areas
- Water Supply Intake Protection Areas
- Outstanding Resource Waters
- Class A Water Watersheds
- Surface Water Impairments
- Local Potential Contamination Sources
- Designated Rivers within one-quarter mile
- All Lakes within one-quarter mile
- Surface Waters with Impairments (2016)
- Watersheds with Chloride Impairments (2016)

AoT screening layers crossed by the AoT project area are described below.

Existing conditions within the AoT project area are further described below and consistent with recent guidance and discussion between Eversource and NHDES. Representative photographs of the AoT project area are included in Appendix G and also within the existing conditions memo in Appendix D.



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3.1 AOT PROJECT AREA: CONCORD, PEMBROKE, BOW

The AoT project area includes work areas along the length of the CHMG ROW, co-located with the full length of the P145 transmission line. The project begins at the Farmwood Substation in Concord and continues southeast, passing to the southwest of Snow Pond and Turtle Pond. The line continues southeast across Interstate 393 and then turns south near Loudon Road. The line continues generally south through residential and industrial areas before crossing the Soucook River and entering the town of Pembroke. The line continues south through Pembroke before turning southwest near Route 3 and continues over the Soucook River again and back into Concord. The line crosses through a relatively undeveloped area, south to the Merrimack River crossing just below Garvins Falls Dam. Just south of the dam, the line turns southeast and continues to its termination at the Merrimack Substation.

3.1.1 Surface and Groundwater Protection

There are 9 surface waters located within the AoT project area: 6 perennial streams and 3 intermittent streams (Figure 3). The AoT project area includes temporary matting in 24 wetland systems, including 10 wetlands identified as Priority Resource Areas (PRAs), for access and work pad placement. Temporary matting impact totals are summarized in the table below. AoT disturbance area is summarized in Section 5.1.2.

Temporary Matting	Impact (sf)
Access	103,167
Work/Pull Pad	896,136
Emergency Pull-Offs/Misc. Features	697
Total	1,000,000

According to Figure 3, portions of the AoT project area are within the following AoT screening layers:

- All Lakes with a Quarter Mile Buffer
 - Snow Pond, Concord, proposed C189 structures 42–45 (Figure 3, Sheets 2 and 3)
 - Turtle Pond, Concord, proposed C189 structures 23–32 (Figure 3, Sheets 4 and 5)
- Surface Waters with Impairments with A Quarter Mile Buffer
 - Turtle Pond, Concord, proposed C189 structures 23–32 (Figure 3, Sheets 4 and 5)
 - Merrimack River, Concord and Bow, proposed M108 structures 1- 5, H137 structures 6–32, and G146 structures 183-186 (Figure 3, Sheets 17–23)
- Groundwater Classification Areas GAA
 - Pembroke Water Department, Concord and Pembroke, proposed M108 structures 10-34, G146 structures 168-179(Figure 3, Sheets 12-16)
- Ground Water Classification Areas GA2
 - Pembroke and Concord, proposed M108 structures 10-31, G146 structures 168-179 (Figure 3, Sheets 13-16)
 - Bow, proposed H137 structures 1-20 (Figure 3, Sheets 20–23)



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- Wellhead Protection Areas
 - Pembroke Water Works, Concord and Pembroke, proposed M108 structures 12-34, G146 structures 169-176 (Figure 3, Sheets 12-, 16)
 - Ruggles III Office Building, Bow, proposed H137 structures 31 and 32, M108 structure 1, and G146 structure 186 (Figure 3, Sheet 18)
 - Bow Municipal Water System, Bow, proposed H137 structures 17–19 (Figure 3, Sheet 20)

3.1.2 FEMA 100-Year Floodplain, Shoreland Protection, Designated Rivers

According to the FEMA Flood Insurance layer on Figure 3, there are five 100-year floodplain zones within the AoT project area. These are associated with Stream S01 and Wetland W03 near the Farmwood Substation in Concord, Mill Brook/Turtle Pond Outlet in Concord, the Soucook River in Pembroke and Concord, the Merrimack River in Concord and Bow, and Bow Bog Brook in Bow.

NHDES Protected Shorelands are located within the AoT project area near Turtle Pond, the Soucook River, and the Merrimack River. NHDES Shoreland Permit by Notifications are being prepared for ground disturbances within the 250-ft protected shoreland areas.

According to the Consolidated List of Water Bodies Subject to RSA 483-B (May 22, 2019) and the NHDES Designated River Corridor Map, the portion of the AoT project area just below the Garvins Falls Dam (approximately 10 proposed structures) is located within the Designated River Corridor associated with the Merrimack River.

4.0 PROJECT DESCRIPTION

4.1 STRUCTURE REPLACEMENT

The proposed Project includes replacement of existing wooden structures along the CHMG lines that are co-located in the same ROW as the P145 project. Within the AoT project area, 135 old structures will be replaced with 134 new structures. The structure replacement process consists of drilling approximately 4-ft-diameter holes near the existing structures. A caisson, or can, is installed approximately 15 to 20 ft below the ground surface. The new structure is installed in the can and backfilled with clean, suitable rock or gravel material. Spoils produced from drilling the hole will be disposed of in an approved upland location away from wetland areas. Spoil piles will be stabilized with seed and weed-free straw mulch. Some replacement structures may require anchors. Anchors will be installed by excavating trenches, installing concrete block anchors, and backfilling trenches. If anchors are installed in wetlands, backfill material will consist of the same excavated soil to maintain hydric soil conditions. If possible, based on soil conditions, screw anchors will be utilized to minimize ground disturbance. Once the new structure is installed and stable, the wires from the old structure will be transferred to the new structure. Old structures will be cut and removed from the ground in upland locations. Old structures located in wetlands will be cut at ground level if saturated soils prevent a clean removal. All construction materials and old structure pieces will be removed and disposed of off-site at an approved disposal facility.



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Following completion of the structure replacement and wire work, all temporary timber construction mats will be removed. Disturbed wetland areas will be restored and stabilized with weed-free straw mulch. Disturbed upland areas will also be restored and stabilized. Upland work pads will be restored by reducing the work pad size to 30 ft by 60 ft by restoring upland perimeter areas to pre-existing contours, with seeding and mulch used as needed. Slopes will be reduced to less than 25% where necessary, and exposed soils will be stabilized with seed and mulch. Seed and mulch will be applied along the shoulders and side slopes of the access roads as necessary, and the established access roads will be left in place.

4.1.1 Access

The CHMG project utilizes existing access routes within the ROW wherever possible, primarily those constructed and used for the P145 project. Proposed access routes are shown on Figures 3 and 4. Access road entrances are located off state and local roadways and utilize existing entrances wherever possible. Temporary driveway permits for access from state owned roads have been obtained from the New Hampshire Department of Transportation and municipalities as part of the P145 project, and no new entrances for the co-located CHMG project are proposed. The proposed access routes were sited to minimize ground disturbance and temporary wetland impacts to the greatest extent practicable while providing safe and efficient access to the existing structures. Timber matting will be used to cross wetlands that cannot be avoided, and streams that cannot be avoided will be spanned with mats to avoid impacts to the bed and banks. Emergency pull-offs will be constructed along access routes, as necessary, to allow vehicles to pass each other safely in the event of an emergency. The pull-offs will be approximately 15 ft x 100 ft and will be constructed at the discretion of the contractor and Eversource on an as-needed basis.

4.1.1.1 Road Construction

Proposed upland access road improvements include construction of approximately 12-ft-wide gravel and stone roads within the ROW. The roads will provide access to existing utility structures for replacement activities. The improved access roads will provide reliable, permanent access to utility infrastructure during future maintenance or emergency repairs. Where possible, the proposed access roads will utilize existing P145 project roads or existing dirt or grass roads or trails. If no existing routes are available or suitable, a new road will be constructed. Minor grading may be necessary to remove large boulders and create a flat surface for the new rock or gravel.

4.1.1.2 Wetland and Upland Temporary Matting

Access through delineated wetlands in the AoT project area will utilize temporary timber construction mats to minimize and prevent rutting in the wetlands (see Figure 4). Where necessary in overly saturated conditions, runners (mats placed parallel to the direction of travel) will be placed on the wetland surface prior to setting the top, perpendicular layer of mats. This helps reduce settling and overall wetland disturbance. Upland timber construction mats are occasionally requested by the landowner where fields or lawn areas may be crossed by the proposed access road. Timber mats will also be used in select upland areas to protect state- and federally listed species and/or archaeological sensitive sites.



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4.1.2 Work Pad Construction

The proposed project includes construction of structure replacement work pads and pull pads. Structure replacement pads will be approximately 120 ft by 120 ft at corner structures and approximately 100 ft by 100 ft at all other replacement structures. All upland work pads will be constructed using clean stone. The work pads will be top dressed with compacted 1.5- to 3-inch-diameter clean stone. Proposed work pads located in wetland areas will be constructed using temporary timber construction mats and will be removed upon completion of the work. Upland work pads will be restored by reducing the work pad size to approximately 30 ft by 60 ft by covering perimeter areas with stockpiled loam. Slopes will be reduced to less than 25% where necessary, and exposed soils will be stabilized with seed and mulch.

4.2 CONSTRUCTION SEQUENCE

The general project construction sequence will be:

1. Install appropriate signage for traffic safety along public roads near construction entrances:
 - a. Consult and coordinate with municipalities and police as necessary if short duration lane closures are needed to allow for safe entry and exit of construction equipment to/from the ROW
2. Install erosion control devices, as needed, as shown on Figure 4:
 - a. Erosion control practices will follow the NHDES Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire (March 2019; Utility BMP Manual).
 - b. Typical erosion control devices used within the ROW may consist of silt fence, straw wattles, stone check dams, and/or hay and straw mulch stabilization.
3. Place construction mats in wetlands for access roads and work pads as depicted on Figure 4:
 - a. Mats will be stored by the contractor off-site. Storage areas will be determined by the contractor and are usually non-Project specific yards owned or leased by the contractor or existing parking lots near the Project area. A log loader style truck will deliver mats to the ROW. Depending on the terrain, the log loader truck may deliver the mats directly to where they will be installed, or they will be stockpiled within the ROW near an existing road. A forwarder will then move the mats to where they are needed on the ROW and install them in conjunction with an excavator.
4. Grade and improve upland access roads and work pads:
 - a. If existing trails are present, they will be improved with a layer of compacted gravel or stone to prevent rutting.
 - b. Where no existing trails are present, an approximately 12- to 16-ft-wide path will be graded smooth by removing some of the topsoil. If present, large boulders will be removed and set to the side of the route in upland areas. The graded areas will be topped with compacted gravel or stone. Exposed soils on side slopes will be stabilized with seed and mulch.



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5. Structure replacements:
 - a. Drill new structure holes utilizing an excavator with a drill attachment;
 - b. Install new poles and structure components. Typical equipment consists of one to two bucket trucks working with a crane truck that lifts the new structure;
 - c. Transfer electrical lines from old structures to new structures; and
 - d. Remove and haul away old structures. Pull cut pole from the ground, if possible, in upland locations. Cut pole flush with ground in wetland locations and restore area with weed-free straw mulch.
6. Clean up excess/stockpiled material at work pads
7. Smooth/grade upland work pads and stabilize and restore with seed and mulch as necessary. Upland work pads are typically restored to an approximately 30-ft by 60-ft size. Topsoil pushed to the sides during the initial construction is used to recover the work pads. Exposed soils are stabilized with seed and mulch
8. Remove construction mats from wetland areas and stabilize/restore disturbed wetland areas with weed-free straw mulch. Matting is removed in a similar manner to how it was installed by using log loader trucks, forwarders, and/or excavators
9. Stabilize, restore, and clean up all staging areas and entrance points

Provided necessary permits are in place, work would begin as soon as possible to allow for efficiencies with the ongoing P145 project and continue until approximately fall 2024. Entrances, access roads, and work pads will be created prior to structure replacement work. New structure holes will likely be drilled prior to mobilization of structure replacement equipment (e.g., cranes, bucket trucks). Installation of new poles and transferring of wires will be completed prior to moving on to the next structure. Multiple structure replacement crews may work in different areas to expedite the process. Removal of mats and restoration will occur as individual work areas are completed.

4.3 BEST MANAGEMENT PRACTICES

4.3.1 Erosion and Sedimentation Control

Work will be conducted in accordance with Eversource's standard BMPs as designated by the Utility BMP Manual. Following these BMPs will minimize and avoid impacts to wetland and stream resources and the surrounding upland to the greatest extent practicable. Erosion control notes are also provided on the Notes and Details sheets of Figures 3 and 4.

Perimeter erosion controls consisting of silt fence, straw wattles, mulch, and straw bales will be installed as necessary around the work areas to minimize potential impacts to adjacent resource areas. Water bars, also known as diversion ditches, will be installed along access roads with steep slopes, where necessary, to prevent water from traveling long distances down the road causing erosion. Water bars will direct water off the road into adjacent upland areas. Exposed soil created during construction will be



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stabilized with seed and mulch as soon as possible after active work in the area is complete. No equipment or material will be stored within wetland areas. Erosion control details are shown on the Notes and Details sheets of Figures 3 and 4. Temporary timber construction mats will be used in all unavoidable wetland areas and will be used to cross all unavoidable streams within the Project area.

4.3.2 Invasive Species Control Plan

Due to the developed landscape surrounding most of the ROW, invasive species are likely present and were observed during field surveys. Contractors will follow the invasive species recommendations in the Utility BMP Manual to help prevent the spread of invasive species, including inspection and cleaning of equipment and contractor training. Equipment, including construction mats, brought to the Project area will be inspected by the contractor and/or environmental monitor, and if plant material or soil is present, the equipment will be cleaned and dried prior to use on the Project. Contractors will be familiar with identification of common invasive species and will be required to clean mats and equipment prior to their use elsewhere. If possible and without increasing wetland impacts, the contractors may also make slight shifts in access roads or work pads to avoid invasive species locations.

4.3.3 Construction Observation and Post Construction Monitoring

During construction, Eversource will contract an environmental monitor to perform routine construction observation visits. The environmental monitor will inspect the Project area for compliance with the Utility BMP Manual and applicable Project permits and conditions. Construction observation visits will occur at least once per week and/or after a significant rainfall (0.5 inches or greater) or snow melt event. Under the National Pollutant Discharge Elimination System, Eversource will file a Notice of Intent and Stormwater Pollution Prevention Plan (SWPPP) under the U.S. Environmental Protection Agency's Construction General Permit. Construction observation visits and associated reporting will follow the SWPPP and Construction General Permit guidelines and be performed by a qualified individual familiar with the SWPPP, Utility BMP Manual, and project specific permit conditions.

A series of post-construction monitoring visits in the Project area will be performed by a qualified environmental scientist to document that disturbed areas are properly stabilized and vegetation is beginning to regrow. Site restoration will be considered successful when there is at least 85% cover by native or non-invasive herbaceous plant species within the restored portions of ROW, including any restored wetland areas. This does not include gravel work pads or access roads that existed prior to construction or were created during construction. The environmental scientist will prepare a report following each post-construction monitoring visit that includes representative photographs and corrective actions (if applicable). Once the disturbed uplands and temporarily impacted wetlands within the Project area are determined to be permanently stabilized, post-construction monitoring will be considered complete.

Additional rare species monitoring is also anticipated as part of the project and will follow the BMPs described in the Wildlife Protection Plan (Appendix E) and recommendations from NHFG and NHB.



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5.0 REGULATORY COMPLIANCE

5.1 ALTERATION OF TERRAIN

The NHDES requires an AoT permit whenever a project proposes to disturb more than 100,000 sf of terrain or 50,000 sf if within a protected shoreland (Env-Wq-1500). The NHDES rule is intended to protect New Hampshire surface waters by controlling soil erosion and managing stormwater runoff from developed areas. The AoT project area is calculated based on overall area of disturbance. Details on impacts in the AoT project area are provided in Section 5.1.2 – Quantification of Impacts Subject to AoT.

5.1.1 Waiver Requests

Env-Wq 1503.12 (d)(1&2)

Eversource previously requested a waiver for including past disturbance in the measurement of contiguous disturbed area included in the P145 Line AoT application (AoT-2205). Existing terrain alteration associated with past transmission line maintenance within the P145 ROW was minimal. Since a waiver was requested for Env-Wq 1503.12 (d)(1&2) as part of the P145 project, and the P145 disturbances were permitted and are underway, the CHMG project no longer requires this waiver and is filing a new AoT permit application. Therefore, no waiver request form is included, but this description is included to provide continuity between the P145 and CHMG projects.

Env-Wq 1503.21 (d)(6&7)

Eversource is requesting a waiver for deviations from the approved plans without applying for an amended permit or a new permit if shifts in the proposed Project layout occur. Changes in project layout are sometimes identified during construction by Eversource and their contractors and may be necessary to safely perform the work or avoid rare species locations identified during field surveys or biological monitoring. This waiver would allow for shifts of access road centerlines and work pad center points within the existing ROW. These exemptions for transmission line maintenance projects were discussed at a pre-application meeting with Eversource, Stantec, and NHDES on February 8, 2022. A formal waiver request form is provided in Appendix H.

Env-Wq 1504.09

Eversource is requesting a waiver from the requirements to prepare a Stormwater Drainage Report, Drainage Area Plans, and Hydrologic Soil Group Plans. New impervious surfaces associated with the project are limited to the footprint of the new transmission line structures. It is not anticipated that the proposed structures will have a significant impact on site drainage patterns, and stormwater treatment practices are not proposed. These exemptions for transmission line maintenance projects were discussed at a pre-application meeting with Eversource, Stantec, and NHDES on February 8, 2022. A formal waiver request form is provided in Appendix H.



NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

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5.1.2 Quantification of Impacts Subject to AoT

There is approximately 1,487,038 sf of total ground area, including 273,776 sf of temporary wetland matting, 213,262 sf of upland matting, and 1,000,000 sf of ground disturbances, proposed within the AoT project area that requires an AoT permit in accordance with Env-Wq 1502.58. 1,900,000 sf of ground disturbance was previously permitted for the P145 project (AoT-2205). The area detailed below exceeds the AoT disturbance thresholds for Env-Wq 1502.58(b)(2) "An area that, over a 10-year period, cumulatively exceeds 100,000 sf of contiguous area..." The width of the proposed disturbance for new access roads is assumed to average approximately 12 ft throughout the AoT project area, and temporary timber construction mats are 16 ft wide. Additional details are shown on Figure 4.

AoT Project Area: Concord, Pembroke, Bow

As shown on Figure 4:

C189 Structures 5 to 53

M108 Structures 1 to 61

H137 Structures 1 to 32

G146 Structures 169 to 186

Disturbance Type	Impact (sf)
New Access	103,167
Gravel Work/Pull Pad	896,136
Emergency Pull-Offs/Misc. Features	697
Total Disturbed Area	1,000,000

5.2 OTHER REGULATORY PROGRAMS

Other regulatory permits and notifications required for the proposed project are summarized below. Eversource and Stantec have corresponded with the towns of Concord, Pembroke, and Bow regarding the proposed work. Each town requires some level of permitting. The towns will also receive a copy of the AoT permit application. The Upper Merrimack River Local Advisory Committee (LAC) will also receive a copy of the AoT permit application because several structures are located within the Designated River Corridor that extends just below Garvins Falls Dam on the Merrimack River. Stantec will provide NHDES with mailing receipts and/or proof that the application was delivered to the towns and LAC via email, once available.

Agency	Permit/Notification	Status
NHDES	Wetlands Utility Statutory Permit by Notification (3)	Pending
NHDES	Shoreland Permit by Notification (3)	Pending
EPA (Construction General Permit)	Stormwater Pollution Prevention Plan	Pending; existing P145 project permit to be amended
Concord Planning Board	Conditional Use Permit	Pending
Pembroke Planning Board	Special Use Permit	Pending
Bow Planning Board	Conditional Use Permit	Pending



NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

January 27, 2023

FIGURES

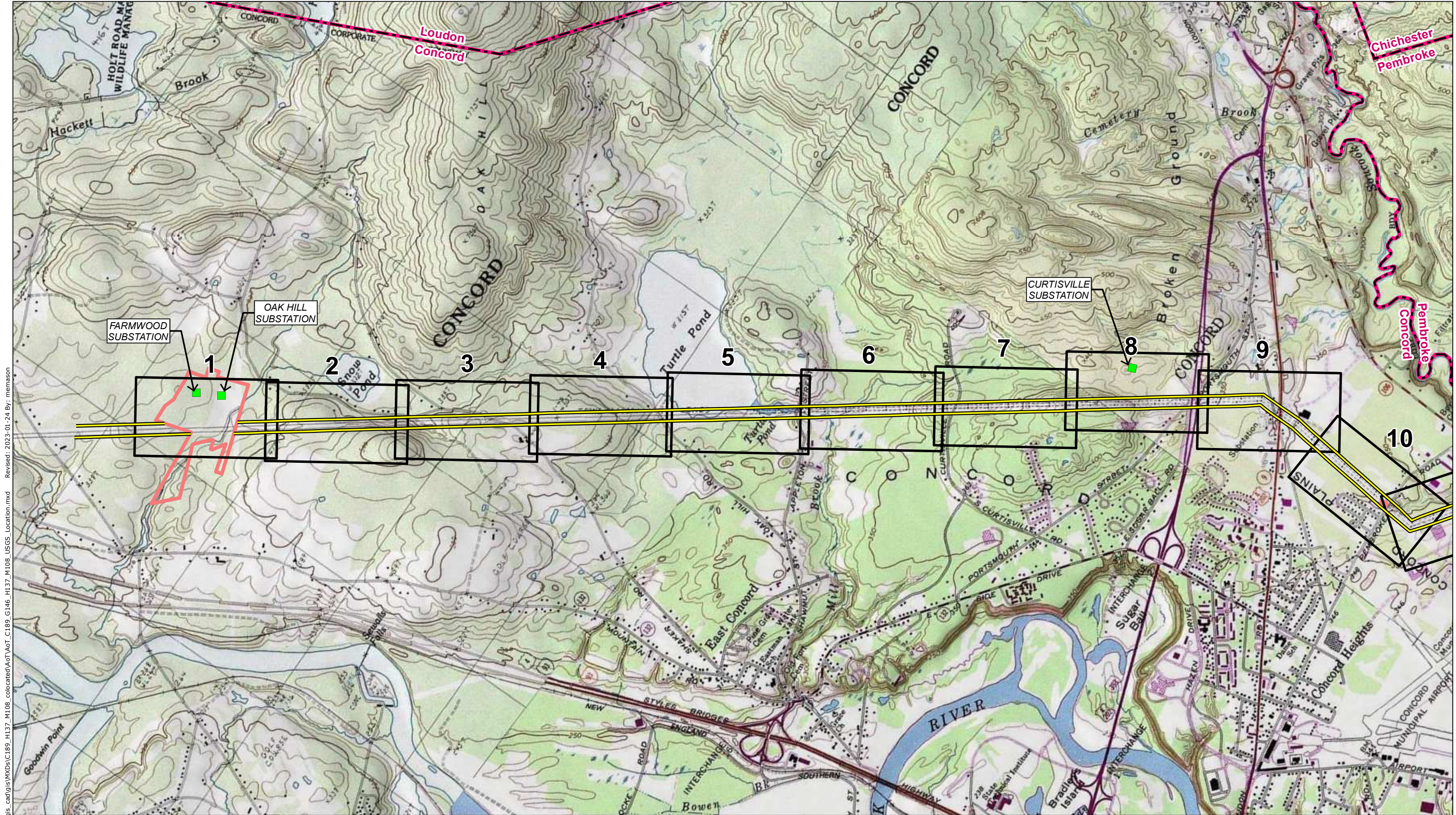


NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

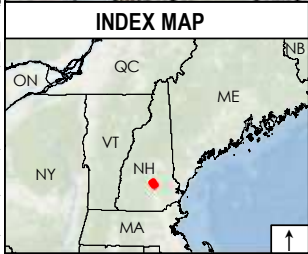
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Figure 1: USGS Locus Plan

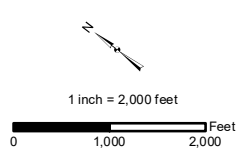




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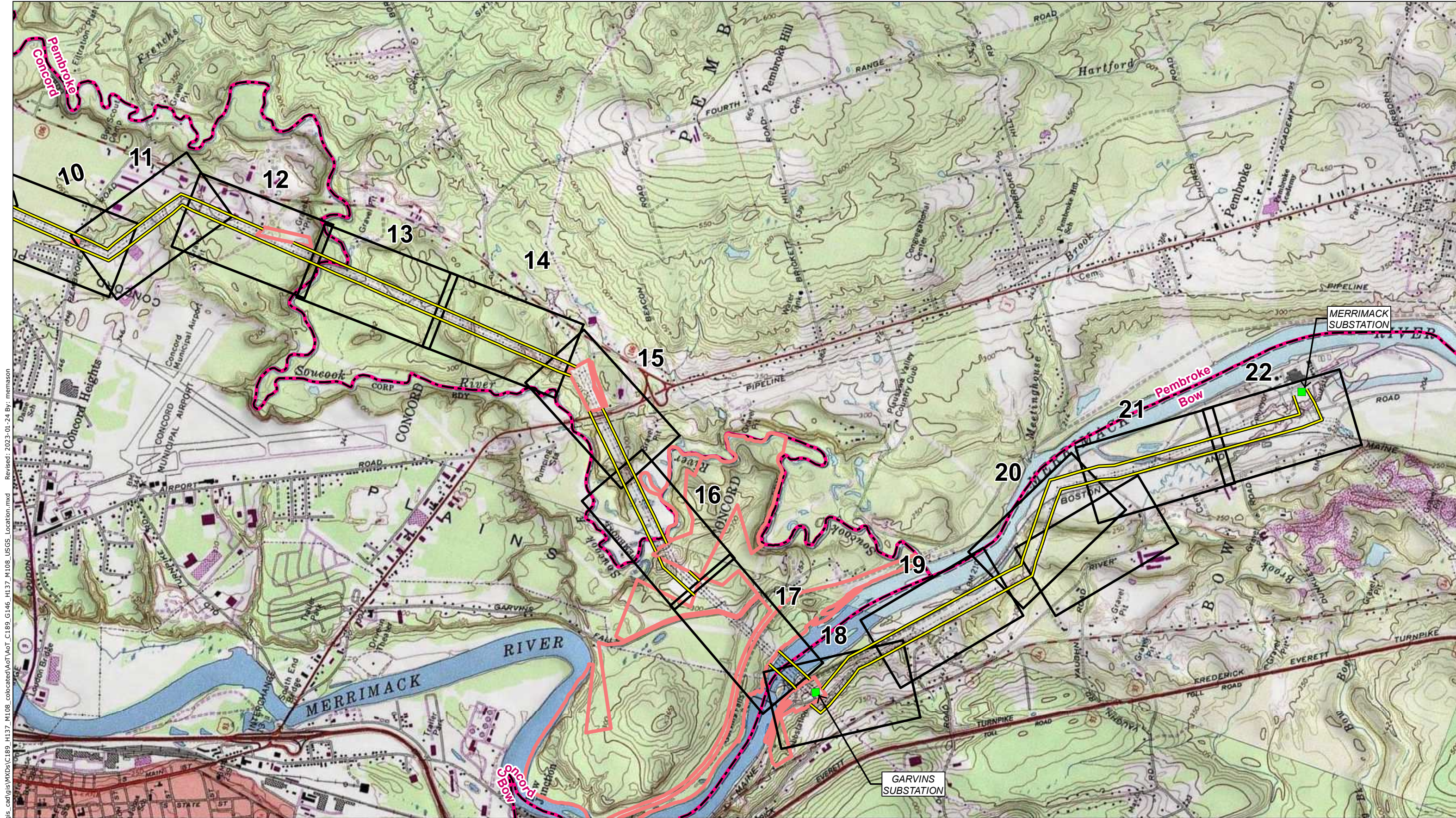
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 - Existing Right-of-Way
 - Eversource Owned
 - Map Sheet
 - Municipal Boundary



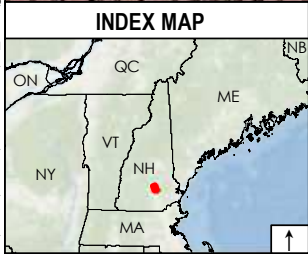
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 This mapping product has been created to comply with submittal requirements to obtain certain regulatory approvals and, as such, there is no reliance on the information contained herein for any other purpose.

NO.	DATE	REVISIONS

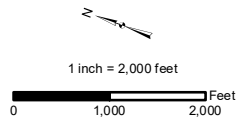
C189/G146/H137/M108 Laminated Wood Structure Replacement Project USGS Site Plan	
Concord, Pembroke, Bow, NH	MAP SHEET
Date: January 24, 2023	
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 Revised: 2023-01-24 By: memason



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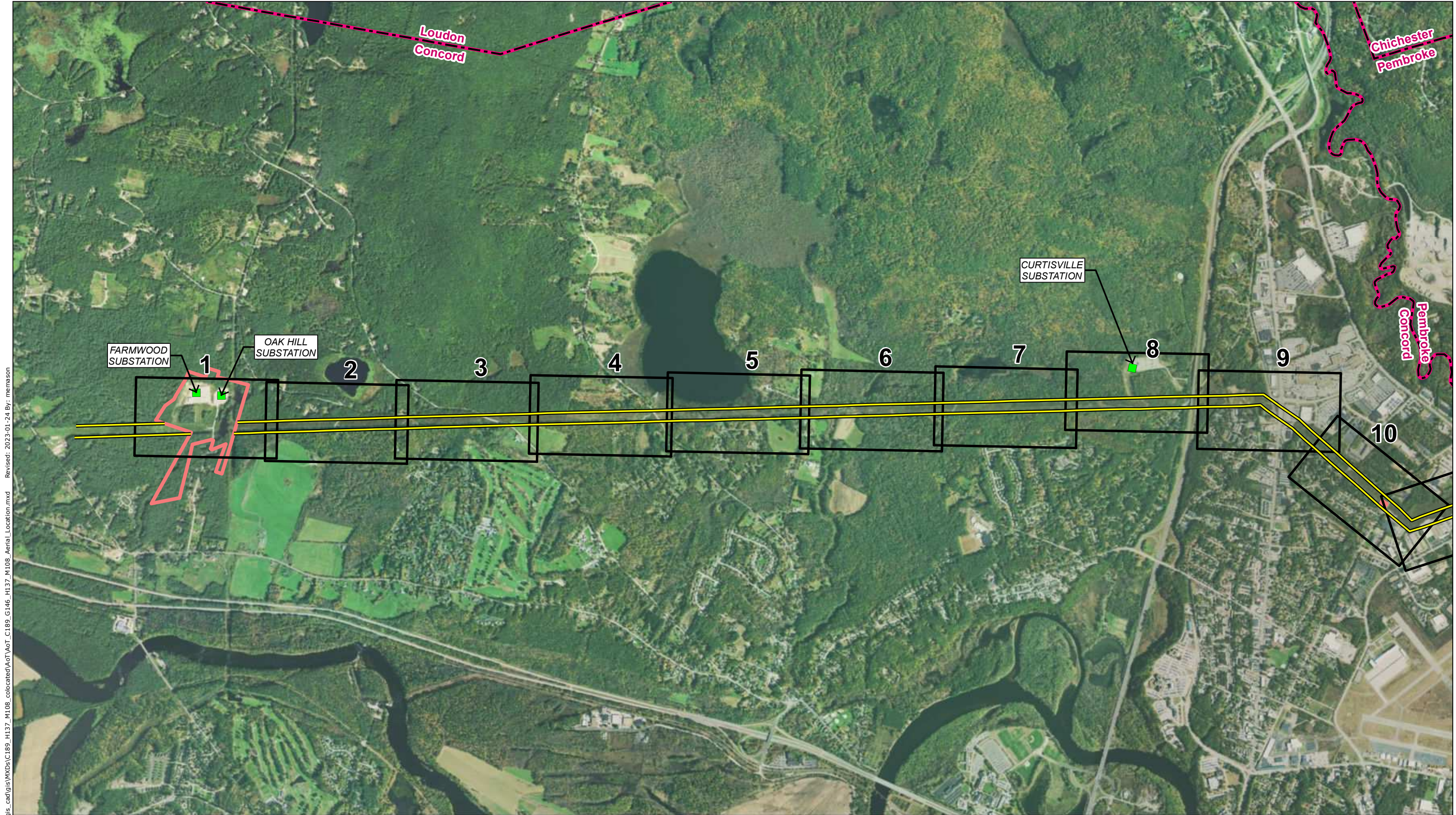
C189/G146/H137/M108 Laminate Wood Structure Replacement Project USGS Site Plan	
Concord, Pembroke, Bow, NH	MAP SHEET
Date: January 24, 2023	
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NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

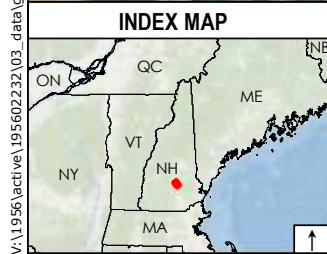
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Figure 2: Aerial Site Plan

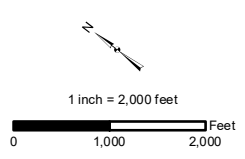




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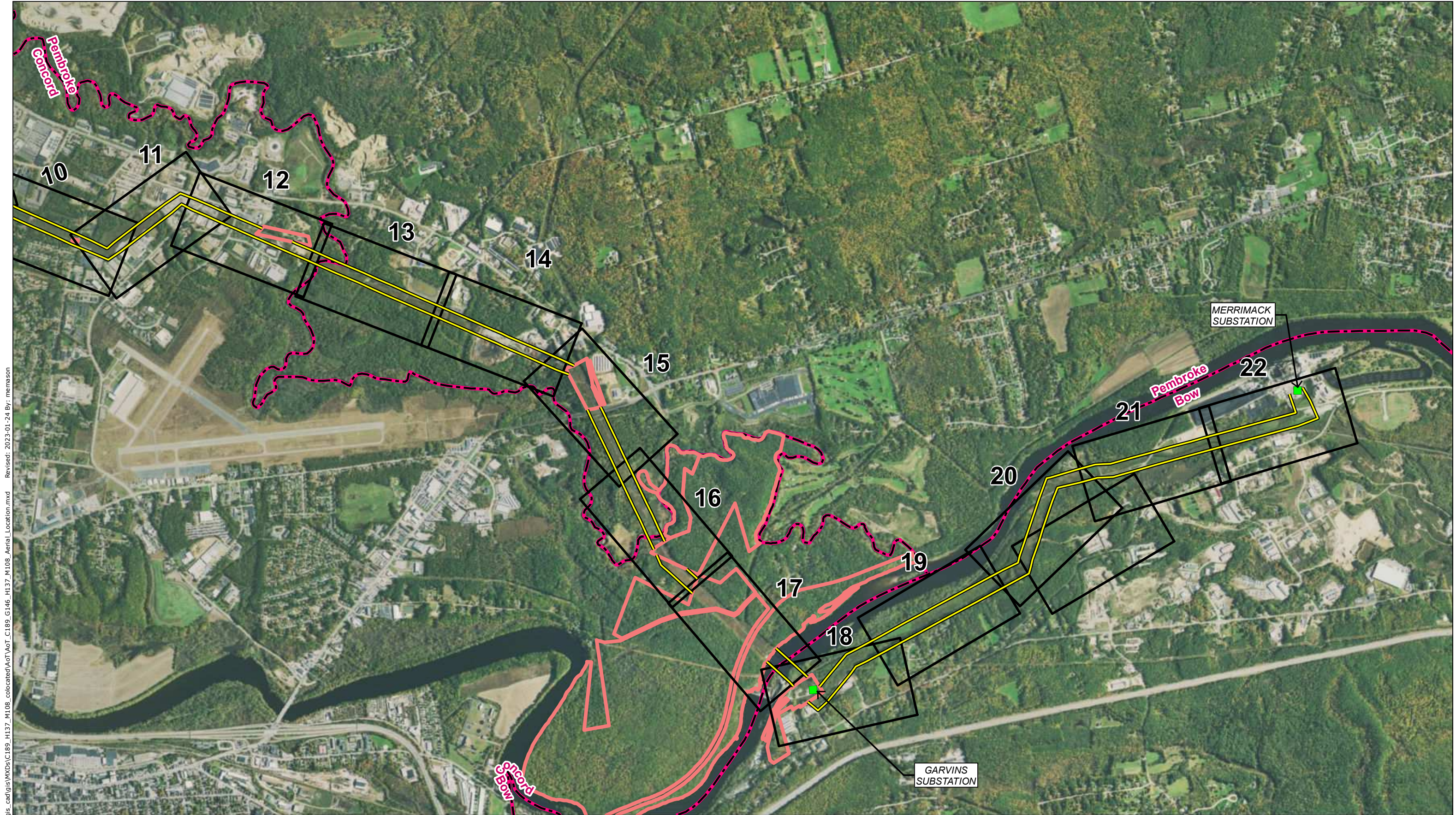
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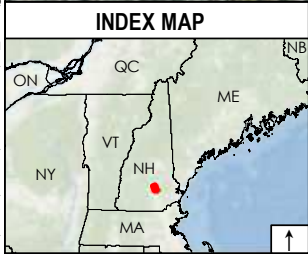
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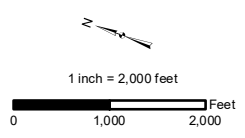
C189/G146/H137/M108 LaminatE Wood Structure Replacement Project Aerial Site Plan
Concord, Pembroke, Bow, NH Date: January 24, 2023
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- Legend**
- Substation
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 - Map Sheet
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Concord, Pembroke, Bow, NH	MAP SHEET
Date: January 24, 2023	
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NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

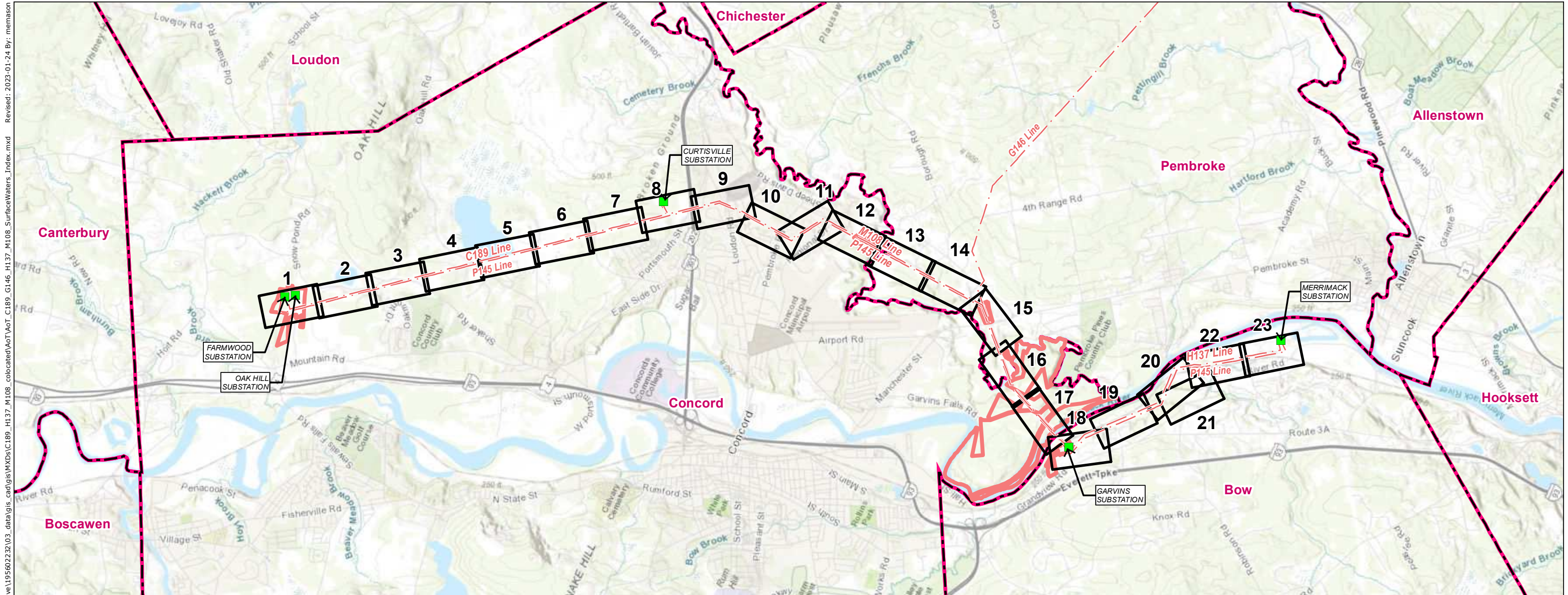
January 27, 2023

Figure 3: Surface Water and Groundwater Overlay Plans



C189/G146/H137/M108 Laminate Wood Structure Replacement Project

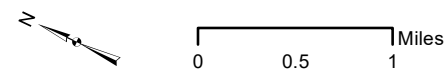
Concord, Pembroke, Bow, NH
 Surface Water and Groundwater Overlay Plans
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- Legend**
- Substation
 - Map Sheet
 - Eversource Owned Property
 - - - Overhead Eversource Line
 - Municipal Boundary

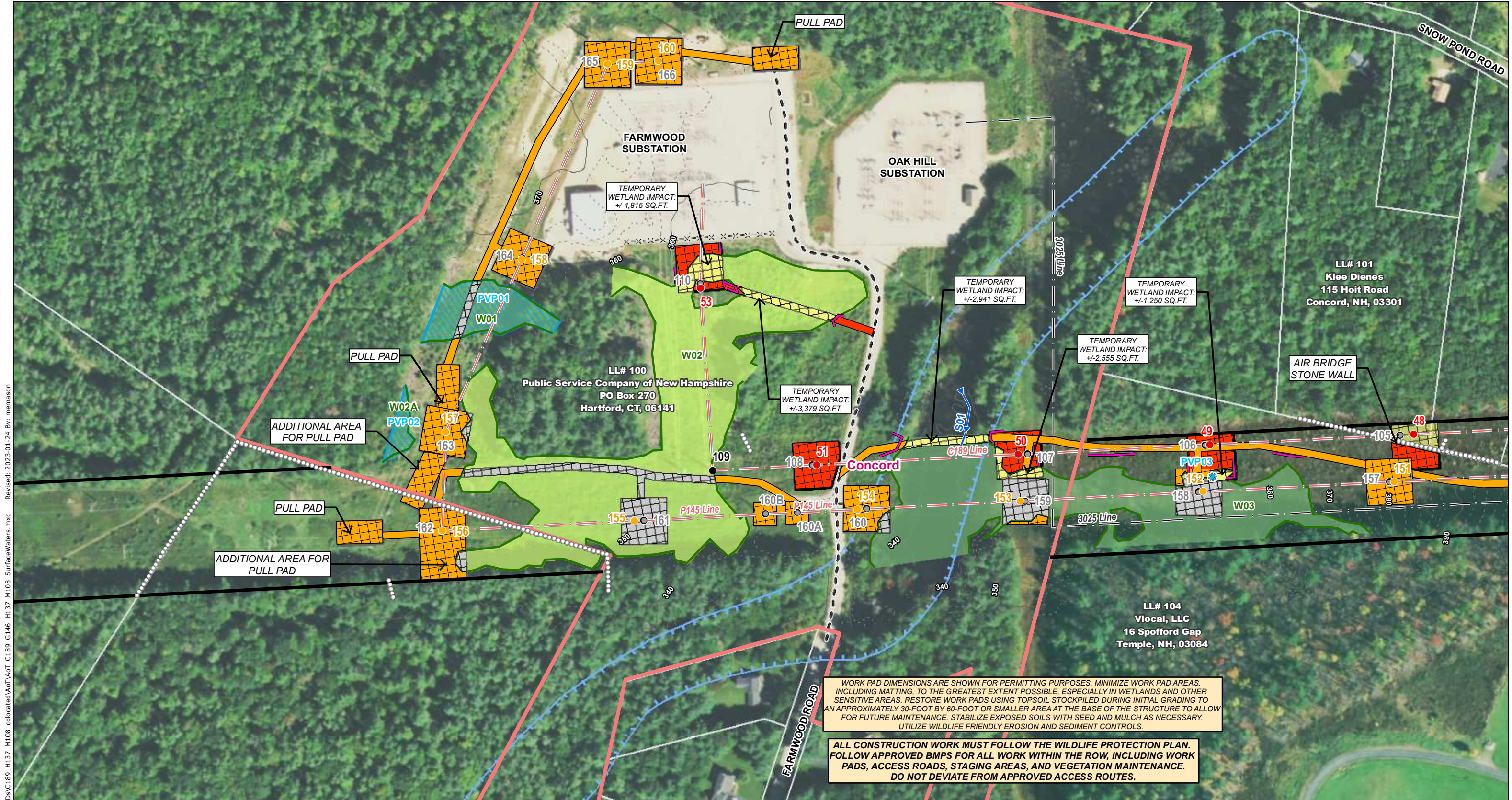
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EVERSOURCE
 ENERGY
 107 Selden Street
 Berlin, CT 06037



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 Notes and Details 1-3

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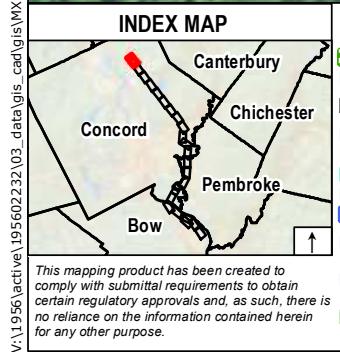
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Stantec
 30 Park Drive
 Topsham, ME 04086



WORK PAD DIMENSIONS ARE SHOWN FOR PERMITTING PURPOSES. MINIMIZE WORK PAD AREAS, INCLUDING MATTING, TO THE GREATEST EXTENT POSSIBLE, ESPECIALLY IN WETLANDS AND OTHER SENSITIVE AREAS. RESTORE WORK PADS USING TOPSOIL STOCKPILED DURING INITIAL GRADING TO AN APPROXIMATELY 30-FOOT BY 60-FOOT OR SMALLER AREA AT THE BASE OF THE STRUCTURE TO ALLOW FOR FUTURE MAINTENANCE. STABILIZE EXPOSED SOILS WITH SEED AND MULCH AS NECESSARY. UTILIZE WILDLIFE FRIENDLY EROSION AND SEDIMENT CONTROLS.

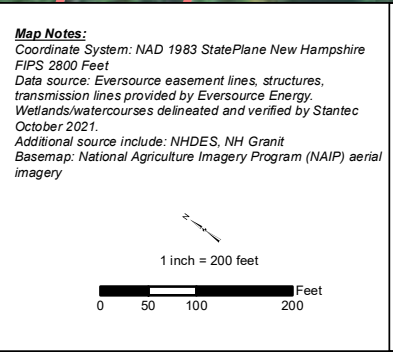
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- Legend**
- Local Potential Contamination Sources
 - Wellhead Protection Areas
 - Class A Surface Waters RSA 485A9 (none)
 - Coastal and Great Bay Region Communities (none)
 - Designated Rivers Quartermile Buffer (none)
 - Groundwater Classification Areas GA1 (none)
 - Groundwater Classification Areas GA2
 - Groundwater Classification Areas GAA
 - All Lakes with a Quarter Mile Buffer
 - Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none)
 - Outstanding Resource Water Watersheds (none)
 - Surface Waters with Impairments 2016 with Quarter Mile Buffer
 - Water Supply Intake Protection Areas (none)
 - Watersheds with Chloride Impairments 2016
 - Proposed Structure
 - Previously Permitted Structure
 - Existing Structure
 - Existing Structure to be Removed
 - Overhead Eversource Line
 - Overhead Distribution Line
 - Underground Distribution Line
 - Existing Right-of-Way (ROW)
 - Existing Access
 - Proposed Access (Previously Permitted)
 - Suggested Erosion and Sediment Control (TYP)
 - AoT Disturbance Area - New Pad
 - AoT Disturbance Area - New Access
 - AoT Disturbance Area - Pad (Previously Permitted)
 - AoT Disturbance Area - Access (Previously Permitted)
 - Temporary Construction Matting
 - Temporary Construction Matting (Previously Permitted)
 - Existing Gravel
 - Stone Work Pad
 - Stone Work Pad (Previously Permitted)
 - Eversource Owned Property
 - Slate Owned Land
 - LLN/Property Owner
 - Parcel Boundary
 - Municipal Boundary
 - FEMA 100-Year Flood Zone
 - Floodway
 - 2' Contours
 - 10' Contours
 - Potential Vernal Pool
 - Potential Vernal Pool Extent
 - Delineated Perennial Stream
 - Delineated Intermittent Stream
 - Delineated Ephemeral Stream
 - Delineated Wetland Boundary
 - Field Delineated Wetland
 - Priority Resource Area
 - Open Water
 - NHDES Protected Shoreland
 - Rail Road
 - GAS Approximate Gas Line
 - Fence
 - Berm
 - Stone Wall (NPT)
 - Gate
 - Culvert

- Map Notes:**
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 - Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.
 - Additional source include: NHDES, NH Grant Basemap: National Agriculture Imagery Program (NAIP) aerial imagery



EVERSOURCE ENERGY

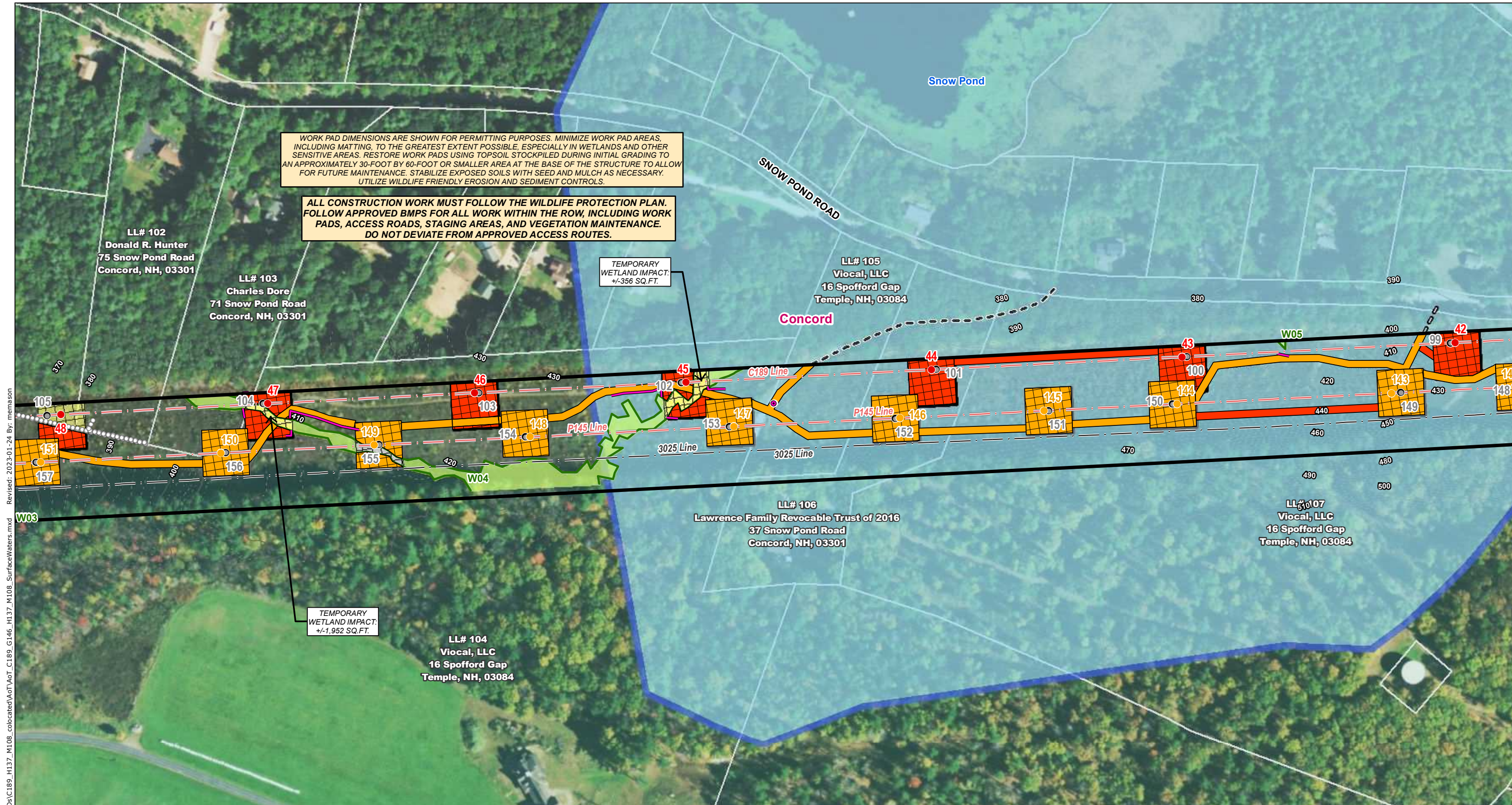
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C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans

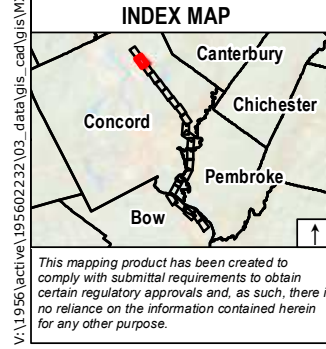
Concord, NH

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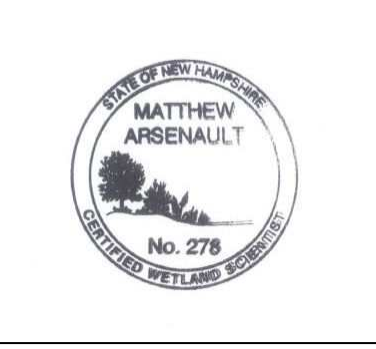
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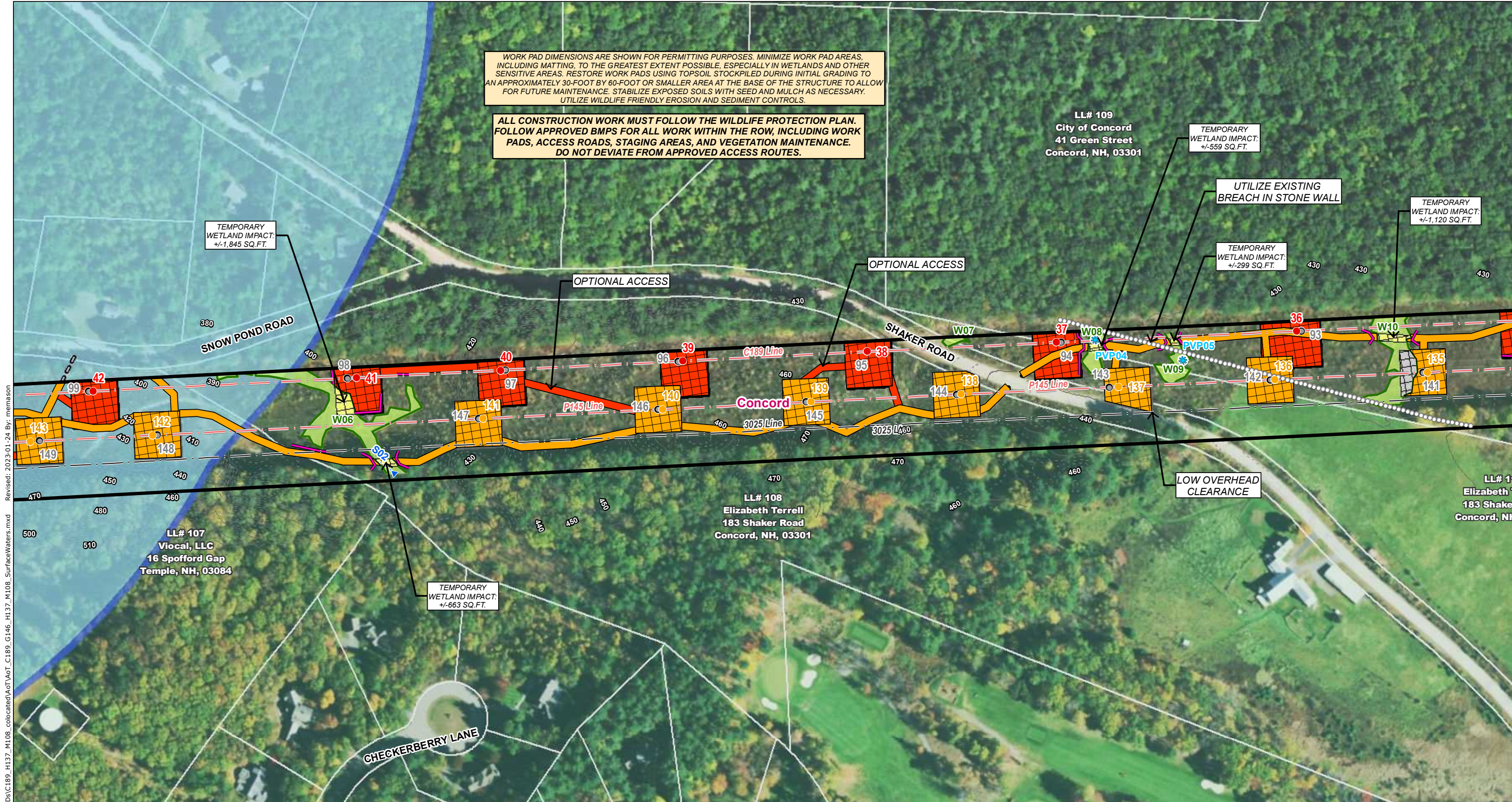
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Additional source include: NHDES, NH Grant Basemap: National Agriculture Imagery Program (NAIP) aerial imagery

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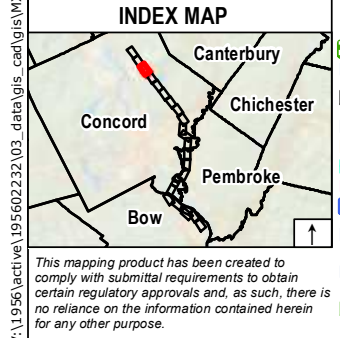
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C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans	
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Revised: 2023-01-24 By: memason
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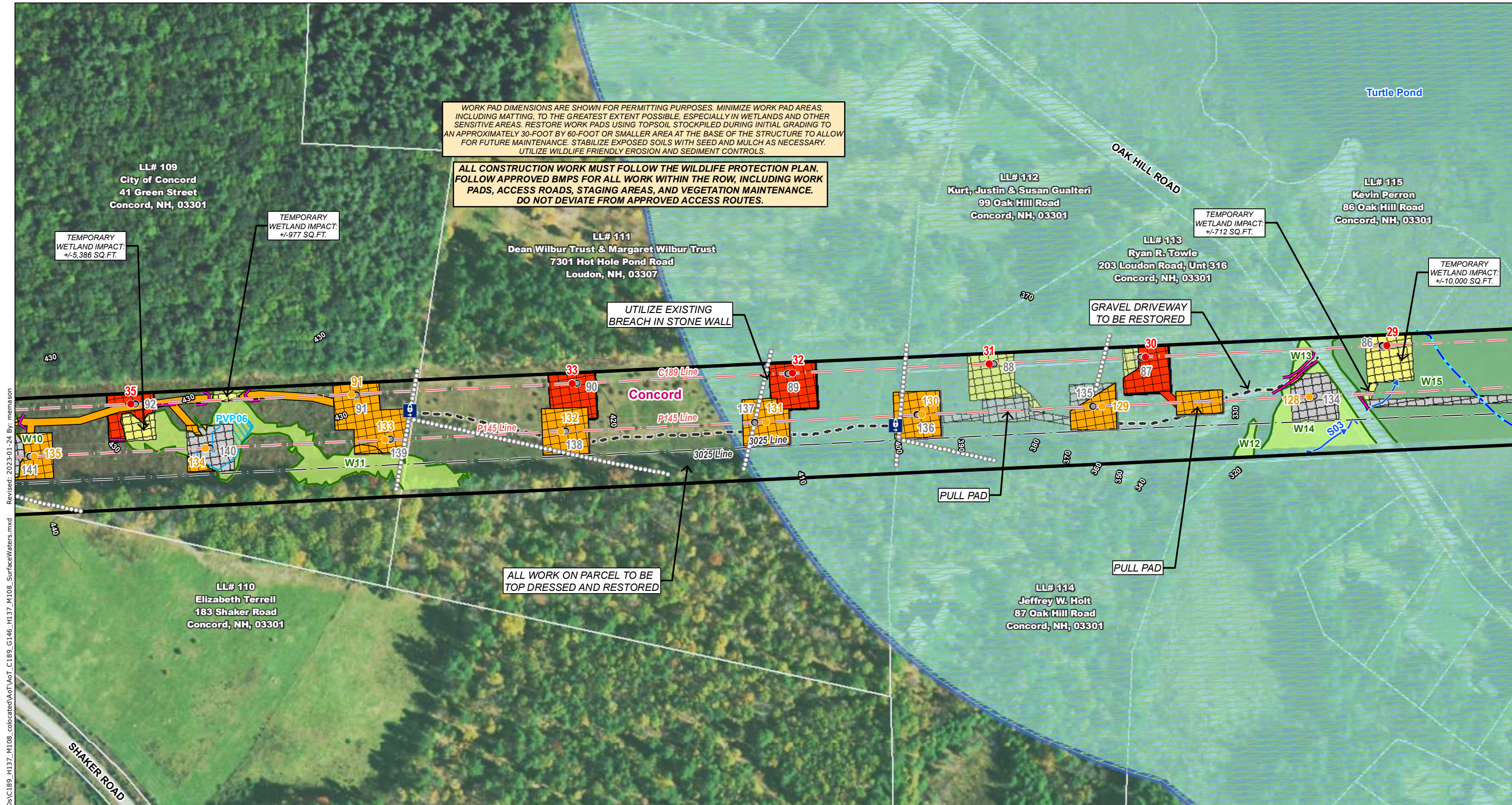


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Wellhead Protection Areas	Watersheds with Chloride Impairments 2016	FEMA 100-Year Flood Zone	Rail Road
Class A Surface Waters RSA 485A9 (none)	Proposed Structure	Floodway	GAS Approximate Gas Line
Coastal and Great Bay Region Communities (none)	Previously Permitted Structure	2' Contours	Fence
Designated Rivers Quartermile Buffer (none)	Existing Structure	10' Contours	Berm
Groundwater Classification Areas GA1 (none)	Existing Structure to be Removed	Potential Vernal Pool	Stone Wall (NPT)
Groundwater Classification Areas GA2	Existing Structure to be Removed	Potential Vernal Pool Extent	Gate
Groundwater Classification Areas GAA	Overhead Eversource Line	Delineated Perennial Stream	Culvert
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Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none)	Underground Distribution Line	Delineated Ephemeral Stream	
Outstanding Resource Water Watersheds (none)	Existing Right-of-Way (ROW)	Delineated Wetland Boundary	
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	Proposed Access (Previously Permitted)	Priority Resource Area	
	Suggested Erosion and Sediment Control (TYP)	Open Water	
	Existing Gravel		
	Stone Work Pad		
	Stone Work Pad (Previously Permitted)		
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	State Owned Land		
	LLN/Property Owner		
	Parcel Boundary		

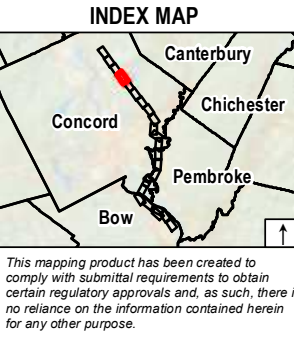
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0 50 100 200 Feet

C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans	
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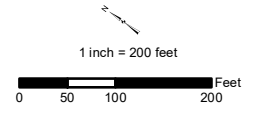


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 Revised: 2023-01-24 By: memason

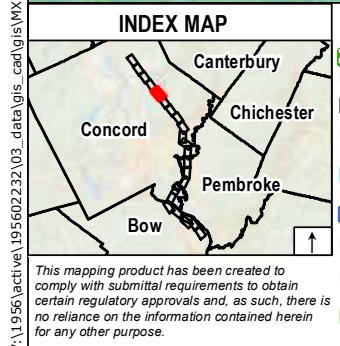
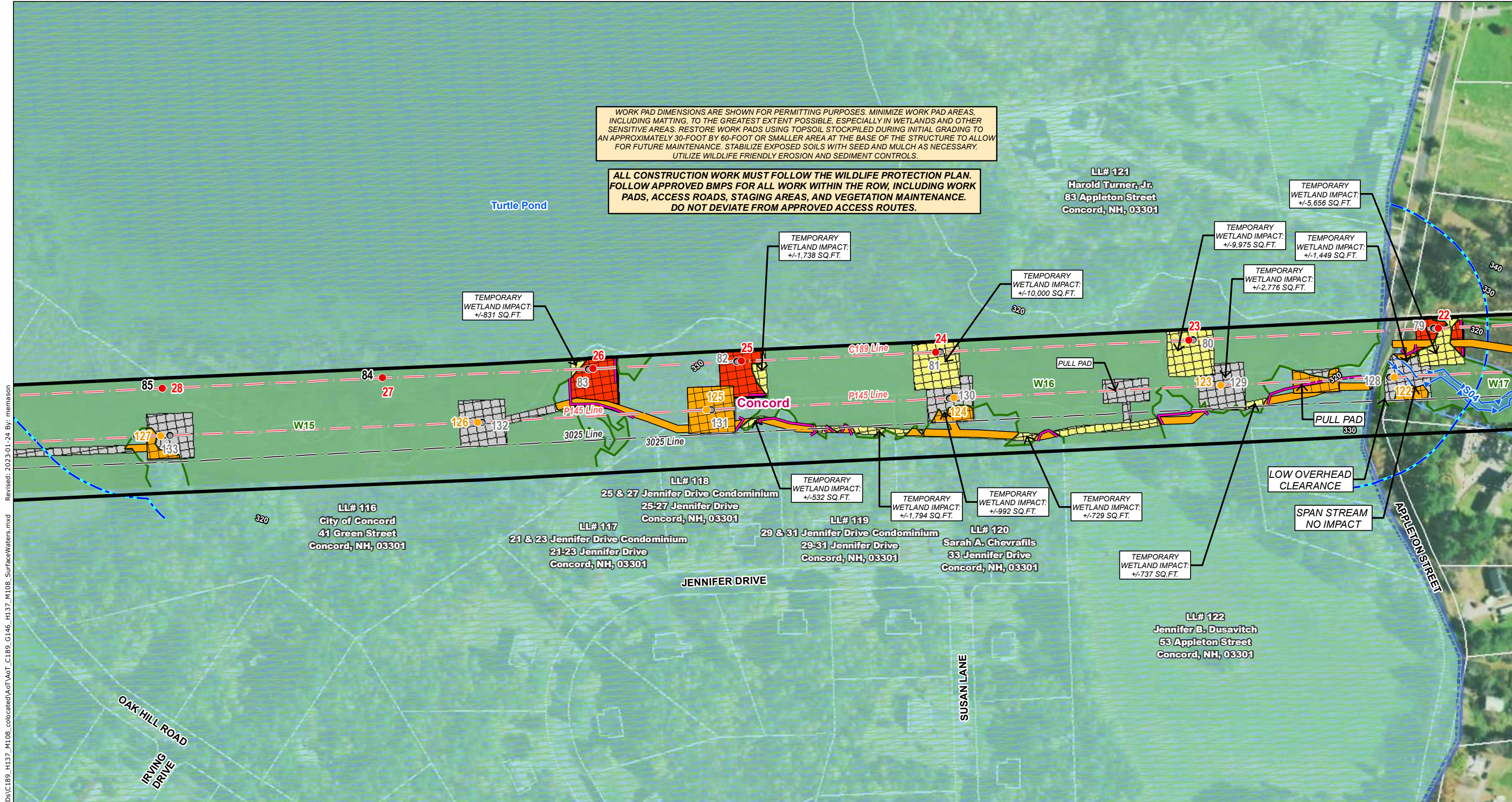


Legend	
	Local Potential Contamination Sources
	Wellhead Protection Areas
	Class A Surface Waters RSA 485A9 (none)
	Coastal and Great Bay Region Communities (none)
	Designated Rivers Quartermile Buffer (none)
	Groundwater Classification Areas GA1 (none)
	Groundwater Classification Areas GA2
	Groundwater Classification Areas GAA
	All Lakes with a Quarter Mile Buffer
	Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none)
	Outstanding Resource Water Watersheds (none)
	Surface Waters with Impairments 2016 with Quarter Mile Buffer
	Water Supply Intake Protection Areas (none)
	Watersheds with Chloride Impairments 2016
	Proposed Structure
	Previously Permitted Structure
	Existing Structure
	Existing Structure to be Removed
	Overhead Eversource Line
	Overhead Distribution Line
	Underground Distribution Line
	Existing Right-of-Way (ROW)
	Existing Access
	Proposed Access (Previously Permitted)
	Suggested Erosion and Sediment Control (TYP)
	AoT Disturbance Area - New Pad
	AoT Disturbance Area - Pad (Previously Permitted)
	AoT Disturbance Area - Access (Previously Permitted)
	Temporary Construction Matting (Previously Permitted)
	Existing Gravel
	Stone Work Pad
	Stone Work Pad (Previously Permitted)
	Eversource Owned Property
	Slate Owned Land
	LLN/Property Owner
	Parcel Boundary
	Municipal Boundary
	FEMA 100-Year Flood Zone
	Floodway
	2' Contours
	10' Contours
	Potential Vernal Pool
	Potential Vernal Pool Extent
	Delineated Perennial Stream
	Delineated Intermittent Stream
	Delineated Ephemeral Stream
	Delineated Wetland Boundary
	Field Delineated Wetland
	Priority Resource Area
	Open Water
	NHDES Protected Shoreland
	Rail Road
	GAS Approximate Gas Line
	Fence
	Berm
	Stone Wall (NPT)
	Gate
	Culvert

Map Notes:
 Coordinate System: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
 Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.
 Additional source include: NHDES, NH Grant Basemap: National Agriculture Imagery Program (NAIP) aerial imagery



C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans	
Concord, NH	MAP SHEET
Date: January 24, 2023	4 of 23



Legend	
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	Class A Surface Waters RSA 485A9 (none)
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1 inch = 200 feet

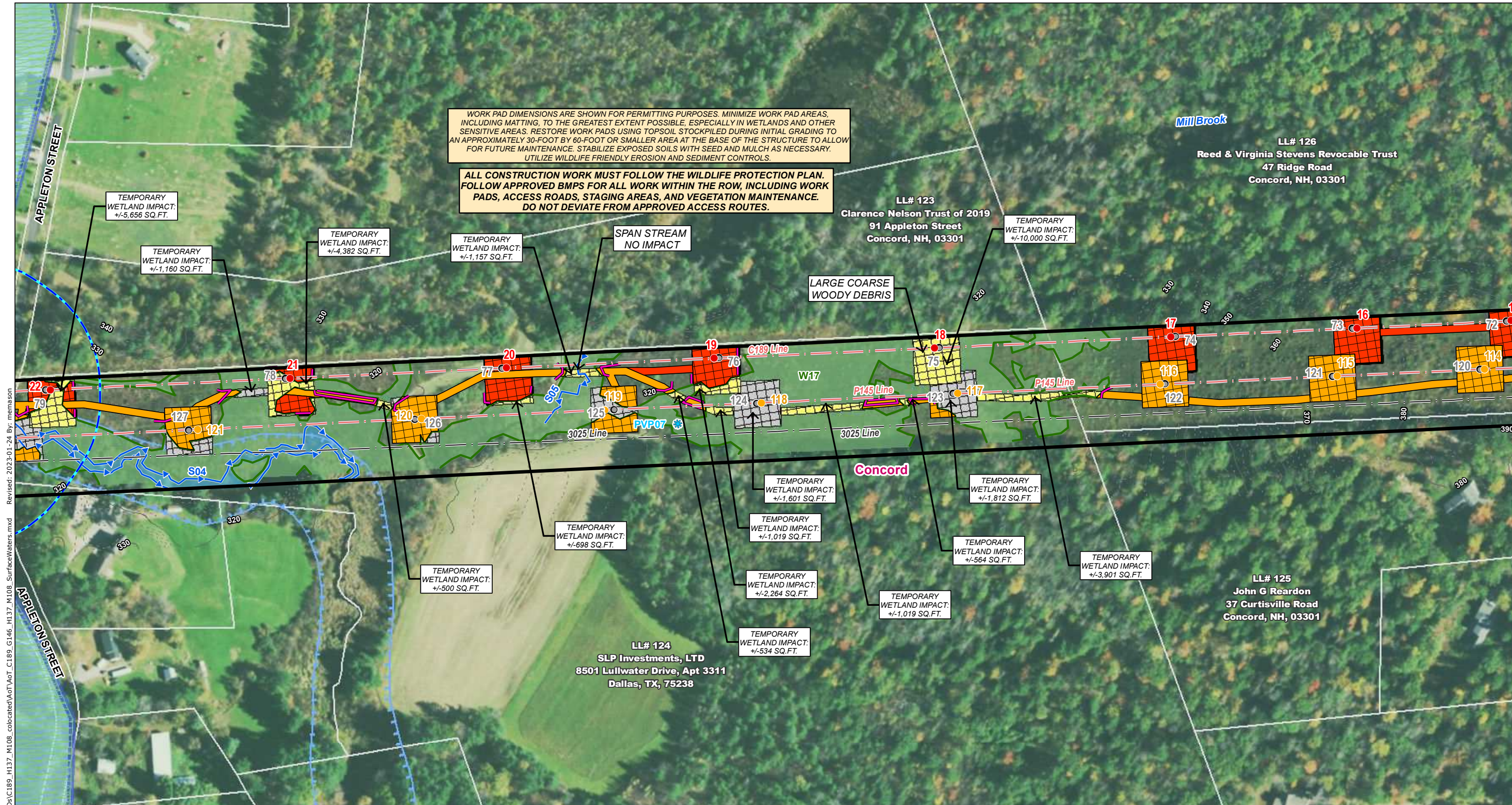
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EVERSOURCE ENERGY

C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans

Concord, NH	MAP SHEET
Date: January 24, 2023	5 of 23

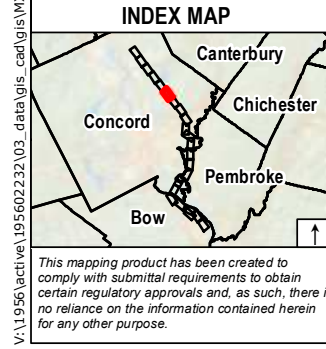
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 Revised: 2023-01-24 By: memason



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Revised: 2023-01-24 By: memason
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Legend

<ul style="list-style-type: none"> Local Potential Contamination Sources Wellhead Protection Areas Class A Surface Waters RSA 485A9 (none) Coastal and Great Bay Region Communities (none) Designated Rivers Quartermile Buffer (none) Groundwater Classification Areas GA1 (none) Groundwater Classification Areas GA2 Groundwater Classification Areas GAA All Lakes with a Quarter Mile Buffer Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none) Outstanding Resource Water Watersheds (none) Surface Waters with Impairments 2016 with Quarter Mile Buffer 	<ul style="list-style-type: none"> Water Supply Intake Protection Areas (none) Watersheds with Chloride Impairments 2016 Proposed Structure Previously Permitted Structure Existing Structure Existing Structure to be Removed Overhead Eversource Line Overhead Distribution Line Underground Distribution Line Existing Right-of-Way (ROW) Existing Access Proposed Access (Previously Permitted) Suggested Erosion and Sediment Control (TYP) 	<ul style="list-style-type: none"> AoT Disturbance Area - New Pad AoT Disturbance Area - New Access AoT Disturbance Area - Pad (Previously Permitted) AoT Disturbance Area - Access (Previously Permitted) Temporary Construction Matting Temporary Construction Matting (Previously Permitted) Existing Gravel Stone Work Pad Stone Work Pad (Previously Permitted) Eversource Owned Property Slate Owned Land LLN/Property Owner Parcel Boundary 	<ul style="list-style-type: none"> Municipal Boundary FEMA 100-Year Flood Zone Floodway 2' Contours 10' Contours Potential Vernal Pool Potential Vernal Pool Extent Delineated Perennial Stream Delineated Intermittent Stream Delineated Ephemeral Stream Delineated Wetland Boundary Field Delineated Wetland Priority Resource Area Open Water 	<ul style="list-style-type: none"> NHDES Protected Shoreland Rail Road Approximate Gas Line Fence Berm Stone Wall (NPT) Gate Culvert
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0 50 100 200 Feet

EVERSOURCE ENERGY

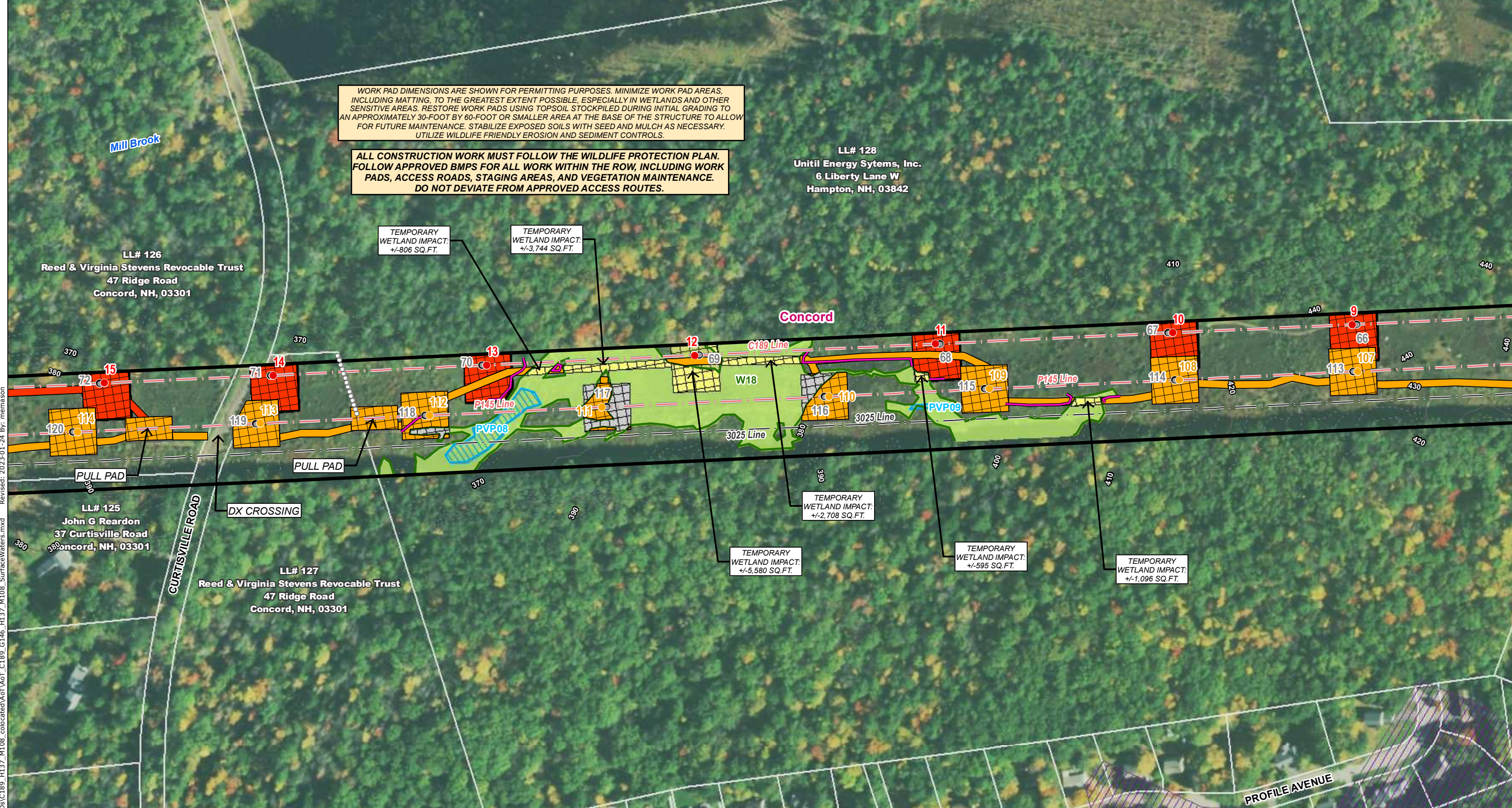
C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans

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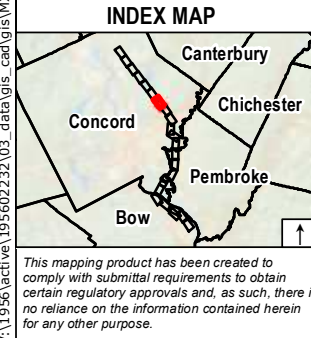
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LL# 128
Unitil Energy Sytems, Inc.
 6 Liberty Lane W
 Hampton, NH, 03842



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 Revised: 2023-01-24 By: memason



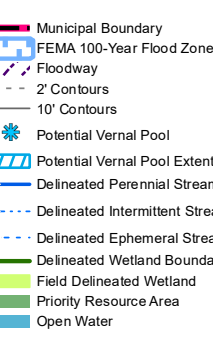
Legend

	Local Potential Contamination Sources
	Wellhead Protection Areas
	Class A Surface Waters RSA 485A9 (none)
	Coastal and Great Bay Region Communities (none)
	Designated Rivers Quarter Mile Buffer (none)
	Groundwater Classification Areas GA1 (none)
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	Floodway
	2' Contours
	10' Contours
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	Fence
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	Gate
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EVERSOURCE ENERGY

C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans

Concord, NH
 Date: January 24, 2023

MAP SHEET
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STRUCTURES 1,2,3,4 ON THE C189 LINE AND 62,63, AND 64 ON THE M108 LINE ARE RENUMBERED ONLY

TEMPORARY WETLAND IMPACT: +/-1,366 SQ.FT.

LL# 128
Unitil Energy Sytems, Inc.
6 Liberty Lane W
Hampton, NH, 03842

LL# 129
Unitil Energy Sytems, Inc.
6 Liberty Lane W
Hampton, NH, 03842

TEMPORARY WETLAND IMPACT: +/-9,024 SQ.FT.

INSTALL INSULATOR STRUTS

TEMPORARY WETLAND IMPACT: +/-9,986 SQ.FT.

Concord

SPLICE CAN

PULL PAD

PORTSMOUTH STREET

TEMPORARY WETLAND IMPACT: +/-781 SQ.FT.

PULL PAD

TEMPORARY WETLAND IMPACT: +/-2,667 SQ.FT.

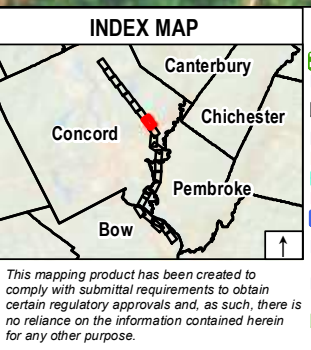
TEMPORARY WETLAND IMPACT: +/-843 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-415 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-4,229 SQ.FT.

LL# 132
Hodges Properties, Inc.
201 Loudon Road
Concord, NH, 03301

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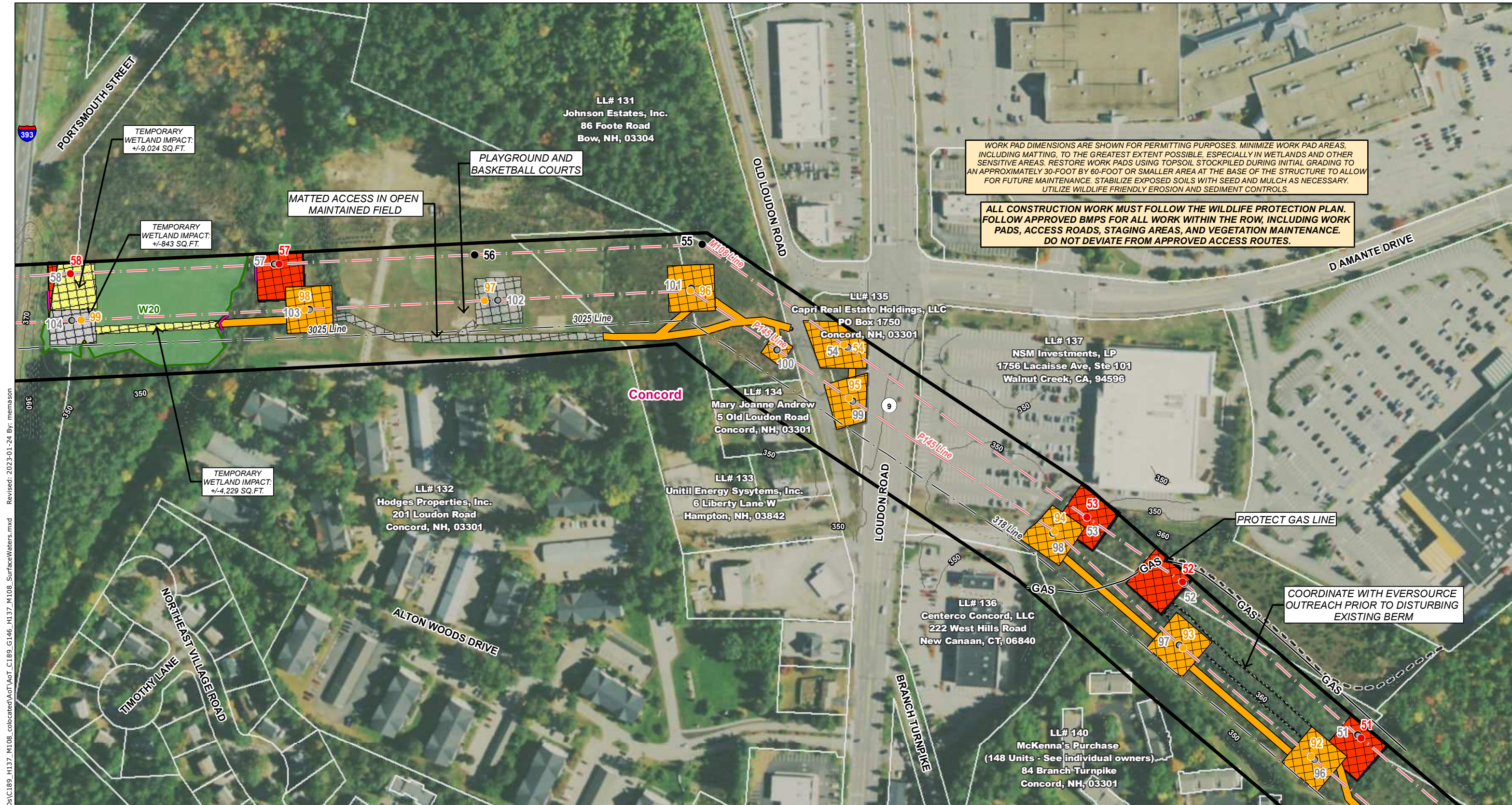
Legend

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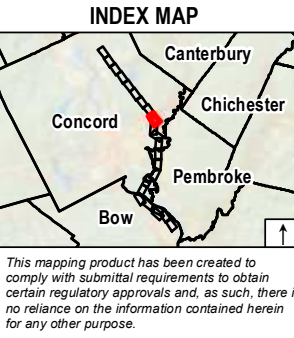
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C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans	
Concord, NH	MAP SHEET
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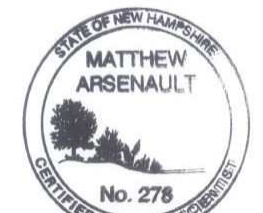


Legend	
	Local Potential Contamination Sources
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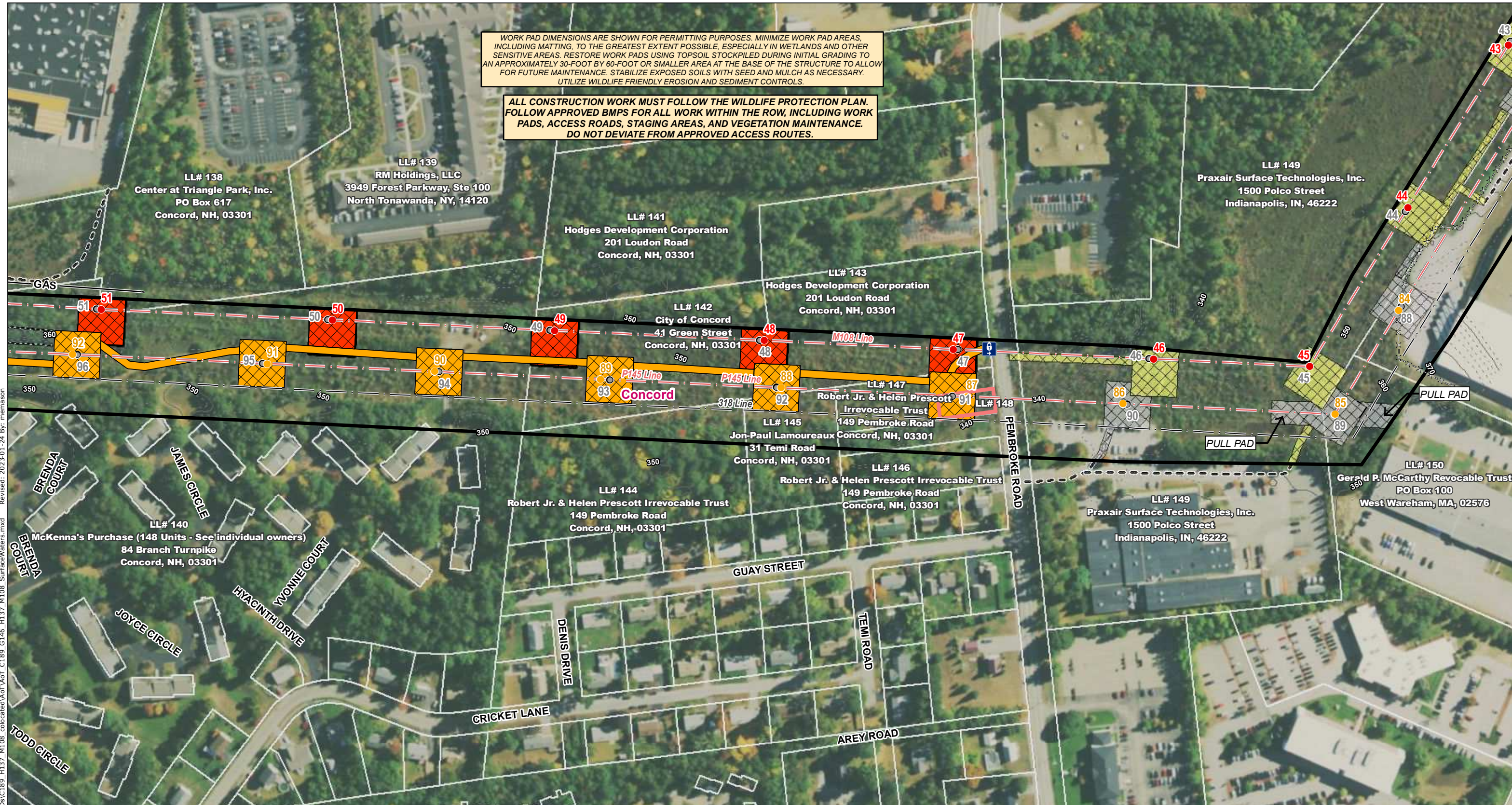
C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans

Concord, NH	MAP SHEET
Date: January 24, 2023	9 of 23

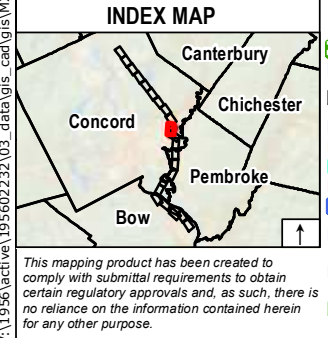


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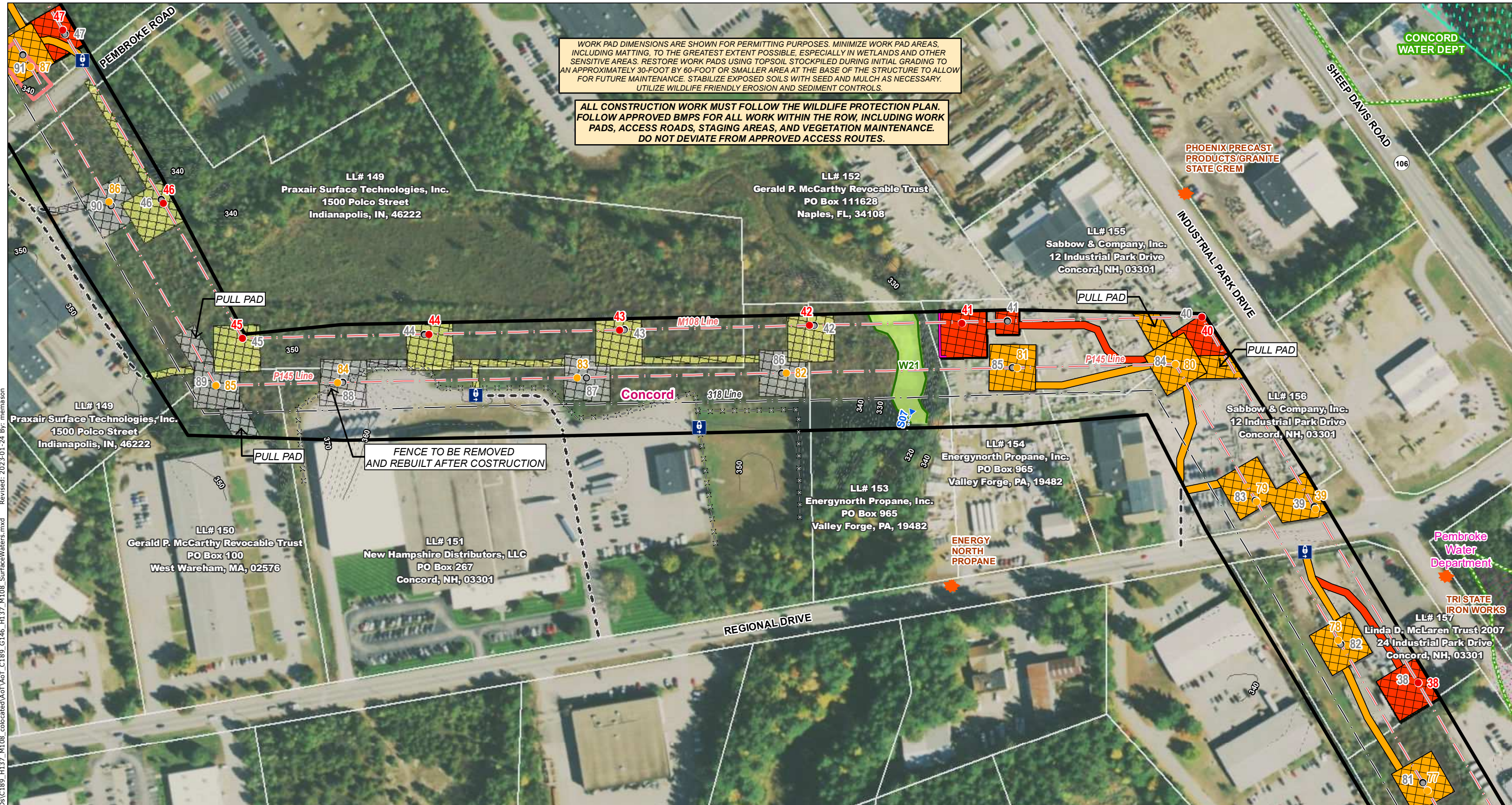
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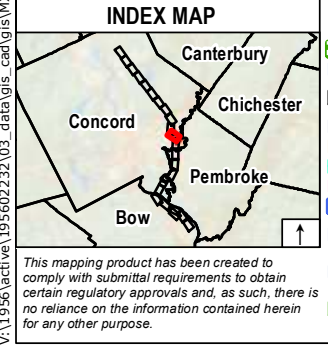
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Concord, NH	MAP SHEET
Date: January 24, 2023	
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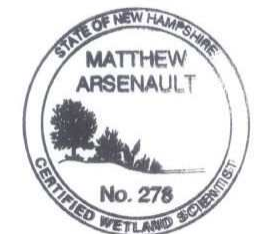
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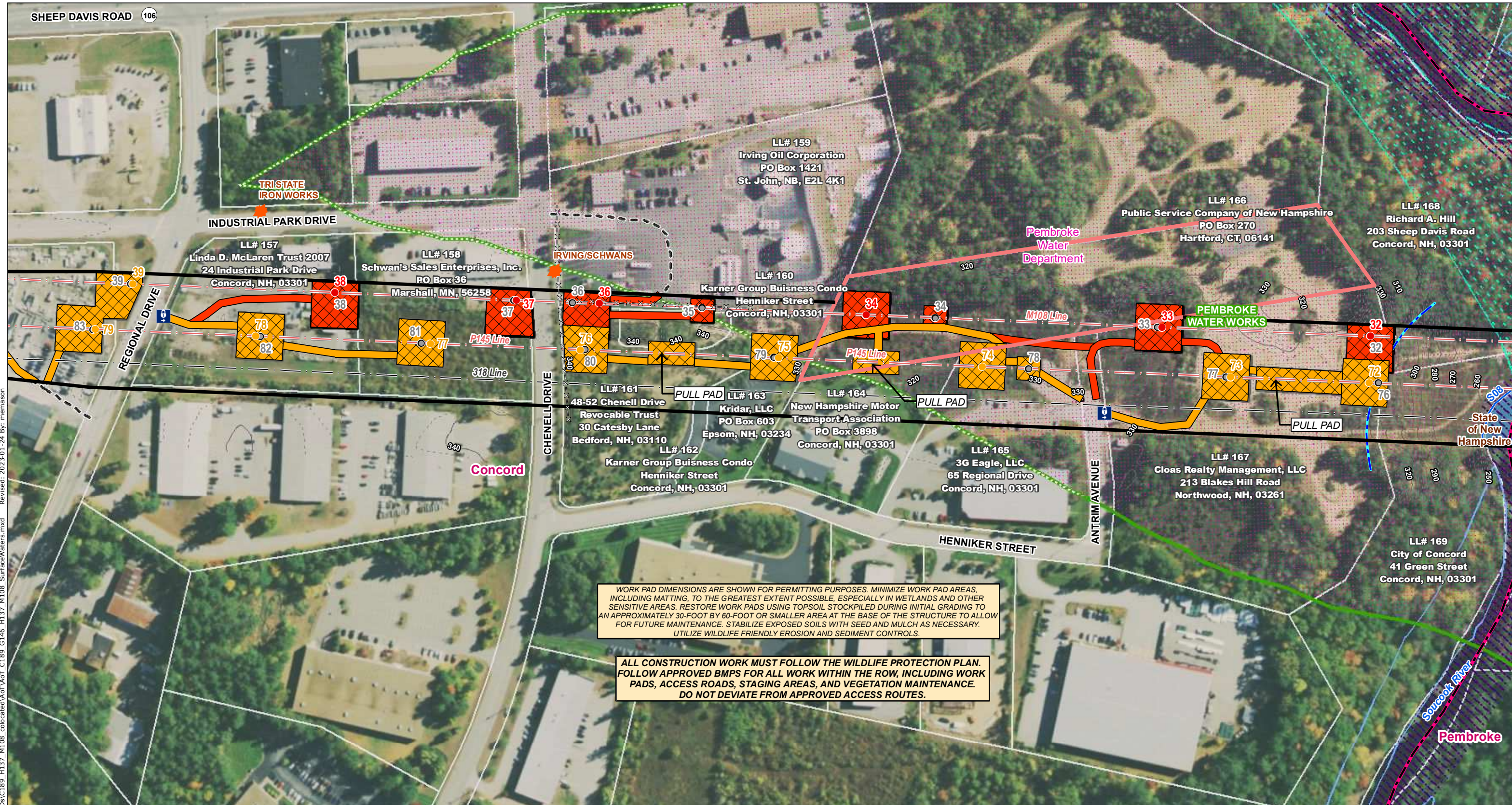
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1 inch = 200 feet

C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans

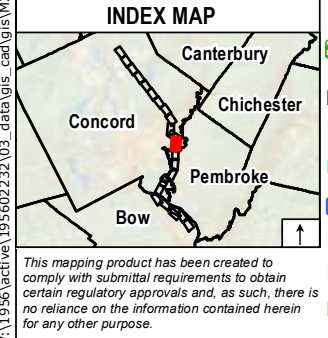
Concord, NH	MAP SHEET
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 - Watersheds with Chloride Impairments 2016
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 - Coastal and Great Bay Region Communities (none)
 - Designated Rivers Quartermile Buffer (none)
 - Groundwater Classification Areas GA1 (none)
 - Groundwater Classification Areas GA2
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 - All Lakes with a Quarter Mile Buffer
 - Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none)
 - Outstanding Resource Water Watersheds (none)
 - Surface Waters with Impairments 2016 with Quarter Mile Buffer

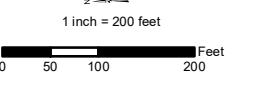
- Water Supply Intake Protection Areas (none)
- Proposed Structure
- Previously Permitted Structure
- Existing Structure
- Existing Structure to be Removed
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- Overhead Distribution Line
- Underground Distribution Line
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- Stone Work Pad (Previously Permitted)
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- Municipal Boundary
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- Potential Vernal Pool
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- Delineated Perennial Stream
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- Priority Resource Area
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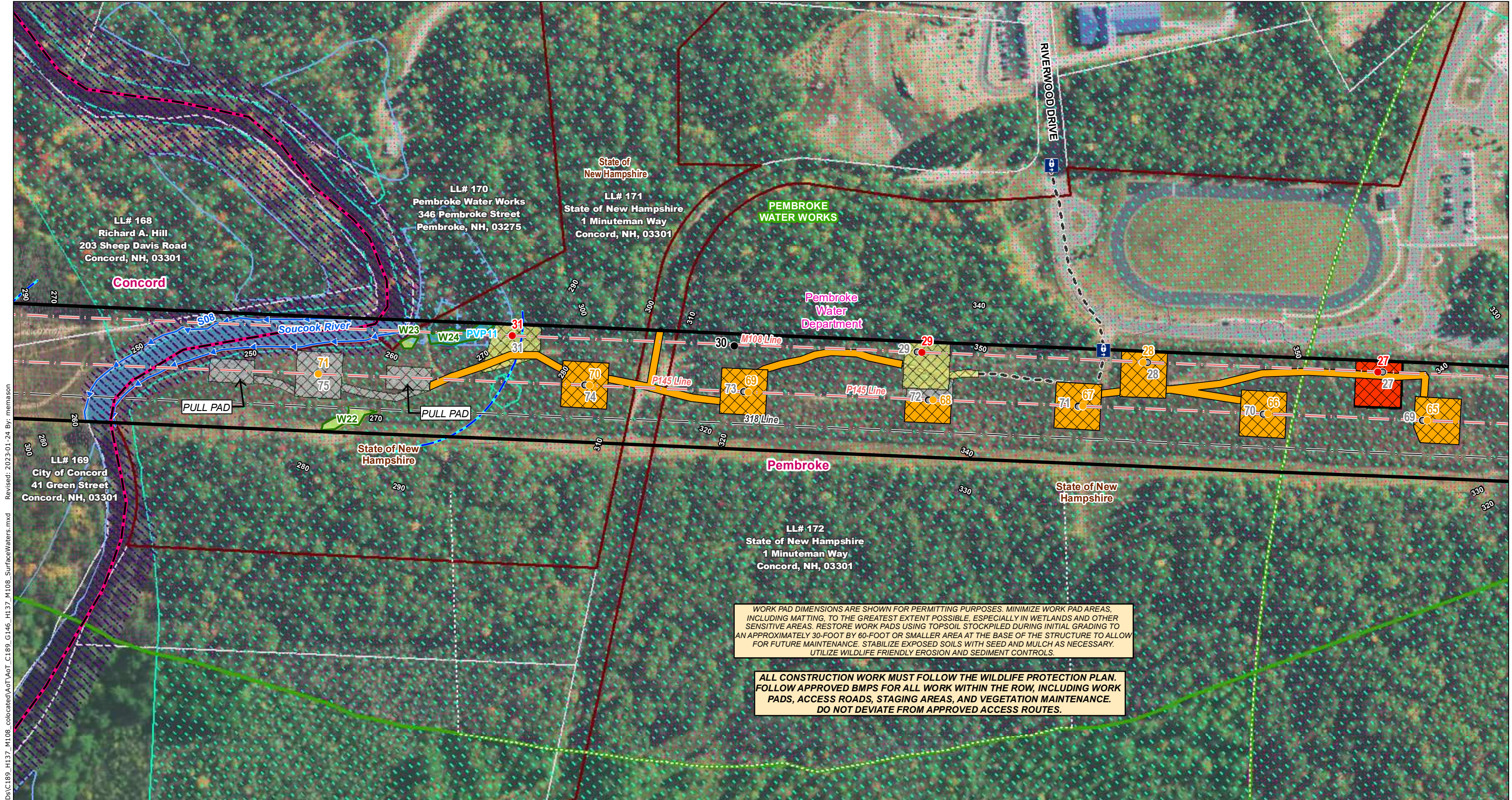
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C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans			
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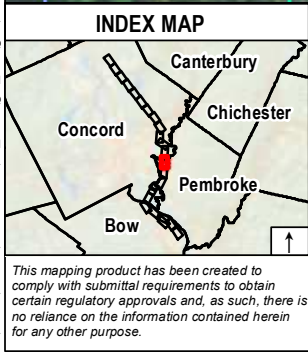
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 Revised: 2023-01-24 By: memason



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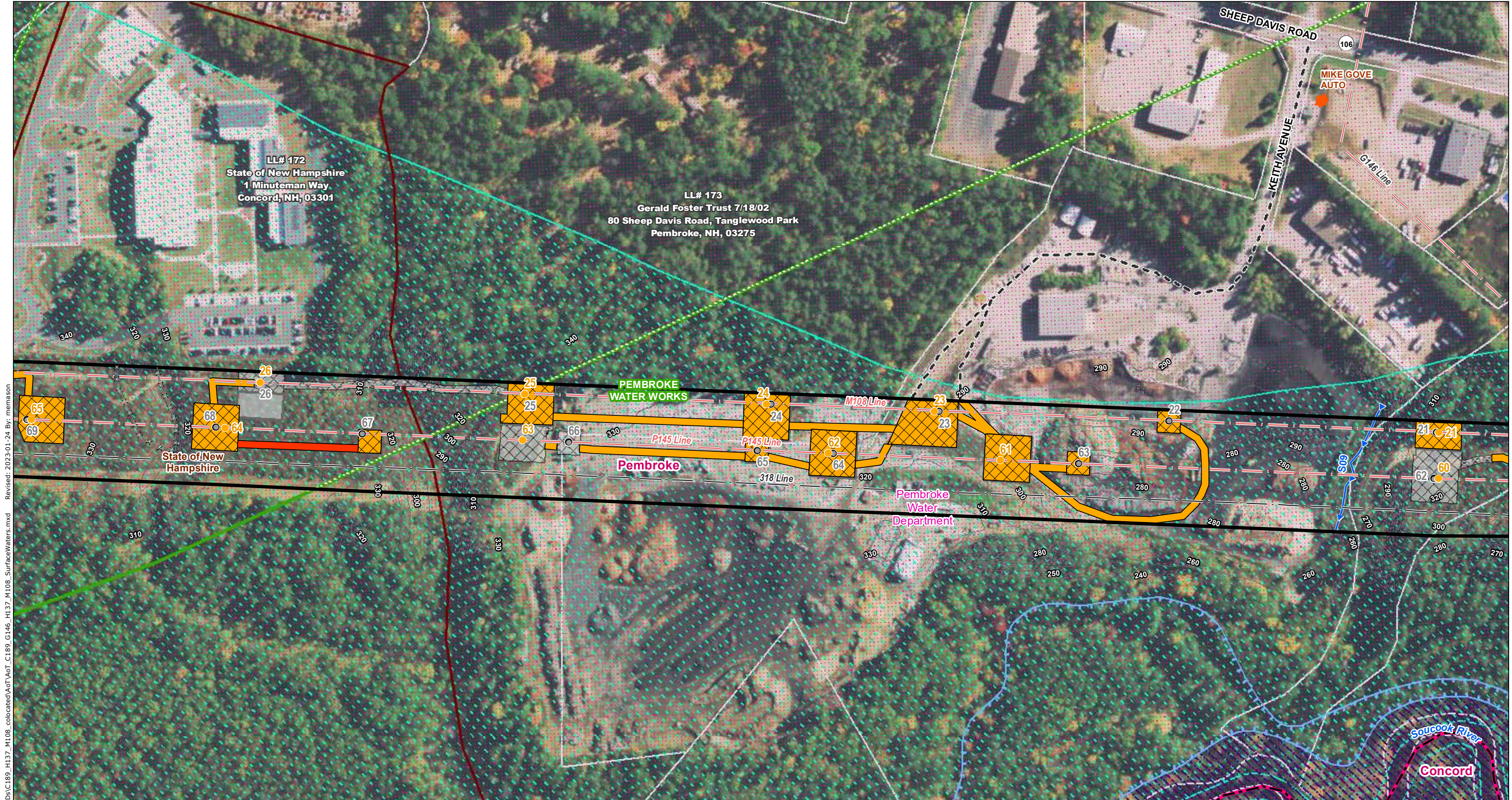


Legend		Legend		Legend		Legend	
	Local Potential Contamination Sources		Water Supply Intake Protection Areas (none)		AoT Disturbance Area - New Pad		FEMA 100-Year Flood Zone
	Wellhead Protection Areas		Watersheds with Chloride Impairments 2016		AoT Disturbance Area - New Access		Floodway
	Class A Surface Waters RSA 485A9 (none)		Proposed Structure		AoT Disturbance Area - Pad (Previously Permitted)		2' Contours
	Coastal and Great Bay Region Communities (none)		Previously Permitted Structure		AoT Disturbance Area - Access (Previously Permitted)		10' Contours
	Designated Rivers Quartermile Buffer (none)		Existing Structure		Temporary Construction Matting (Previously Permitted)		Potential Vernal Pool
	Groundwater Classification Areas GA1 (none)		Existing Structure to be Removed		Existing Gravel		Delineated Perennial Stream
	Groundwater Classification Areas GA2		Overhead Eversource Line		Stone Work Pad		Delineated Intermittent Stream
	Groundwater Classification Areas GAA		Overhead Distribution Line		Stone Work Pad (Previously Permitted)		Delineated Ephemeral Stream
	All Lakes with a Quarter Mile Buffer		Underground Distribution Line		Eversource Owned Property		Delineated Wetland Boundary
	Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none)		Existing Right-of-Way (ROW)		Slate Owned Land		Field Delineated Wetland
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	Outstanding Resource Water Watersheds (none)		Proposed Access (Previously Permitted)		Parcel Boundary		Open Water
	Surface Waters with Impairments 2016 with Quarter Mile Buffer		Suggested Erosion and Sediment Control (TYP)				

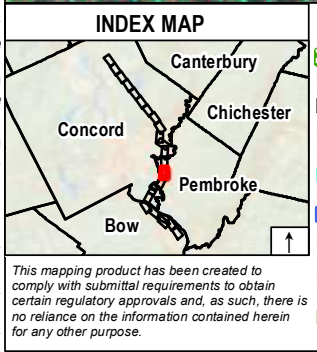
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C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans	
Pembroke & Concord, NH	MAP SHEET
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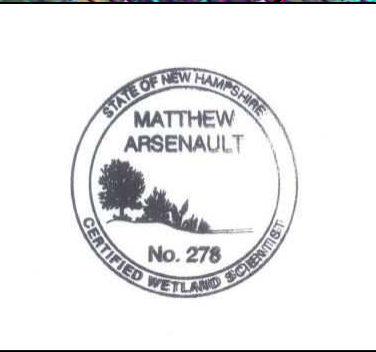


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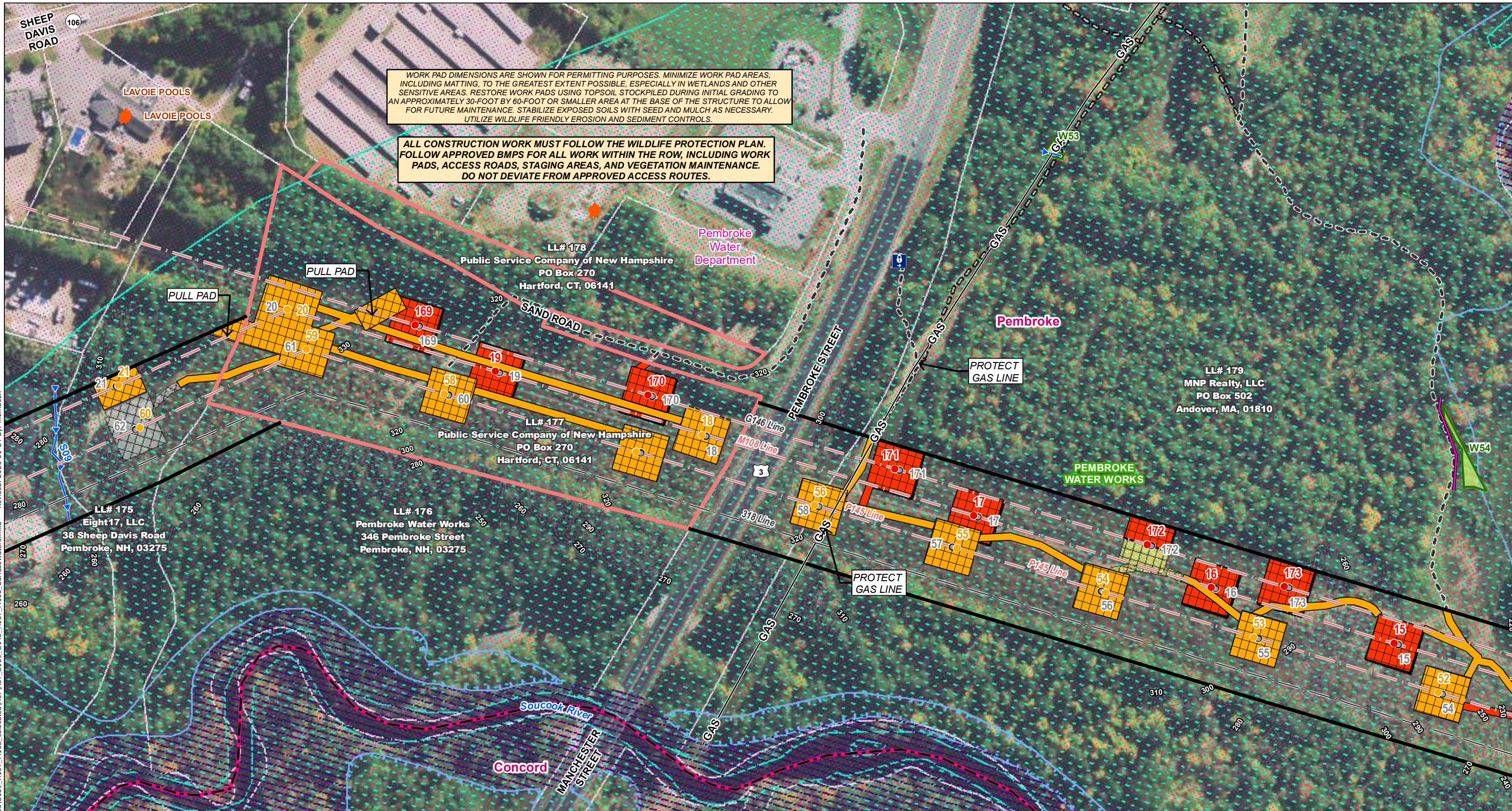
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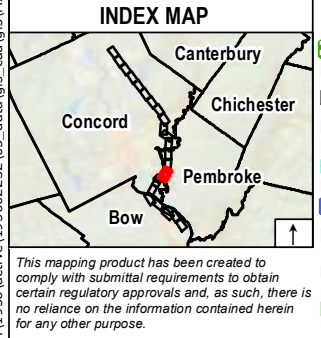
EVERSOURCE ENERGY Stantec	
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Pembroke, NH	MAP SHEET
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 Revised: 2023-01-24 By: memason



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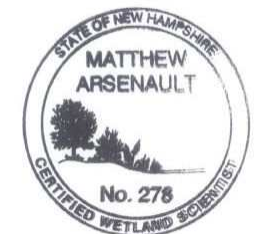
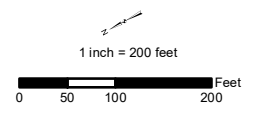
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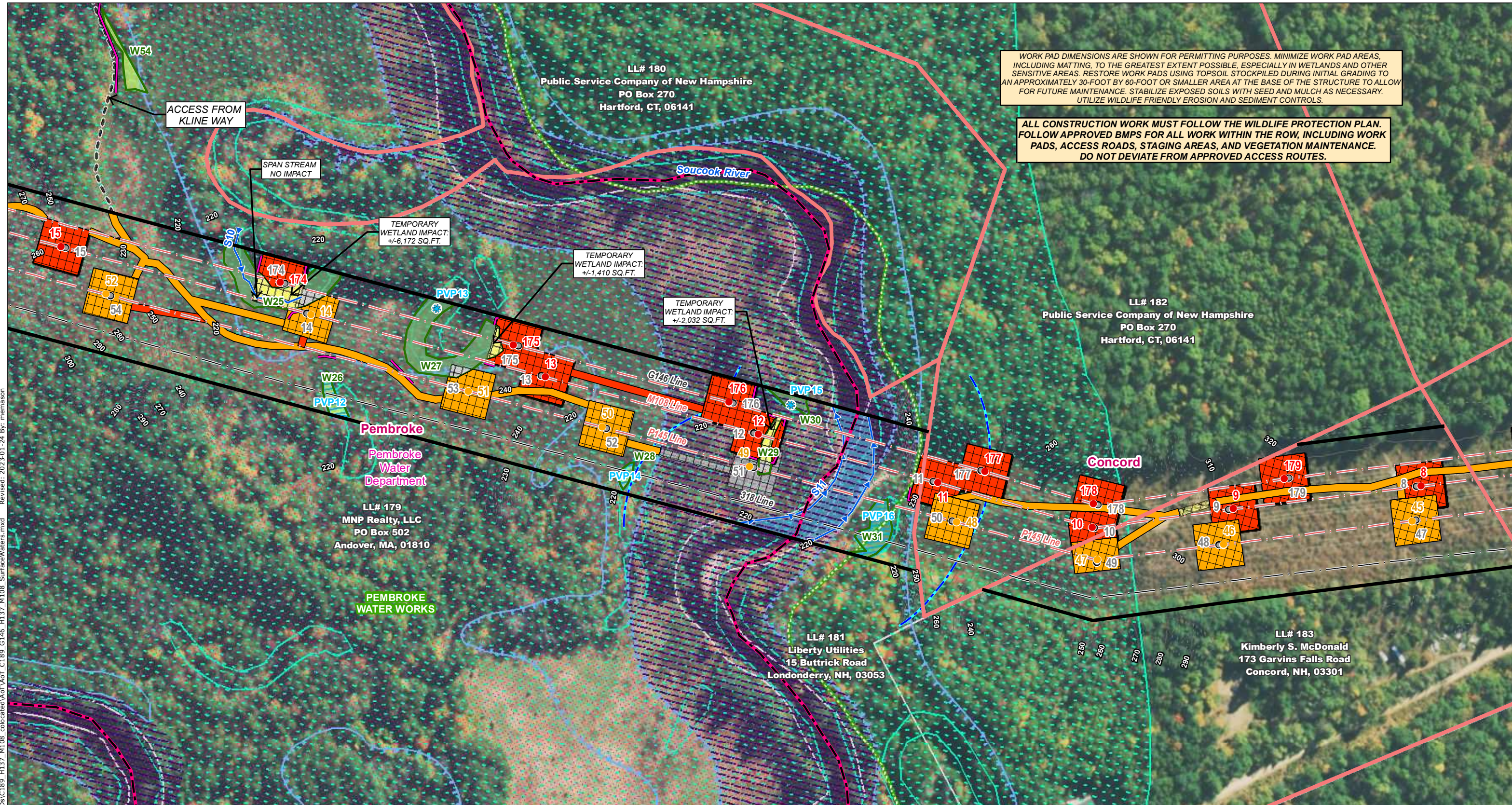
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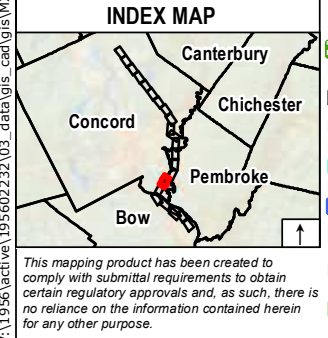
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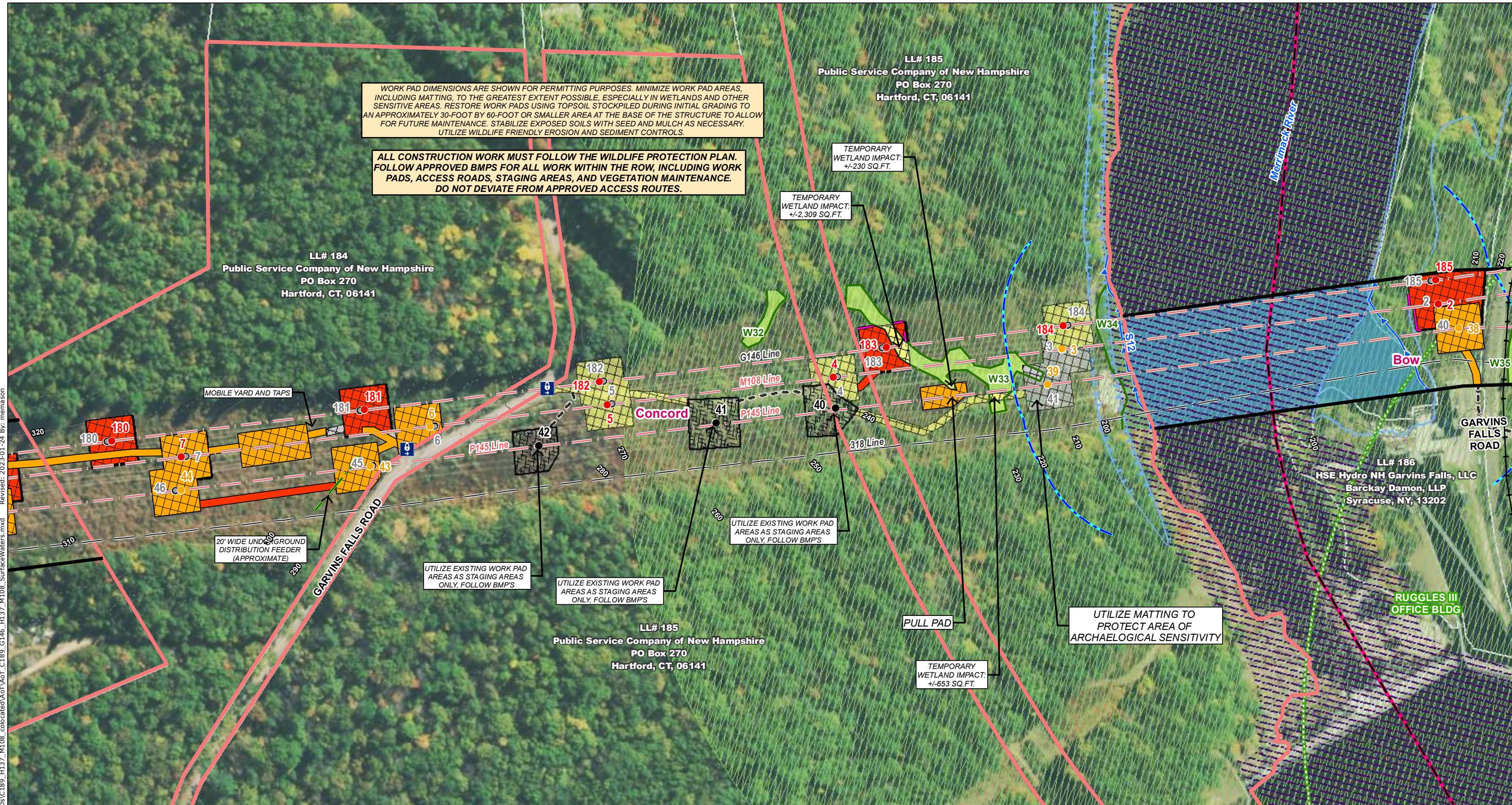
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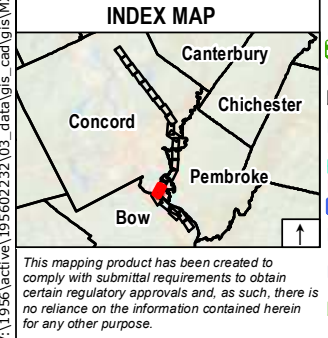
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Revised: 2023-01-24 By: memason
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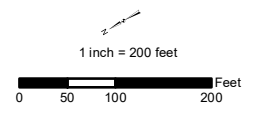
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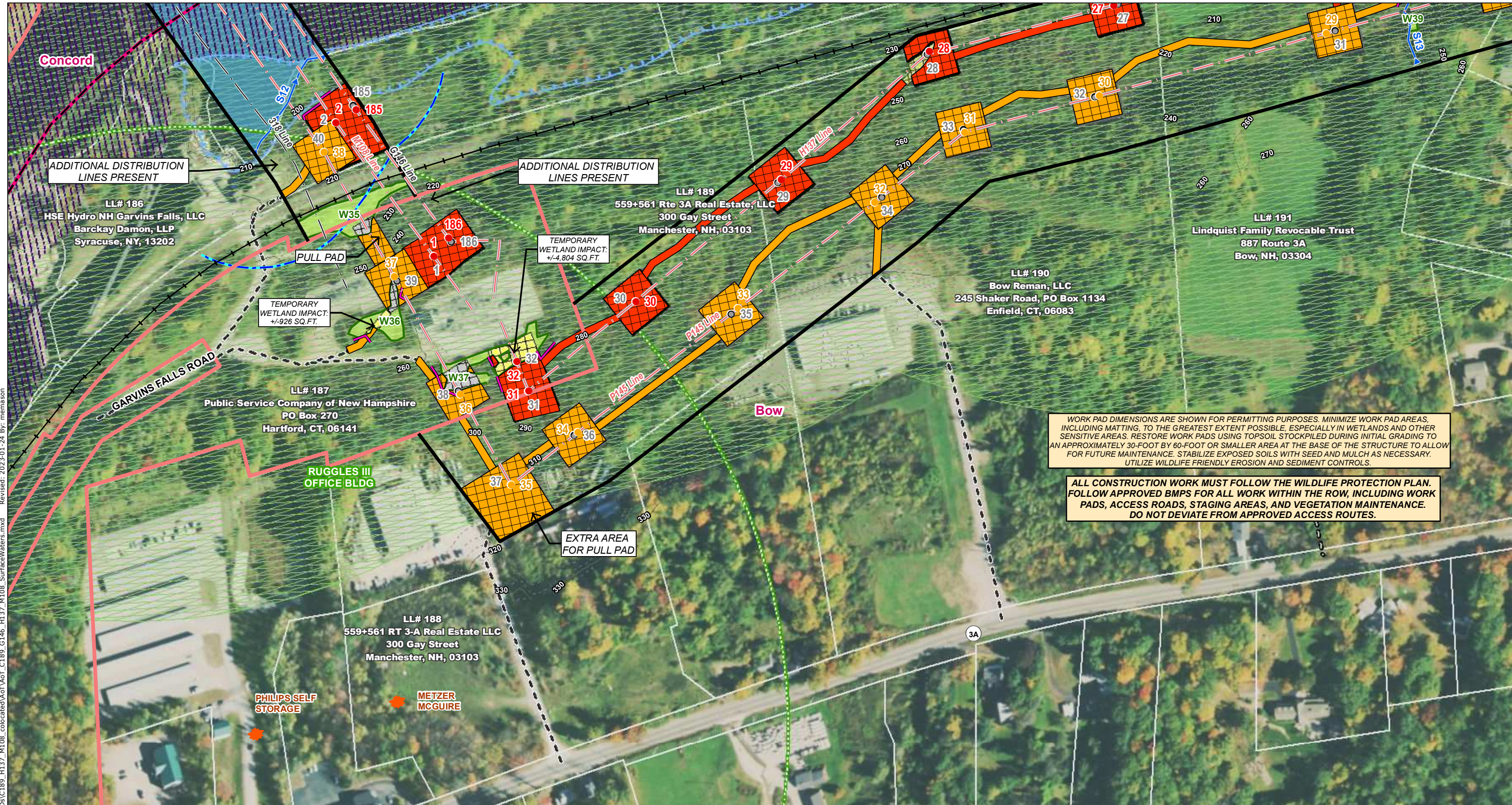


Legend	
	Local Potential Contamination Sources
	Wellhead Protection Areas
	Class A Surface Waters RSA 485A9 (none)
	Coastal and Great Bay Region Communities (none)
	Designated Rivers Quartermile Buffer (none)
	Groundwater Classification Areas GA1 (none)
	Groundwater Classification Areas GA2
	Groundwater Classification Areas GAA
	All Lakes with a Quarter Mile Buffer
	Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none)
	Outstanding Resource Water Watersheds (none)
	Surface Waters with Impairments 2016 with Quarter Mile Buffer
	Water Supply Intake Protection Areas (none)
	Watersheds with Chloride Impairments 2016
	Proposed Structure
	Previously Permitted Structure
	Existing Structure
	Existing Structure to be Removed
	Overhead Eversource Line
	Overhead Distribution Line
	Underground Distribution Line
	Existing Right-of-Way (ROW)
	Existing Access
	Proposed Access (Previously Permitted)
	Suggested Erosion and Sediment Control (TYP)
	AoT Disturbance Area - New Pad
	AoT Disturbance Area - Pad (Previously Permitted)
	AoT Disturbance Area - Access (Previously Permitted)
	Temporary Construction Matting
	Temporary Construction Matting (Previously Permitted)
	Existing Gravel
	Stone Work Pad
	Stone Work Pad (Previously Permitted)
	Eversource Owned Property
	Slate Owned Land
	LLN/Property Owner
	Parcel Boundary
	Municipal Boundary
	FEMA 100-Year Flood Zone
	Floodway
	2' Contours
	10' Contours
	Potential Vernal Pool
	Potential Vernal Pool Extent
	Delineated Perennial Stream
	Delineated Intermittent Stream
	Delineated Ephemeral Stream
	Delineated Wetland Boundary
	Field Delineated Wetland
	Priority Resource Area
	Open Water
	NHDES Protected Shoreland
	Rail Road
	Approximate Gas Line
	Fence
	Berm
	Stone Wall (NPT)
	Gate
	Culvert

Map Notes:
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ADDITIONAL DISTRIBUTION LINES PRESENT

ADDITIONAL DISTRIBUTION LINES PRESENT

TEMPORARY WETLAND IMPACT: +/-926 SQ.FT.

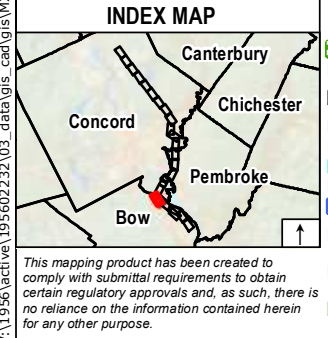
TEMPORARY WETLAND IMPACT: +/-4,804 SQ.FT.

EXTRA AREA FOR PULL PAD

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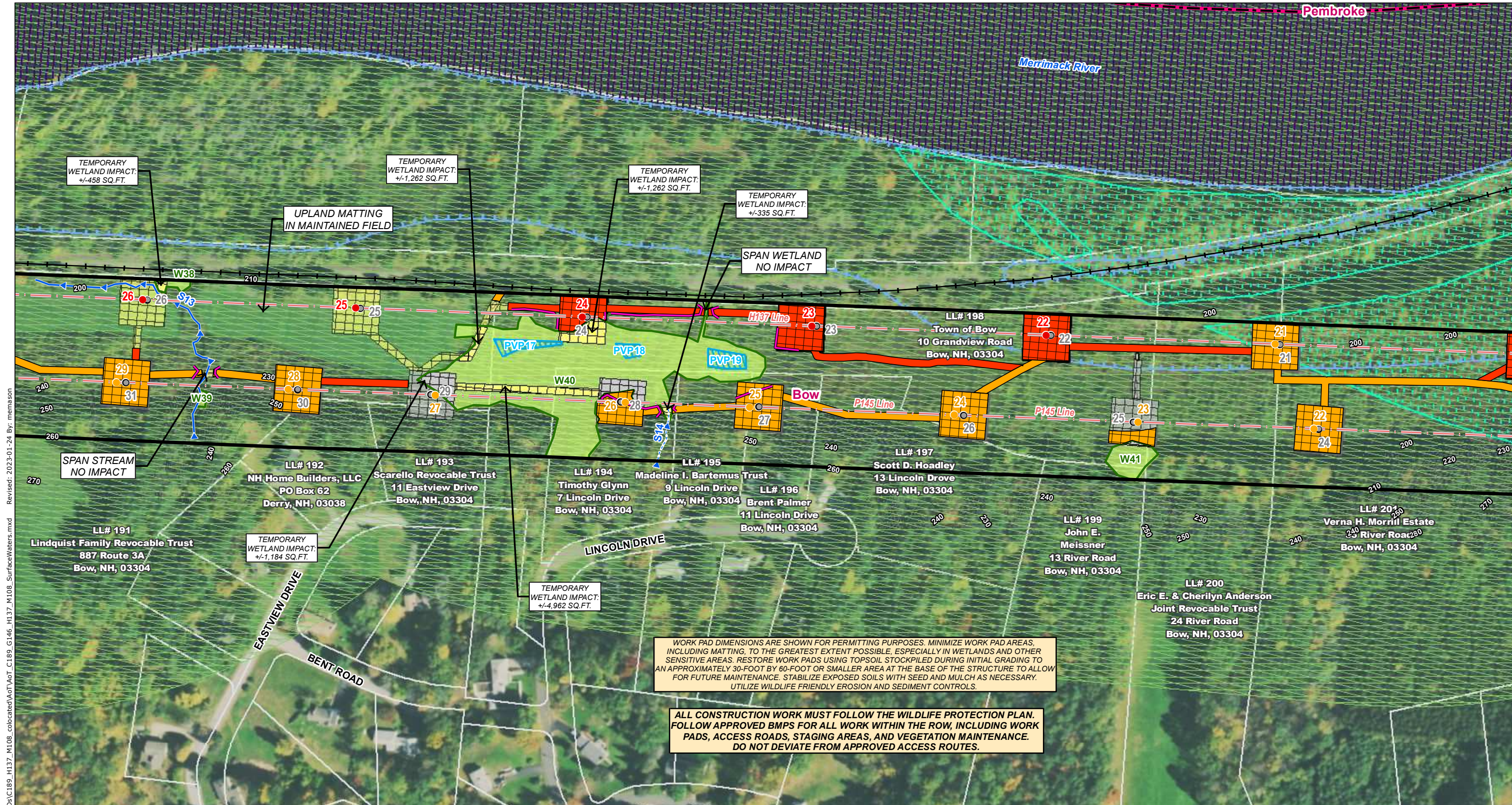
Legend		Legend		Legend		Legend	
	Local Potential Contamination Sources		AoT Disturbance Area - New Pad		Municipal Boundary		NHDES Protected Shoreland
	Wellhead Protection Areas		AoT Disturbance Area - New Access		FEMA 100-Year Flood Zone		Rail Road
	Class A Surface Waters RSA 485A9 (none)		AoT Disturbance Area - Pad (Previously Permitted)		Floodway		GAS Approximate Gas Line
	Coastal and Great Bay Region Communities (none)		Existing Structure		2' Contours		Fence
	Designated Rivers Quartermile Buffer (none)		Existing Structure to be Removed		10' Contours		Berm
	Groundwater Classification Areas GA1 (none)		Temporary Construction Matting (Previously Permitted)		Potential Vernal Pool		Stone Wall (NPT)
	Groundwater Classification Areas GA2		Temporary Construction Matting (Previously Permitted)		Delineated Perennial Stream		Gate
	Groundwater Classification Areas GAA		Existing Gravel		Delineated Intermittent Stream		Culvert
	All Lakes with a Quarter Mile Buffer		Stone Work Pad		Delineated Ephemeral Stream		
	Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none)		Stone Work Pad (Previously Permitted)		Delineated Wetland Boundary		
	Outstanding Resource Water Watersheds (none)		Eversource Owned Property		Field Delineated Wetland		
	Surface Waters with Impairments 2016 with Quarter Mile Buffer		State Owned Land		Priority Resource Area		
			LLN/Property Owner		Open Water		
			Suggested Erosion and Sediment Control (TYP)				

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C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans

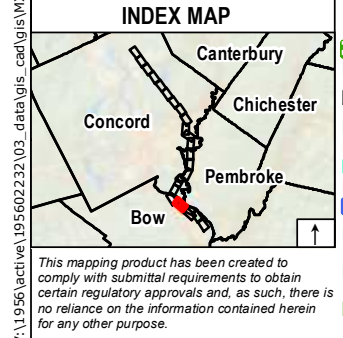
Bow, NH	MAP SHEET
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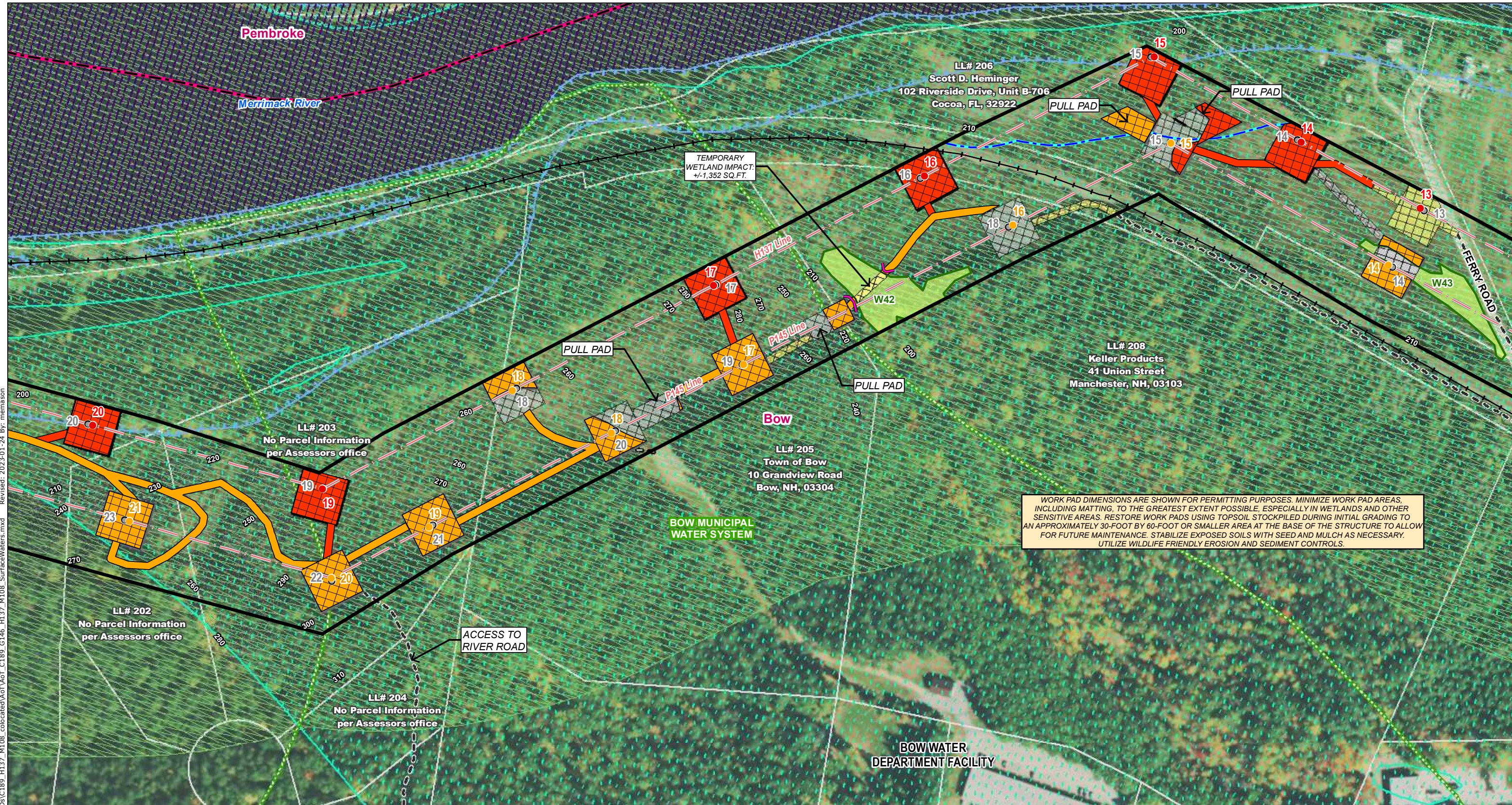


- Legend**
- Local Potential Contamination Sources
 - Wellhead Protection Areas
 - Class A Surface Waters RSA 485A9 (none)
 - Coastal and Great Bay Region Communities (none)
 - Designated Rivers Quartermile Buffer (none)
 - Groundwater Classification Areas GA1 (none)
 - Groundwater Classification Areas GA2
 - Groundwater Classification Areas GAA
 - All Lakes with a Quarter Mile Buffer
 - Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none)
 - Outstanding Resource Water Watersheds (none)
 - Surface Waters with Impairments 2016 with Quarter Mile Buffer
 - Water Supply Intake Protection Areas (none)
 - Watersheds with Chloride Impairments 2016
 - Proposed Structure
 - Previously Permitted Structure
 - Existing Structure
 - Existing Structure to be Removed
 - Overhead Eversource Line
 - Overhead Distribution Line
 - Underground Distribution Line
 - Existing Right-of-Way (ROW)
 - Existing Access
 - Proposed Access (Previously Permitted)
 - Suggested Erosion and Sediment Control (TYP)
 - AoT Disturbance Area - New Pad
 - AoT Disturbance Area - New Access
 - AoT Disturbance Area - Pad (Previously Permitted)
 - AoT Disturbance Area - Access (Previously Permitted)
 - Temporary Construction Matting
 - Temporary Construction Matting (Previously Permitted)
 - Existing Gravel
 - Stone Work Pad
 - Stone Work Pad (Previously Permitted)
 - Eversource Owned Property
 - Slate Owned Land
 - LLN/Property Owner
 - Parcel Boundary
 - Municipal Boundary
 - FEMA 100-Year Flood Zone
 - Floodway
 - 2' Contours
 - 10' Contours
 - Potential Vernal Pool
 - Potential Vernal Pool Extent
 - Delineated Perennial Stream
 - Delineated Intermittent Stream
 - Delineated Ephemeral Stream
 - Delineated Wetland Boundary
 - Field Delineated Wetland
 - Priority Resource Area
 - Open Water
 - NHDES Protected Shoreland
 - Rail Road
 - Approximate Gas Line
 - Fence
 - Berm
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 - Gate
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- 1 inch = 200 feet
- 0 50 100 200 Feet

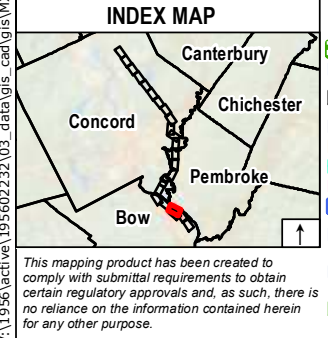


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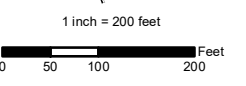
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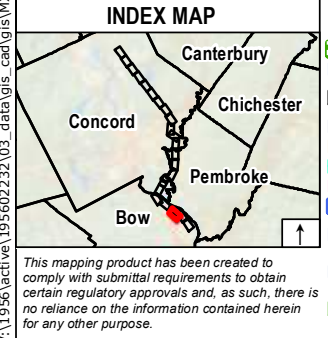
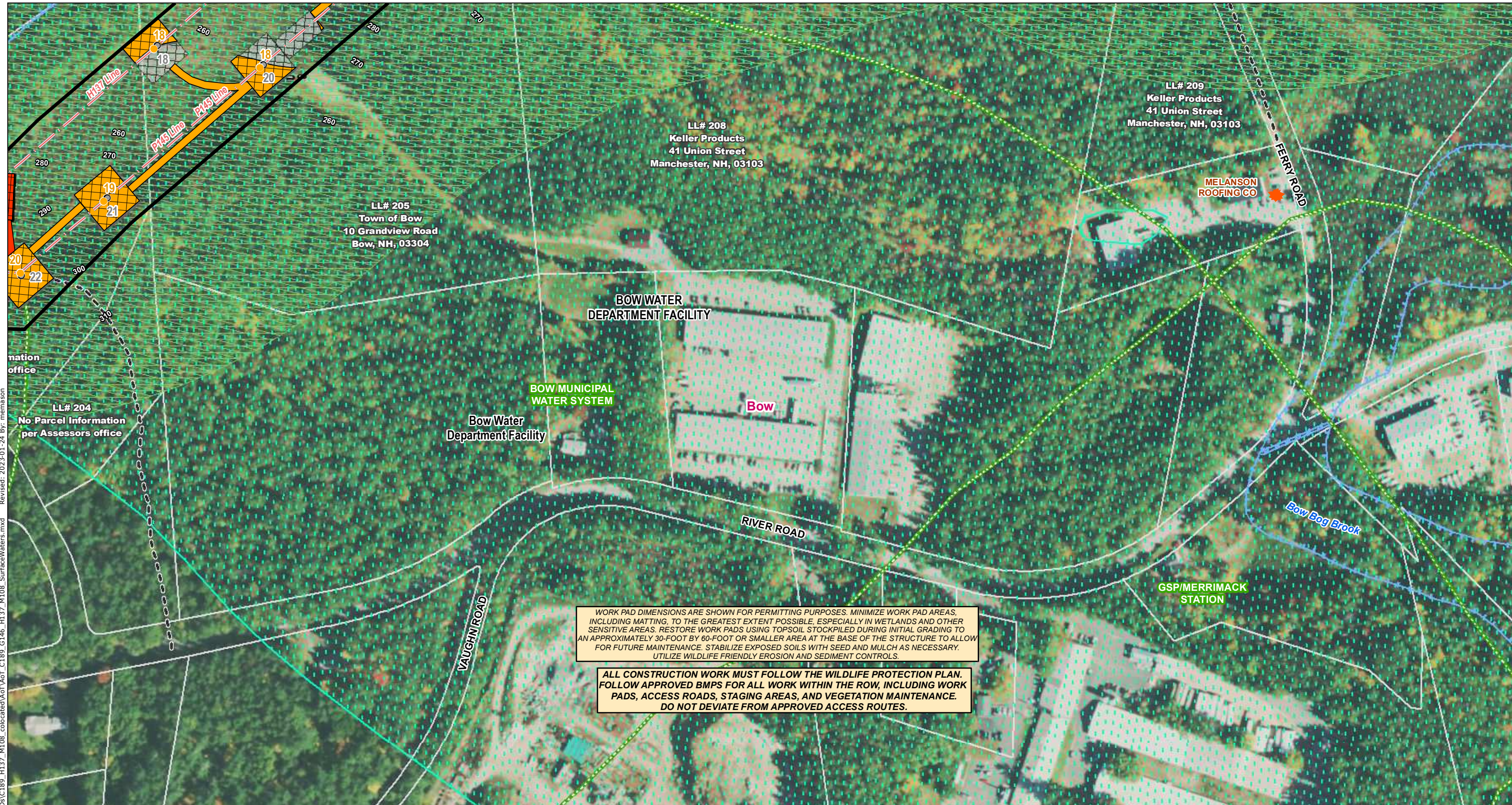


Legend		Map Notes	
	Local Potential Contamination Sources		Municipal Boundary
	Wellhead Protection Areas		FEMA 100-Year Flood Zone
	Class A Surface Waters RSA 485A9 (none)		Floodway
	Coastal and Great Bay Region Communities (none)		2' Contours
	Designated Rivers Quartermile Buffer (none)		10' Contours
	Groundwater Classification Areas GA1 (none)		Potential Vernal Pool
	Groundwater Classification Areas GA2		Potential Vernal Pool Extent
	Groundwater Classification Areas GAA		Delineated Perennial Stream
	All Lakes with a Quarter Mile Buffer		Delineated Intermittent Stream
	Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none)		Delineated Ephemeral Stream
	Outstanding Resource Water Watersheds (none)		Delineated Wetland Boundary
	Surface Waters with Impairments 2016 with Quarter Mile Buffer		Field Delineated Wetland
	Water Supply Intake Protection Areas (none)		Priority Resource Area
	Watersheds with Chloride Impairments 2016		Open Water
	Proposed Structure		NHDES Protected Shoreland
	Previously Permitted Structure		Rail Road
	Existing Structure		GAS Approximate Gas Line
	Existing Structure to be Removed		Fence
	Overhead Eversource Line		Berm
	Overhead Distribution Line		Stone Wall (NPT)
	Underground Distribution Line		Gate
	Existing Right-of-Way (ROW)		Culvert
	Existing Access		
	Proposed Access (Previously Permitted)		
	Suggested Erosion and Sediment Control (TYP)		
	AoT Disturbance Area - New Pad		
	AoT Disturbance Area - New Access		
	AoT Disturbance Area - Pad (Previously Permitted)		
	AoT Disturbance Area - Access (Previously Permitted)		
	Temporary Construction Matting		
	Temporary Construction Matting (Previously Permitted)		
	Existing Gravel		
	Stone Work Pad		
	Stone Work Pad (Previously Permitted)		
	Eversource Owned Property		
	Slate Owned Land		
	LLN/Property Owner		
	Parcel Boundary		



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Legend		Map Notes	
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	Wellhead Protection Areas		Floodway
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	Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none)		Field Delineated Wetland
	Outstanding Resource Water Watersheds (none)		Priority Resource Area
	Surface Waters with Impairments 2016 with Quarter Mile Buffer		Open Water
	Water Supply Intake Protection Areas (none)		Municipal Boundary
	Watersheds with Chloride Impairments 2016		NHDES Protected Shoreland
	Proposed Structure		Rail Road
	Previously Permitted Structure		GAS Approximate Gas Line
	Existing Structure		Fence
	Existing Structure to be Removed		Berm
	Overhead Eversource Line		Stone Wall (NPT)
	Overhead Distribution Line		Gate
	Underground Distribution Line		Culvert
	Existing Right-of-Way (ROW)		AoT Disturbance Area - New Pad
	Existing Access		AoT Disturbance Area - Pad (Previously Permitted)
	Proposed Access (Previously Permitted)		AoT Disturbance Area - Access (Previously Permitted)
	Suggested Erosion and Sediment Control (TYP)		Temporary Construction Matting (Previously Permitted)
	Existing Gravel		Temporary Construction Matting (Previously Permitted)
	Stone Work Pad		Existing Gravel
	Stone Work Pad (Previously Permitted)		Stone Work Pad
	Eversource Owned Property		Stone Work Pad (Previously Permitted)
	Slate Owned Land		Eversource Owned Property
	LLN/Property Owner		Slate Owned Land
	Parcel Boundary		LLN/Property Owner

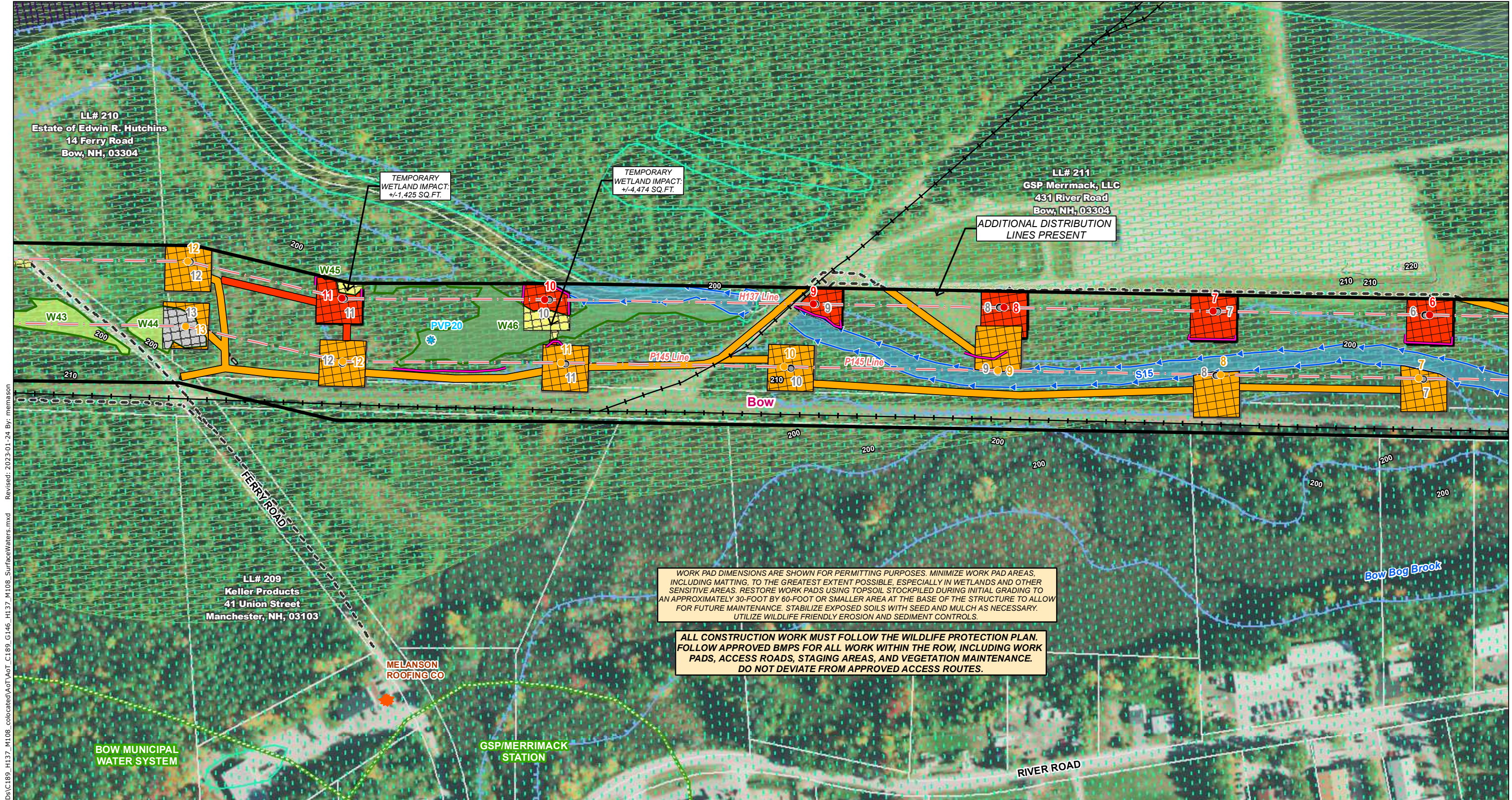
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1 inch = 200 feet

0 50 100 200 Feet

EVERSOURCE ENERGY		Stantec	
C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans			
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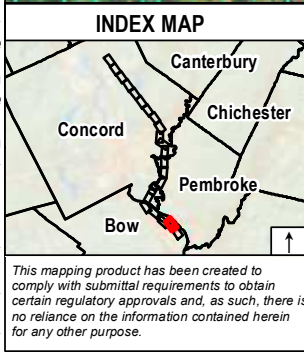
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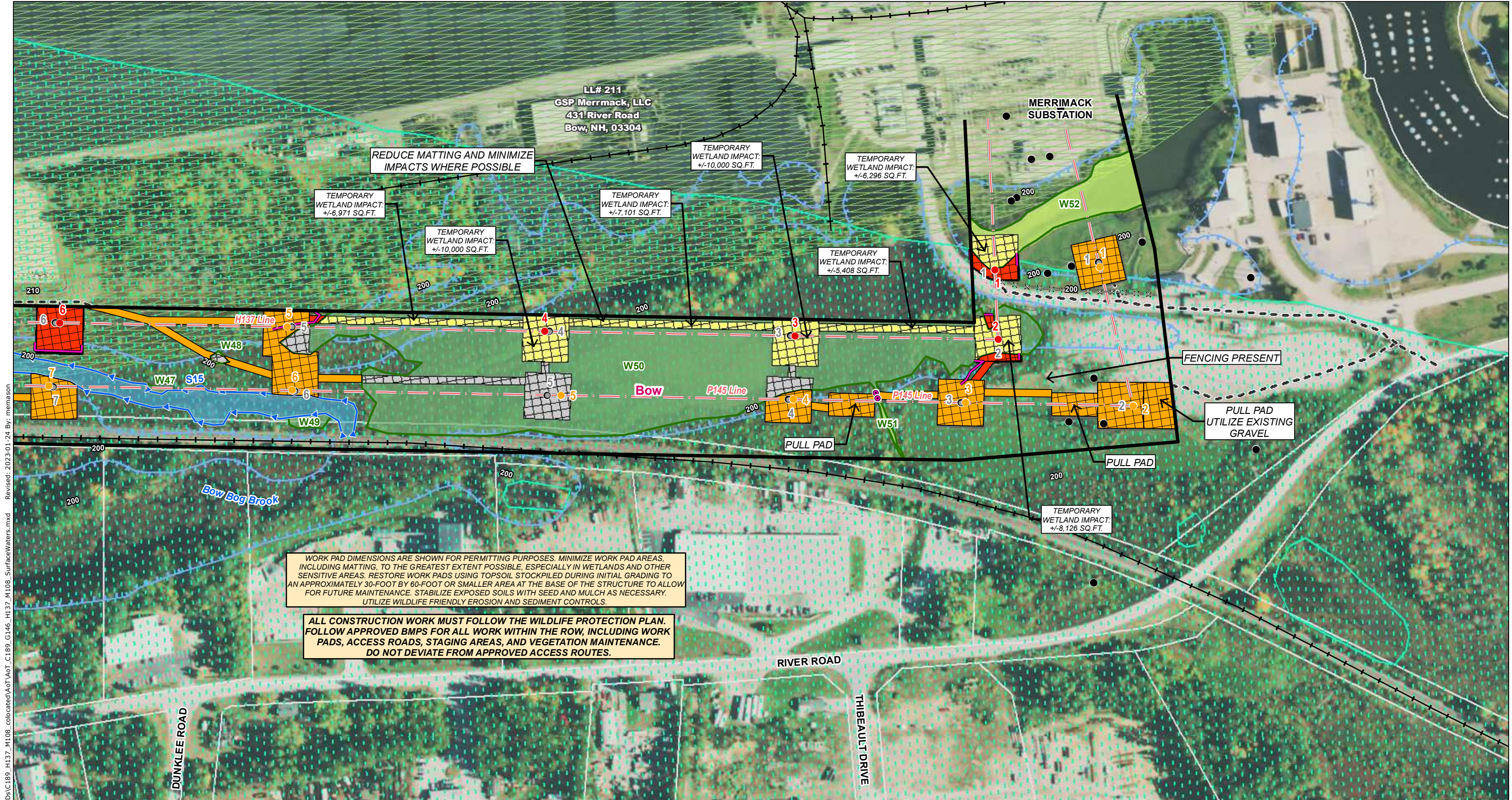
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Legend		Legend		Legend		Legend	
	Local Potential Contamination Sources		Water Supply Intake Protection Areas (none)		AoT Disturbance Area - New Pad		Municipal Boundary
	Wellhead Protection Areas		Watersheds with Chloride Impairments 2016		AoT Disturbance Area - New Access		FEMA 100-Year Flood Zone
	Class A Surface Waters RSA 485A9 (none)		Proposed Structure		AoT Disturbance Area - Pad (Previously Permitted)		Floodway
	Coastal and Great Bay Region Communities (none)		Previously Permitted Structure		AoT Disturbance Area - Access (Previously Permitted)		2' Contours
	Designated Rivers Quartermile Buffer (none)		Existing Structure		Temporary Construction Matting (Previously Permitted)		10' Contours
	Groundwater Classification Areas GA1 (none)		Existing Structure to be Removed		Existing Gravel		Potential Vernal Pool
	Groundwater Classification Areas GA2		Overhead Eversource Line		Stone Work Pad		Delineated Perennial Stream
	Groundwater Classification Areas GAA		Overhead Distribution Line		Stone Work Pad (Previously Permitted)		Delineated Intermittent Stream
	All Lakes with a Quarter Mile Buffer		Underground Distribution Line		Eversource Owned Property		Delineated Ephemeral Stream
	Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none)		Existing Right-of-Way (ROW)		Slate Owned Land		Delineated Wetland Boundary
	Outstanding Resource Water Watersheds (none)		Existing Access		LLN/Property Owner		Field Delineated Wetland
	Surface Waters with Impairments 2016 with Quarter Mile Buffer		Proposed Access (Previously Permitted)		Parcel Boundary		Priority Resource Area
			Suggested Erosion and Sediment Control (TYP)				Open Water

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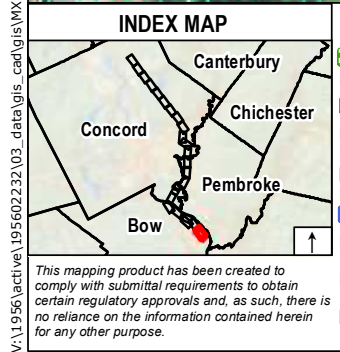
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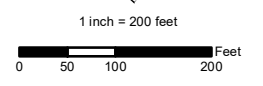
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<p>Legend</p> <ul style="list-style-type: none"> ▲ Local Potential Contamination Sources ■ Wellhead Protection Areas ■ Class A Surface Waters RSA 485A9 (none) ■ Coastal and Great Bay Region Communities (none) ■ Designated Rivers Quartermile Buffer (none) ■ Groundwater Classification Areas GA1 (none) ■ Groundwater Classification Areas GA2 ■ Groundwater Classification Areas GAA ■ All Lakes with a Quarter Mile Buffer ■ Class A Surface Waters RSA 485A9 Lakes Only Quarter Mile Buffer (none) ■ Outstanding Resource Water Watersheds (none) ■ Surface Waters with Impairments 2016 with Quarter Mile Buffer 	<ul style="list-style-type: none"> ■ Water Supply Intake Protection Areas (none) ■ Watersheds with Chloride Impairments 2016 ● Proposed Structure ● Previously Permitted Structure ● Existing Structure ● Existing Structure to be Removed — Overhead Eversource Line — Overhead Distribution Line — Underground Distribution Line — Existing Right-of-Way (ROW) — Existing Access — Proposed Access (Previously Permitted) — Suggested Erosion and Sediment Control (TYP) 	<ul style="list-style-type: none"> ■ AoT Disturbance Area - New Pad ■ AoT Disturbance Area - Pad (Previously Permitted) ■ AoT Disturbance Area - Access (Previously Permitted) ■ Temporary Construction Matting ■ Temporary Construction Matting (Previously Permitted) ■ Existing Gravel ■ Stone Work Pad ■ Stone Work Pad (Previously Permitted) ■ Eversource Owned Property ■ Slate Owned Land ■ LLN/Property Owner ■ Parcel Boundary 	<ul style="list-style-type: none"> ■ Municipal Boundary ■ FEMA 100-Year Flood Zone ■ Floodway — 2' Contours — 10' Contours ■ Potential Vernal Pool ■ Potential Vernal Pool Extent ■ Delineated Perennial Stream ■ Delineated Intermittent Stream ■ Delineated Ephemeral Stream ■ Delineated Wetland Boundary ■ Field Delineated Wetland ■ Priority Resource Area ■ Open Water 	<ul style="list-style-type: none"> ■ NHDES Protected Shoreland — Rail Road — GAS Approximate Gas Line — Fence — Berm — Stone Wall (NPT) ■ Gate ● Culvert 	<p>Map Notes:</p> <p>Coordinate System: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet</p> <p>Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.</p> <p>Additional source include: NHDES, NH Grant Basemap: National Agriculture Imagery Program (NAIP) aerial imagery</p>
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C189/G146/H137/M108 Laminate Wood Alteration of Terrain Surface Water and Groundwater Overlay Plans	
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CONSTRUCTION SEQUENCE:

1. WETLAND BOUNDARIES TO BE CLEARLY MARKED PRIOR TO THE START OF CONSTRUCTION.
2. SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAIL PROVIDED, AS NECESSARY.
3. WETLAND IMPACTS ASSOCIATED WITH WETLAND CROSSINGS ARE REQUIRED FOR ACCESS BETWEEN STRUCTURES
4. ADEQUATE PRECAUTION SHALL BE EXERCISED TO AVOID SPILLAGE OF FUEL OILS, CHEMICALS, OR SIMILAR SUBSTANCES; NO FUELS, LUBRICANTS, CHEMICALS OR SIMILAR SUBSTANCES SHALL BE STORED BENEATH TREES OR IN THE VICINITY OF ANY WETLANDS, RIVER, STREAM OR OTHER BODY OF WATER; OR IN THE VICINITY OF NATURAL OR MAN-MADE CHANNELS LEADING THERETO. NO POWER EQUIPMENT SHALL BE STORED, MAINTAINED, OR FUELED IN ANY AREA ADJACENT TO A WETLAND, RIVER, STREAM OR OTHER BODY OF WATER.
5. REMOVE COMPLETELY ALL CONTAMINATION FROM ANY SPILLAGE OF CHEMICALS OR PETROLEUM PRODUCT WITH COMPLETE REHABILITATION OF THE AFFECTED AREA.
6. ACCESS ROUTES HAVE BEEN SELECTED TO PREVENT DEGRADATION OF THE RIGHT-OF-WAY AND MINIMIZE ENVIRONMENTAL IMPACT. OPERATIONS SHALL BE CONFINED TO THE SPECIFIED ACCESS ROUTES WITHIN THE PROPOSED WETLAND IMPACT AREA. MATTED ACCESS ROUTES SHALL NOT EXCEED A 16 FOOT-WIDTH, UPLAND ROUTES SHOULD BE APPROXIMATELY 12- FEET WIDE.
7. IMPACT TO VEGETATION WITHIN WETLANDS WILL BE LIMITED TO THE EXTENT NECESSARY TO PLACE THE SWAMP MATS WHERE REQUIRED. NO ADDITIONAL CLEARING IS PERMITTED.
8. LOW GROWING VARIETIES OF VEGETATION ADJACENT TO WETLANDS SHALL BE PRESERVED TO THE EXTENT POSSIBLE. STUMPS AND ROCKS SHALL NOT BE REMOVED, AND THERE SHALL BE NO EXCAVATIONS, FILLS OR GRADING DONE ADJACENT TO WETLANDS, UNLESS MINOR EXCAVATION IS NEEDED FOR ACCESS.
9. TIMBER MATS WILL BE USED ALONG ACCESS ROUTES WITHIN WETLAND AREAS. THESE MATS ARE CONSTRUCTED OF HEAVY TIMBERS OR COMPOSITE MATERIAL, BOLTED TOGETHER, AND ARE PLACED END-TO-END IN THE WETLAND TO SUPPORT HEAVY EQUIPMENT. ALL SWAMP MATS SHALL BE PLACED AND REMOVED SO AS NOT TO CAUSE ANY RUTS, CHANNELS OR DEPRESSIONS, OR OTHERWISE CAUSE ANY UNDUE DISTURBANCE TO WETLANDS.
10. IF TIMBER MAT BMP IS NOT SUFFICIENT DUE TO HIGH WATER, ADDITIONAL BMP'S MAY INCLUDE THE PLACEMENT OF GEOTEXTILE FABRIC UNDER MATS OR USING A LAYER OF RUNNER MATS TO ELEVATE MATS TO MAINTAIN HYDROLOGIC CONNECTIVITY. ALL MATERIAL WILL BE REMOVED FROM JURISDICTIONAL AREAS AFTER CONSTRUCTION COMPLETION.
11. NO MATERIAL SHALL BE PLACED IN ANY LOCATION OR IN ANY MANNER SO AS TO IMPAIR SURFACE WATER FLOW INTO, THROUGH OR OUT OF ANY WETLAND AREA. NO INSTALLATION SHALL CREATE AN IMPOUNDMENT THAT WILL IMPEDE THE FLOW OF WATER OR CAUSE FLOODING.
12. NO MATERIAL SHALL BE TAKEN FROM THE WETLANDS AREA EXCEPT THAT WHICH MUST NECESSARILY BE REMOVED FOR THE STRUCTURE INSTALLATION. ALL EXCESS MATERIAL TAKEN FROM THE WETLAND WILL BE REMOVED FROM THE SITE AND DISPOSED IN UPLAND.
13. ANY PROPOSED SUPPORT FILLS SHALL BE CLEAN GRAVEL AND STONE, FREE OF WASTE METAL PRODUCTS, ORGANIC MATERIALS AND SIMILAR DEBRIS AND SHALL NOT EXCEED THE AMOUNT PERMITTED. THIS ALLOWABLE FILL IS THE ONLY FILL THAT MAY REMAIN IN THE WETLAND AFTER CONSTRUCTION. ALL CUT AND FILLS SLOPES SHALL BE SEEDED/LOAMED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE. IMPORTATION OF COMMERCIAL LOAM IS PROHIBITED.
14. INSTALL NEW POLES IN THE LOCATIONS DESIGNATED ON THE PERMITTING PLANS.
15. CABLE INSTALLATION WILL BE PERFORMED IN A MANNER SO AS TO AVOID, OR LIMIT TO THE MAXIMUM EXTENT POSSIBLE, TRAVERSING WETLANDS WITH HEAVY EQUIPMENT. IN SOME CASES, A HELICOPTER MAY BE USED DURING THE INSTALLATION TO MINIMIZE IMPACTS.
16. ALL SWAMP MATS, MATERIAL, AND DEBRIS WILL BE REMOVED FROM THE WORK AREA UPON THE COMPLETION OF CONSTRUCTION.
17. UPLAND DISTURBED AREAS SHALL BE RESTORED AND STABILIZED UPON COMPLETION OF CONSTRUCTION. WORK PAD RESTORATION SHOULD INCLUDE REDUCING THE WORK PAD TO A 30 BY 60 FOOT AREA, AND REDUCING SLOPES TO A MAXIMUM OF 25%. STOCKPILED MATERIAL SHOULD BE SPREAD TO REDUCE ANY UNNECESSARY SLOPES. GRAVEL WORK PADS AND SLOPES SHOULD BE SCARIFIED TO A MINIMUM OF 3" BEFORE SPREADING TOPSOIL/LOAM.
18. ALL TEMPORARY WETLAND IMPACTS WILL BE RE-GRADED TO ORIGINAL CONTOURS FOLLOWING CONSTRUCTION, IF NEEDED. NEW ENGLAND EROSION CONTROL/RESTORATION MIX, OR EQUIVALENT SEED MIX SHALL BE APPLIED IN WETLAND AREAS THAT ARE NOT INUNDATED, AS NECESSARY.
19. SEDIMENT AND EROSION CONTROL MEASURES WILL BE EVALUATED AND REMOVED IF NECESSARY UPON THE COMPLETION OF CONSTRUCTION.
20. COMMERCIAL LOAM WILL NOT BE USED AS PART OF RESTORATION. ONLY IN-SITU TOPSOIL WILL BE USED TO RESTORE DISTURBED AREAS.
21. WHERE PEATLANDS ARE MAPPED ADJACENT TO THE ROW, THE ASSOCIATED WETLANDS WITHIN THE ROW SHALL BE TREATED AS A PEATLAND AND PRIORITY RESOURCE AREA. ELEVATED MATTING SHALL BE USED AS NECESSARY TO PREVENT EXCESSIVE GROUND DISTURBANCE WITHIN THESE AREAS.

WINTER CONSTRUCTION NOTES

1. PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED. STABILIZATION METHODS SHALL INCLUDE SEEDING AND MULCH, AND INSTALLATION OF EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS
2. DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE TEMPORARILY STABILIZED WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.

3. AFTER NOVEMBER 15TH, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL (NHDOT 304.3).



GENERAL NOTES:

OWNER: PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE d/b/a EVERSOURCE ENERGY
13 LEGENDS DRIVE
HOOKSETT, NH 03106

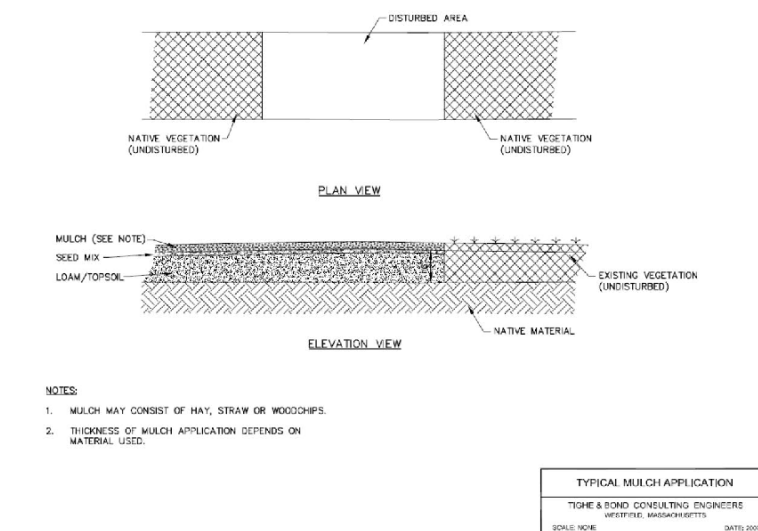
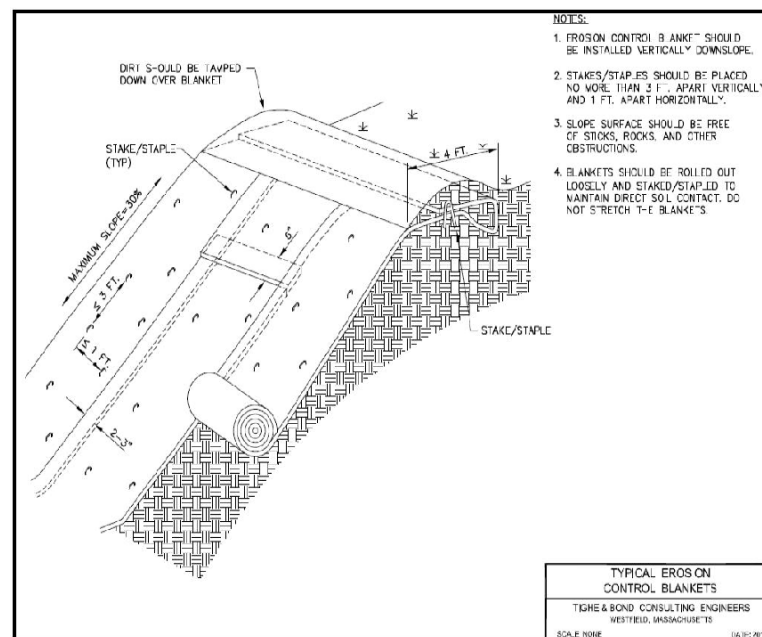
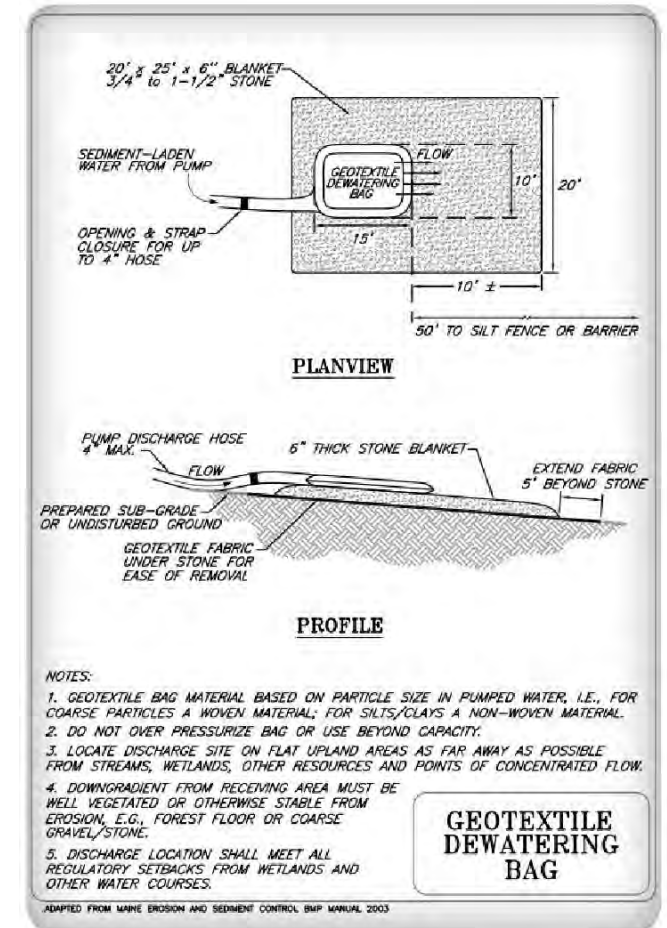
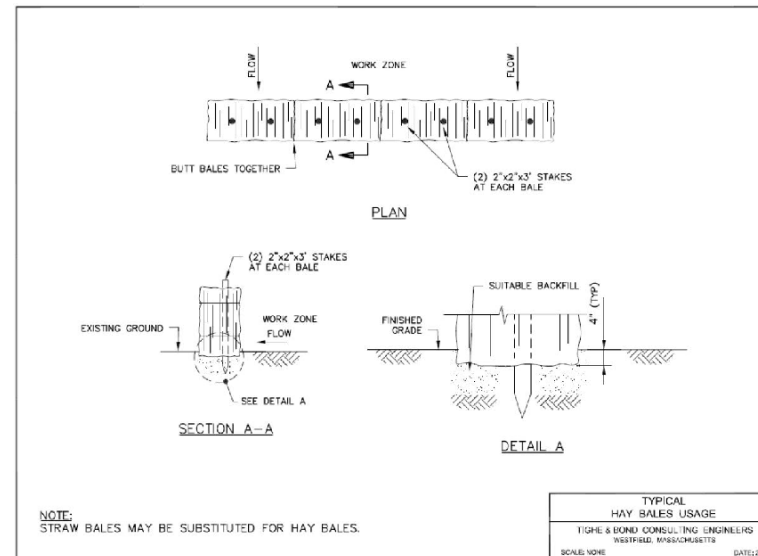
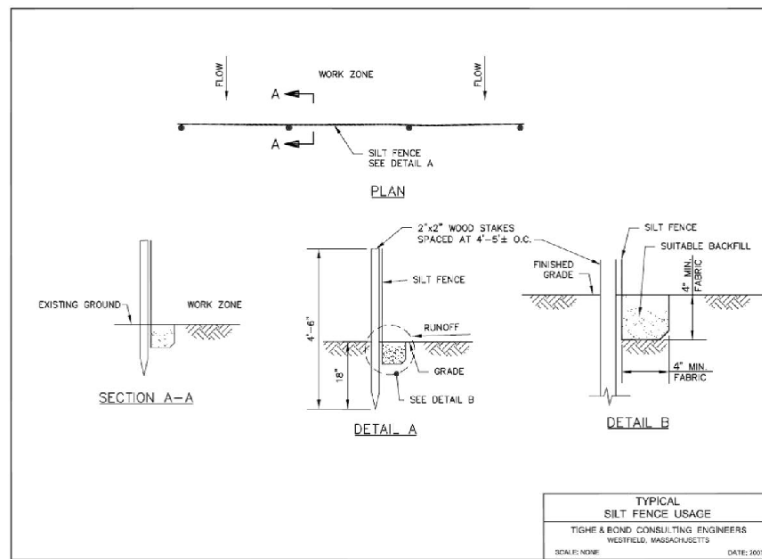
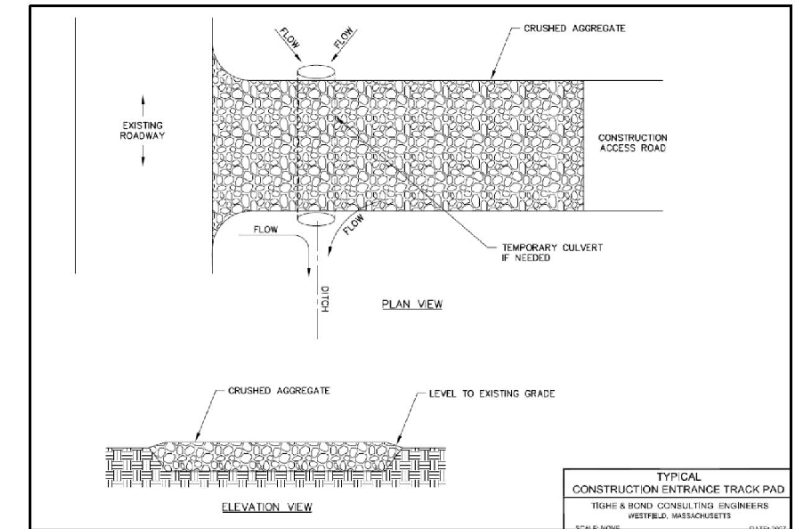
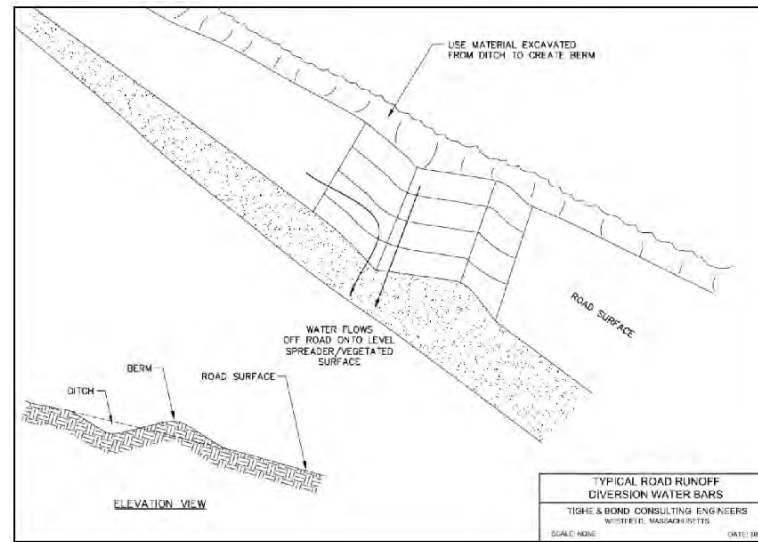
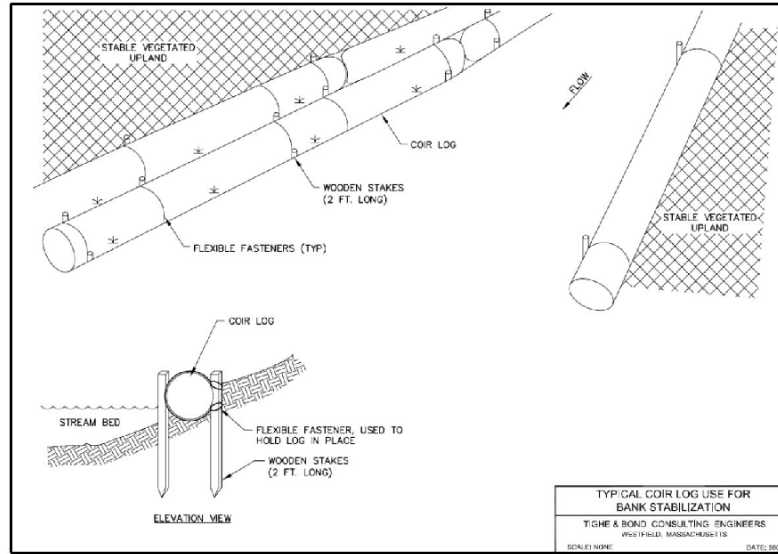
1. BASE PLAN PROVIDED BY EVERSOURCE ENERGY. STANTEC PROVIDED THE WETLAND DATA. EVERSOURCE ENERGY PROVIDED THE UTILITY DESIGN.
2. JURISDICTIONAL WETLANDS WERE DELINEATED BY STANTEC IN 2021. WETLANDS WERE DELINEATED IN ACCORDANCE WITH THE 1987 U.S. ARMY CORPS OF ENGINEERS' "WETLANDS DELINEATION MANUAL, TECHNICAL REPORT Y-87-1," AND REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTH CENTRAL AND NORTHEAST REGION," JANUARY 2012.
3. SITE PLAN IS FOR PERMITTING PURPOSES ONLY AND DOES NOT REPRESENT A PROPERTY BOUNDARY SURVEY.
4. THE PROJECT WILL BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.
5. IN ACCORANCE WITH ENV-WQ 1505.02, THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT IN NO CASE SHALL EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
 - A MINIMUM 85 PERCENT VEGETATED GROWTH HAS BEEN ESTABLISHED
 - A MINIMUM OF 3 INCHES OF NON-EROSIVE MATERIAL HAS BEEN INSTALLED
 - OR, EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.
6. IN THE EVENT THAT A RARE OR THREATENED SPECIES IS OBSERVED, THE NEW HAMPSHIRE FISH AND GAME AND NEW HAMPSHIRE NATURAL HERITAGE BUREAU (NHB) WILL BE NOTIFIED.

EROSION CONTROL NOTES:

1. INSTALLATION OF EROSION CONTROL GRINDINGS AND/OR SILT FENCES SHALL BE COMPLETE PRIOR TO THE START OF WORK IN ANY GIVEN AREA. EROSION CONTROLS SHALL BE USED DURING CONSTRUCTION AND REMOVED WHEN ALL SLOPES HAVE A HEALTHY STAND OF VEGETATION COVER. EROSION CONTROL MEASURES SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER .25" OR GREATER RAINFALL EVENTS.
2. AS REQUIRED, CONSTRUCT TEMPORARY BERMS, SILTATION FENCES, SEDIMENT TRAPS, ETC. TO PREVENT EROSION & SEDIMENTATION OF WETLANDS.
3. THE WORK AREA SHALL BE GRADED AND OTHERWISE SHAPED IN SUCH A MANNER AS TO MINIMIZE SOIL EROSION, SILTATION OF DRAINAGE CHANNELS, DAMAGE TO EXISTING VEGETATION, AND DAMAGE TO PROPERTY OUTSIDE LIMITS OF THE WORK AREA. EROSION CONTROL GRINDINGS WILL BE NECESSARY TO ACCOMPLISH THIS END.
4. ANY STRIPPED TOPSOIL SHALL BE STOCKPILED, WITHOUT COMPACTION, AND STABILIZED WITH BMPS.
5. PERMANENT OR TEMPORARY COVER MUST BE IN PLACE BEFORE THE GROWING SEASON ENDS. WHEN SEEDED AREAS ARE NOT MULCHED, PLANTINGS SHOULD BE MADE FROM EARLY SPRING TO MAY 20 OR FROM AUGUST 15 TO SEPTEMBER 15. NO DISTURBED AREA SHALL BE LEFT EXPOSED DURING WINTER MONTHS, PLANT ANNUAL RYEGRASS PRIOR TO OCTOBER 15TH.
6. EROSION CONTROLS SHALL BE INSPECTED WEEKLY AND AFTER EVERY HALF-INCH OF RAINFALL.
7. EROSION CONTROL MATTING, IF REQUIRED, WILL CONSIST OF JUTE MATTING. MATTING WITH WELDED PLASTIC OR 'BIODEGRADABLE PLASTIC' NETTING OR THREAD WILL BE AVOIDED TO LIMIT UNINTENTIONAL MORTALITY TO SNAKES OR OTHER SMALL ANIMALS.

C189/G146/H137/M108 Laminate Wood Structure Replacement Alteration of Terrain Concord, Pembroke, Bow, New Hampshire Notes and Details Page 1 of 3	
	
	January 24, 2023

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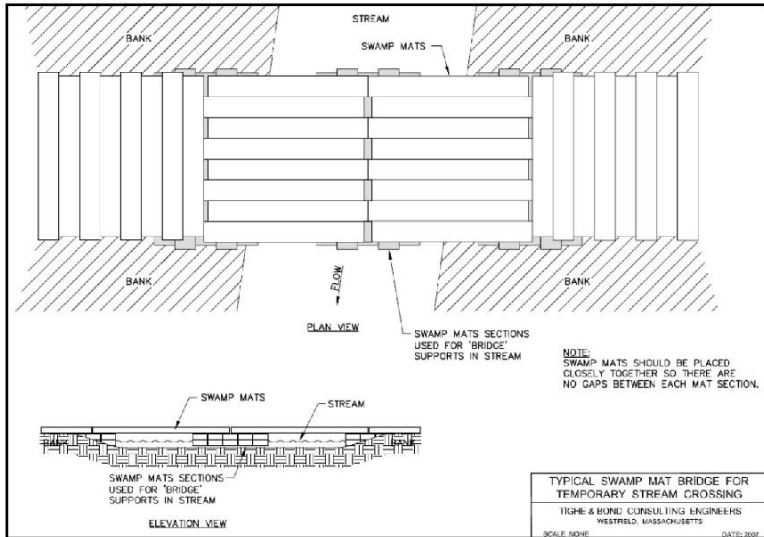
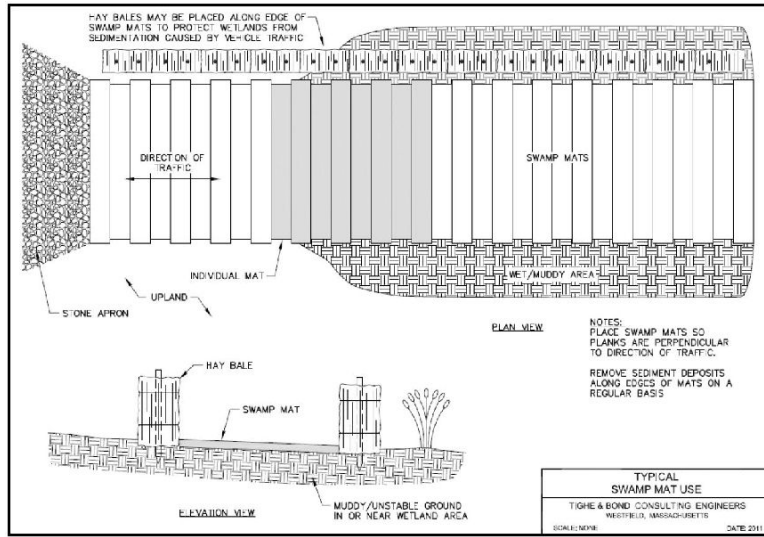


C189/G146/H137/M108
Laminate Wood Structure Replacement
 Alteration of Terrain
 Concord, Pembroke, Bow, New Hampshire
 Notes and Details
 Page 2 of 3

EVERSOURCE
 ENERGY

Stantec

January 24, 2023



NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

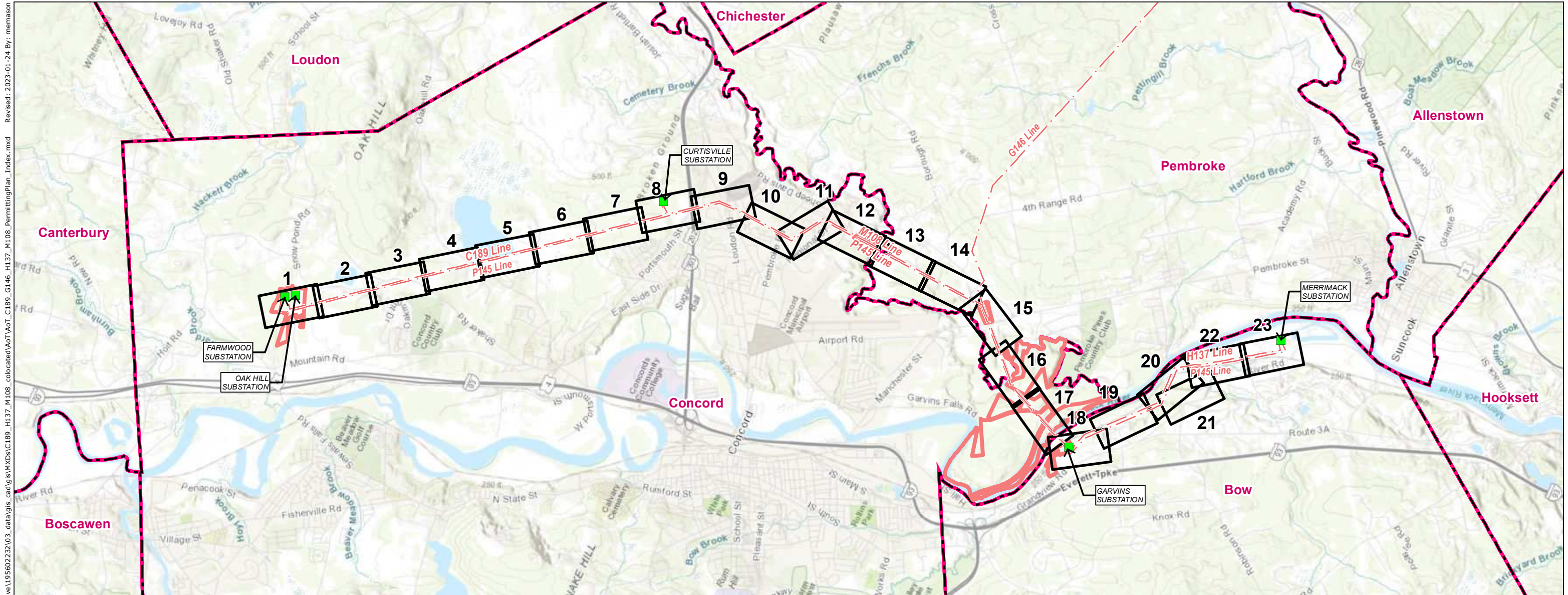
January 27, 2023

Figure 4: Alteration of Terrain Permitting Plans



C189/G146/H137/M108 Laminate Wood Structure Replacement Project

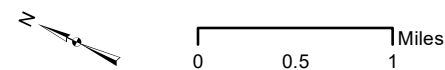
Concord, Pembroke, Bow, NH
 Alteration of Terrain Permitting Plans
 Date: January 24, 2023



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- Legend**
- Substation
 - Map Sheet
 - Eversource Owned Property
 - - - Overhead Eversource Line
 - Municipal Boundary

PREPARED FOR:
EVERSOURCE
 ENERGY
 107 Selden Street
 Berlin, CT 06037

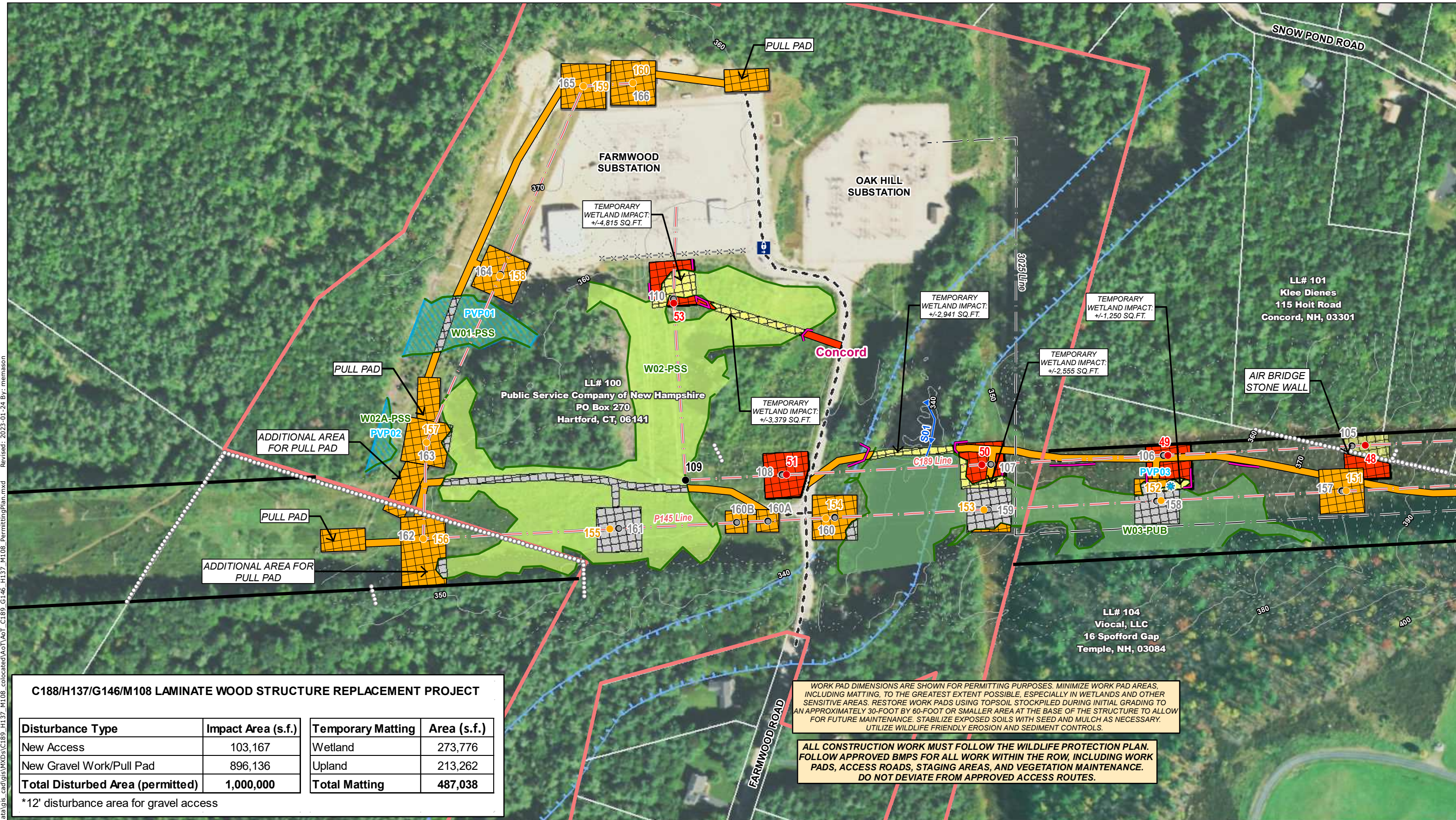


INDEX OF FIGURES
 Title Sheet / Index Map
 Map Sheets 1-23
 Notes and Details 1-3

NO.	DATE	REVISIONS

PREPARED BY:
Stantec
 30 Park Drive
 Topsham, ME 04086

V:\1956\active\19560223\03_data\gis_cad\gis\WKDs\C189_H137_M108_colorated\AoT\AoT_C189_G146_H137_M108_PermittinPlan.mxd Revised: 2023-01-24 By: memason



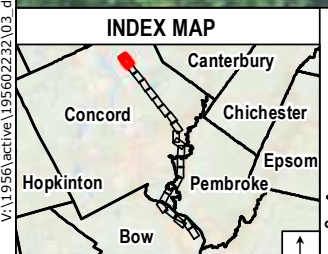
C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

Disturbance Type	Impact Area (s.f.)	Temporary Matting	Area (s.f.)
New Access	103,167	Wetland	273,776
New Gravel Work/Pull Pad	896,136	Upland	213,262
Total Disturbed Area (permitted)	1,000,000	Total Matting	487,038

*12' disturbance area for gravel access

WORK PAD DIMENSIONS ARE SHOWN FOR PERMITTING PURPOSES. MINIMIZE WORK PAD AREAS, INCLUDING MATTING, TO THE GREATEST EXTENT POSSIBLE, ESPECIALLY IN WETLANDS AND OTHER SENSITIVE AREAS. RESTORE WORK PADS USING TOPSOIL STOCKPILED DURING INITIAL GRADING TO AN APPROXIMATELY 30-FOOT BY 60-FOOT OR SMALLER AREA AT THE BASE OF THE STRUCTURE TO ALLOW FOR FUTURE MAINTENANCE. STABILIZE EXPOSED SOILS WITH SEED AND MULCH AS NECESSARY. UTILIZE WILDLIFE FRIENDLY EROSION AND SEDIMENT CONTROLS.

ALL CONSTRUCTION WORK MUST FOLLOW THE WILDLIFE PROTECTION PLAN. FOLLOW APPROVED BMPs FOR ALL WORK WITHIN THE ROW, INCLUDING WORK PADS, ACCESS ROADS, STAGING AREAS, AND VEGETATION MAINTENANCE. DO NOT DEVIATE FROM APPROVED ACCESS ROUTES.



Legend

- Proposed Structure
- Previously Permitted Structure
- Existing Structure
- Existing Structure to be Removed
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- Overhead Distribution Line
- Underground Distribution Line
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- Berm
- Gate
- Culvert

Map Notes:
 Coordinate System: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
 Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.
 Additional source include: NH Grant Basemap: 2018 National Agriculture Imagery Program (NAIP) aerial imagery
 This mapping product has been created to comply with submittal requirements to obtain certain regulatory approvals and, as such, there is no reliance on the information contained herein for any other purpose.

1 inch = 200 feet
 0 50 100 200 Feet

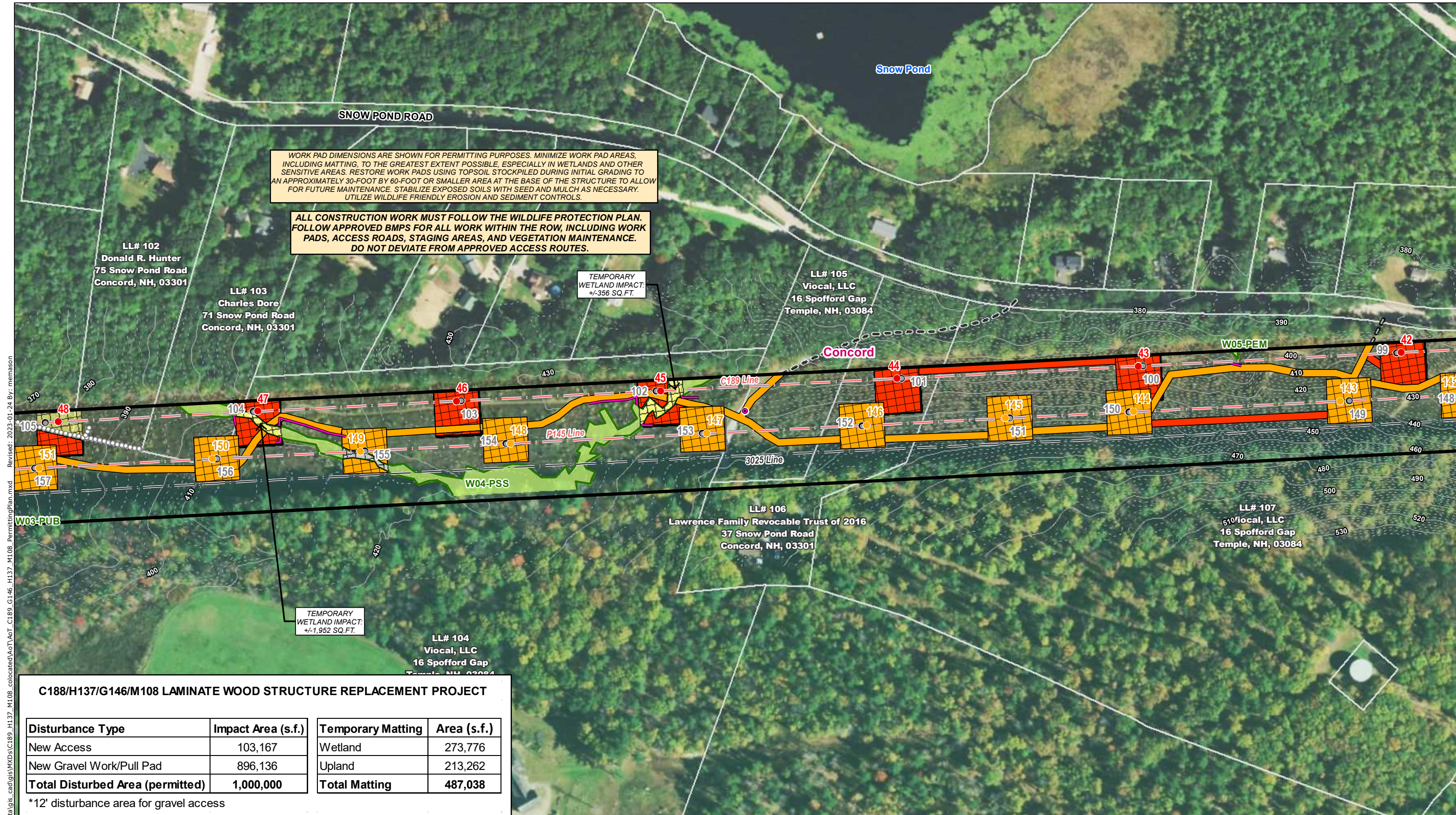


EVERSOURCE ENERGY **Stantec**

C189/G146/H137/M108 Laminated Wood Alteration of Terrain Permitting Map Set

Concord, NH	MAP SHEET
Date: January 24, 2023	1 of 23

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Revised: 2023-01-24 By: memason



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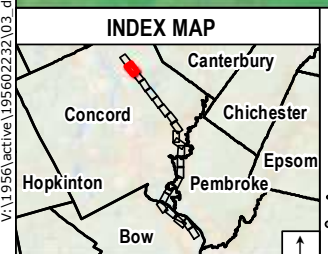
TEMPORARY WETLAND IMPACT: +/-356 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-1,952 SQ.FT.

C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

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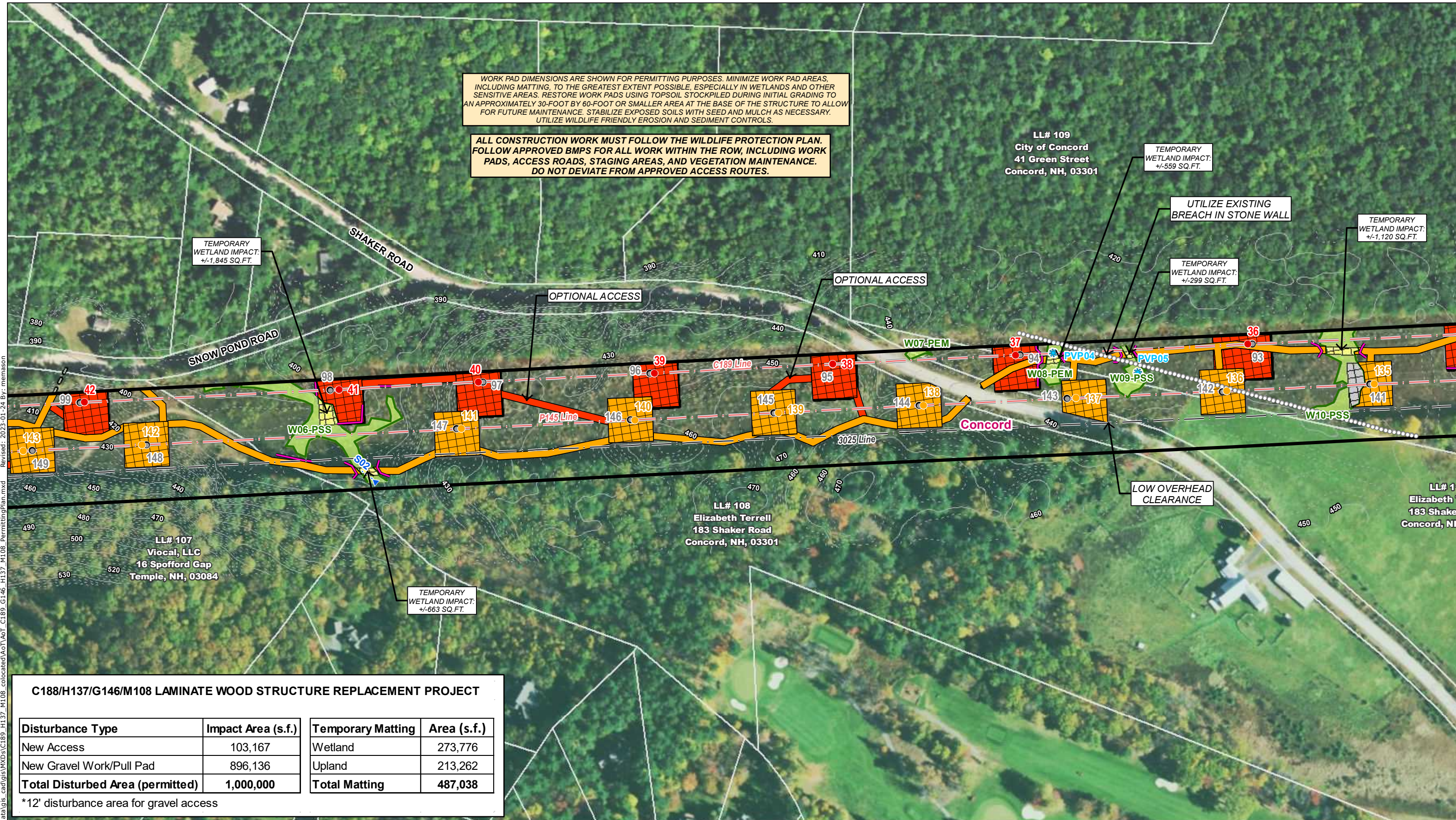
C189/G146/H137/M108 Laminare Wood Alteration of Terrain Permitting Map Set

Concord, NH	MAP SHEET
Date: January 24, 2023	2 of 23

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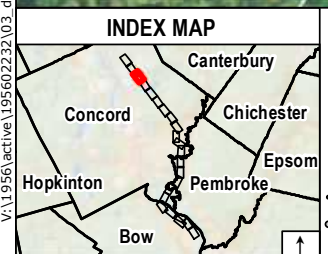
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1 inch = 200 feet
 0 50 100 200 Feet



EVERSOURCE ENERGY **Stantec**

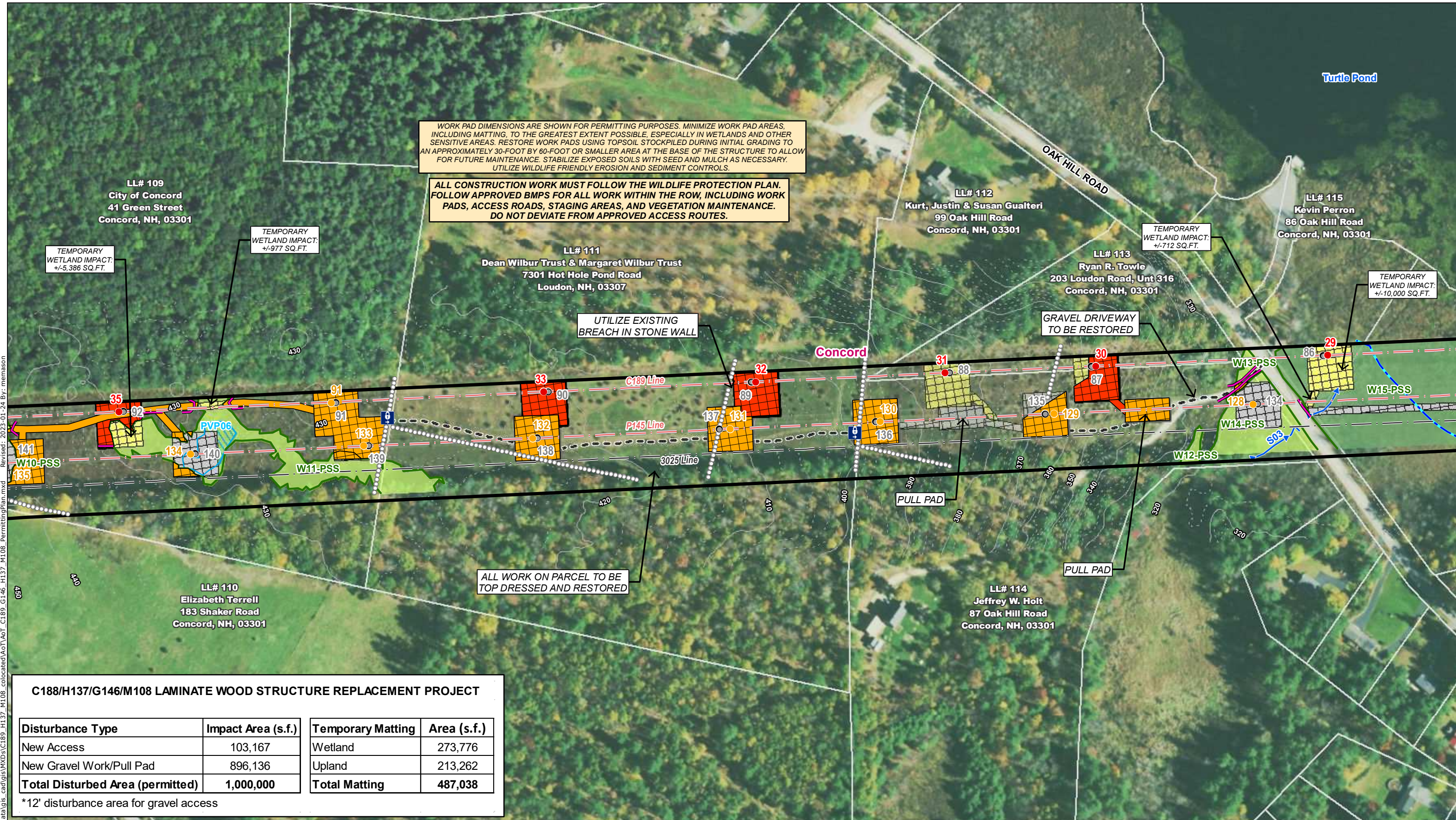
C189/G146/H137/M108 Laminate Wood Alteration of Terrain Permitting Map Set

Concord, NH MAP SHEET

Date: January 24, 2023

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WORK PAD DIMENSIONS ARE SHOWN FOR PERMITTING PURPOSES. MINIMIZE WORK PAD AREAS, INCLUDING MATTING, TO THE GREATEST EXTENT POSSIBLE, ESPECIALLY IN WETLANDS AND OTHER SENSITIVE AREAS. RESTORE WORK PADS USING TOPSOIL STOCKPILED DURING INITIAL GRADING TO AN APPROXIMATELY 30-FOOT BY 60-FOOT OR SMALLER AREA AT THE BASE OF THE STRUCTURE TO ALLOW FOR FUTURE MAINTENANCE. STABILIZE EXPOSED SOILS WITH SEED AND MULCH AS NECESSARY. UTILIZE WILDLIFE FRIENDLY EROSION AND SEDIMENT CONTROLS.

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ALL WORK ON PARCEL TO BE TOP DRESSED AND RESTORED

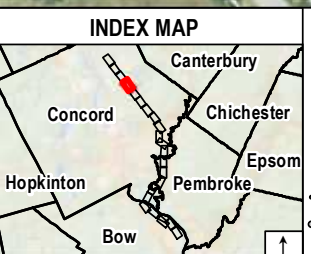
UTILIZE EXISTING BREACH IN STONE WALL

GRAVEL DRIVEWAY TO BE RESTORED

C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

Disturbance Type	Impact Area (s.f.)	Temporary Matting	Area (s.f.)
New Access	103,167	Wetland	273,776
New Gravel Work/Pull Pad	896,136	Upland	213,262
Total Disturbed Area (permitted)	1,000,000	Total Matting	487,038

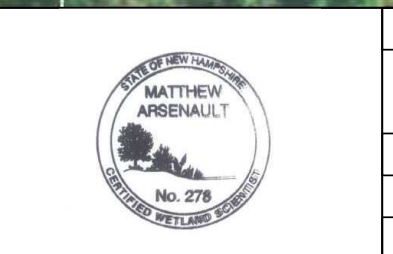
*12' disturbance area for gravel access



- Legend**
- Proposed Structure
 - Previously Permitted Structure
 - Existing Structure
 - Existing Structure to be Removed
 - Overhead Eversource Line
 - Overhead Distribution Line
 - Underground Distribution Line
 - Existing Right-of-Way (ROW)
 - Existing Access
 - Proposed Access (Previously Permitted)
 - Suggested Erosion and Sediment Control (TYP)
 - AoT Disturbance Area - New Access
 - AoT Disturbance Area - New Pad (Previously Permitted)
 - AoT Disturbance Area - Pad (Previously Permitted)
 - Temporary Construction Matting
 - Temporary Construction Matting (Previously Permitted)
 - Existing Gravel
 - Stone Work Pad
 - Stone Work Pad (Previously Permitted)
 - Eversource Owned Property
 - State Owned Land
 - LLN/Property Owner
 - Parcel Boundary
 - Municipal Boundary
 - 2' Contours
 - 10' Contours
 - Potential Vernal Pool
 - Potential Vernal Pool Extent
 - Delineated Perennial Stream
 - Delineated Intermittent Stream
 - Delineated Ephemeral Stream
 - Field Delineated Wetland Boundary
 - Field Delineated Wetland
 - Priority Resource Area
 - Open Water
 - FEMA 100-Year Flood Zone
 - FEMA Floodway
 - NHDES Protected Shoreland
 - Railroad
 - GAS Approximate Gas Line
 - Fence
 - Stone Wall
 - Berm
 - Gate
 - Culvert

Map Notes:
 Coordinate System: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
 Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.
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EVERSOURCE ENERGY **Stantec**

C189/G146/H137/M108 Laminare Wood Alteration of Terrain Permitting Map Set

Concord, NH	MAP SHEET
Date: January 24, 2023	4 of 23

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Turtle Pond

LL# 121
Harold Turner, Jr.
83 Appleton Street
Concord, NH, 03301

TEMPORARY WETLAND IMPACT: +/-831 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-1,738 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-10,000 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-9,975 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-1,449 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-2,776 SQ.FT.

127 133

W15-PSS

126 132

83 26

125 131

82 25

3025/Line

W16-PSS

Concord

P145/Line

81 24

130 124

W16-PSS

PULL PAD

79 23

123 129

W17-PSS

PULL PAD

122 128

320

330

340

350

APPLETON STREET

LL# 116
City of Concord
41 Green Street
Concord, NH, 03301

LL# 118
25 & 27 Jennifer Drive Condominium
25-27 Jennifer Drive
Concord, NH, 03301

LL# 117
21 & 23 Jennifer Drive Condominium
21-23 Jennifer Drive
Concord, NH, 03301

LL# 119
29 & 31 Jennifer Drive Condominium
29-31 Jennifer Drive
Concord, NH, 03301

LL# 120
Sarah A. Chevrafilis
33 Jennifer Drive
Concord, NH, 03301

TEMPORARY WETLAND IMPACT: +/-532 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-1,794 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-992 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-729 SQ.FT.

LOW OVERHEAD CLEARANCE

SPAN STREAM NO IMPACT

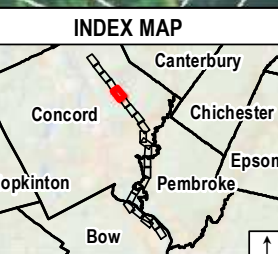
TEMPORARY WETLAND IMPACT: +/-737 SQ.FT.

LL# 122
Jennifer B. Dusavitch
53 Appleton Street
Concord, NH, 03301

C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

Disturbance Type	Impact Area (s.f.)	Temporary Matting	Area (s.f.)
New Access	103,167	Wetland	273,776
New Gravel Work/Pull Pad	896,136	Upland	213,262
Total Disturbed Area (permitted)	1,000,000	Total Matting	487,038

*12' disturbance area for gravel access



- Legend**
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 - Previously Permitted Structure
 - Existing Structure
 - Existing Structure to be Removed
 - Overhead Eversource Line
 - Overhead Distribution Line
 - Underground Distribution Line
 - Existing Right-of-Way (ROW)
 - Existing Access
 - Proposed Access (Previously Permitted)
 - Suggested Erosion and Sediment Control (TYP)
 - AoT Disturbance Area - New Access
 - AoT Disturbance Area - New Pad
 - AoT Disturbance Area - Access (Previously Permitted)
 - AoT Disturbance Area - Pad (Previously Permitted)
 - Temporary Construction Matting
 - Temporary Construction Matting (Previously Permitted)
 - Existing Gravel
 - Stone Work Pad
 - Stone Work Pad (Previously Permitted)
 - Eversource Owned Property
 - State Owned Land
 - LLN/Property Owner
 - Parcel Boundary
 - Municipal Boundary
 - 2' Contours
 - 10' Contours
 - Potential Vernal Pool
 - Potential Vernal Pool Extent
 - Delineated Perennial Stream
 - Delineated Intermittent Stream
 - Delineated Ephemeral Stream
 - Field Delineated Wetland Boundary
 - Field Delineated Wetland
 - Priority Resource Area
 - Open Water
 - FEMA 100-Year Flood Zone
 - FEMA Floodway
 - NHDES Protected Shoreland
 - Railroad
 - GAS Approximate Gas Line
 - Fence
 - Stone Wall
 - Berm
 - Gate
 - Culvert

1 inch = 200 feet

Map Notes:
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Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.
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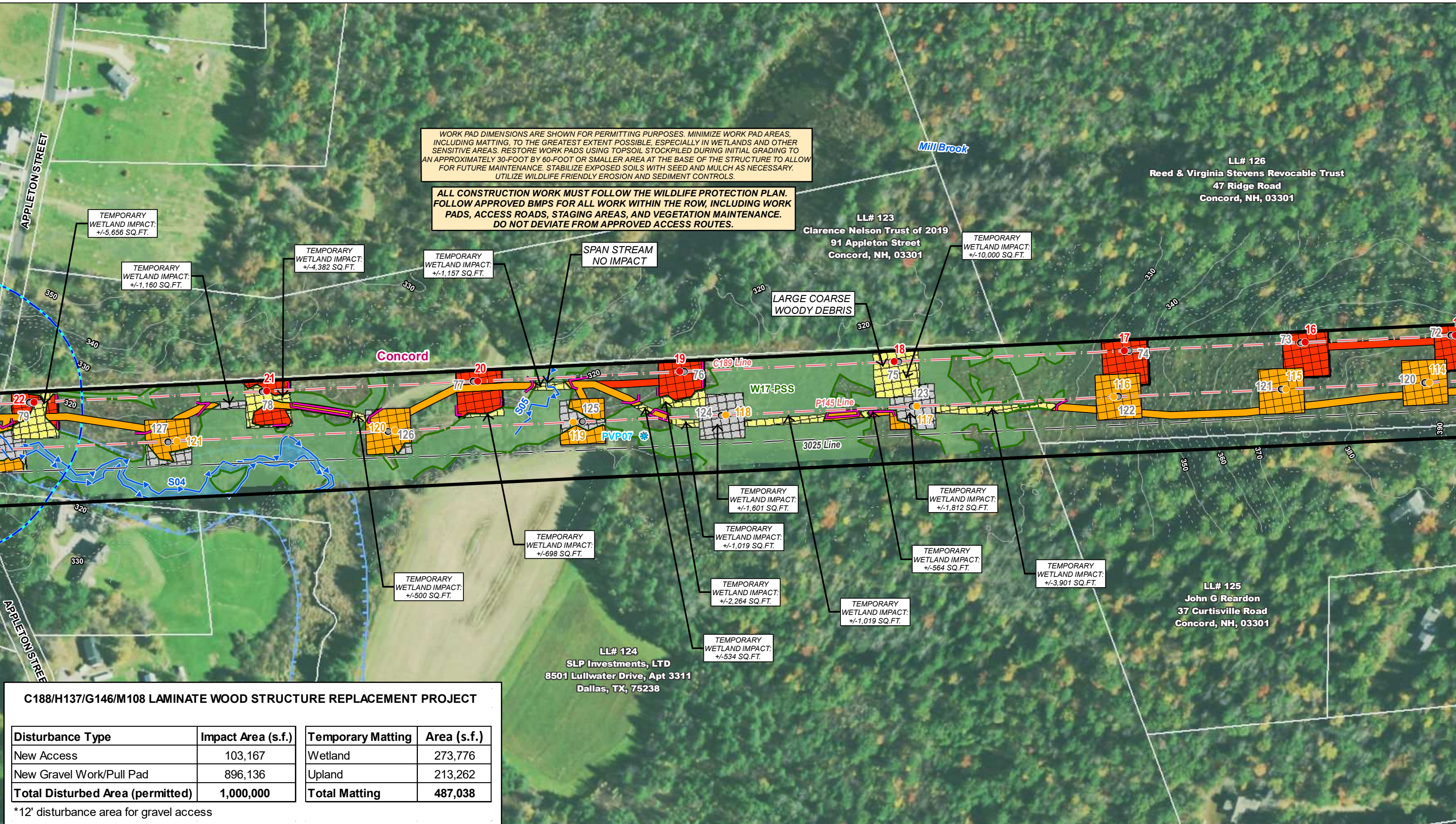


EVERSOURCE ENERGY **Stantec**

C189/G146/H137/M108 Laminate Wood Alteration of Terrain Permitting Map Set

Concord, NH	MAP SHEET
Date: January 24, 2023	5 of 23

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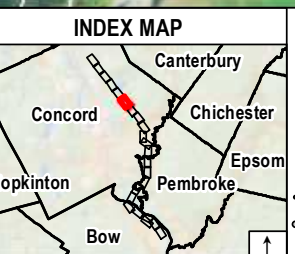


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C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

Disturbance Type	Impact Area (s.f.)	Temporary Matting	Area (s.f.)
New Access	103,167	Wetland	273,776
New Gravel Work/Pull Pad	896,136	Upland	213,262
Total Disturbed Area (permitted)	1,000,000	Total Matting	487,038

*12' disturbance area for gravel access

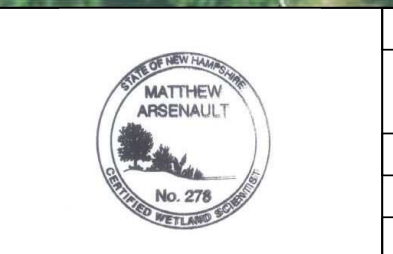


- Legend**
- Proposed Structure
 - Previously Permitted Structure
 - Existing Structure
 - Existing Structure to be Removed
 - Overhead Eversource Line
 - Overhead Distribution Line
 - Underground Distribution Line
 - Existing Right-of-Way (ROW)
 - Proposed Access
 - Proposed Access (Previously Permitted)
 - Suggested Erosion and Sediment Control (TYP)
 - AoT Disturbance Area - New Access
 - AoT Disturbance Area - New Pad
 - AoT Disturbance Area - Access (Previously Permitted)
 - AoT Disturbance Area - Pad (Previously Permitted)
 - Temporary Construction Matting
 - Temporary Construction Matting (Previously Permitted)
 - Existing Gravel
 - Stone Work Pad
 - Stone Work Pad (Previously Permitted)
 - Eversource Owned Property
 - State Owned Land
 - LLN/Property Owner
 - Parcel Boundary
 - Municipal Boundary
 - 2' Contours
 - 10' Contours
 - Potential Vernal Pool
 - Potential Vernal Pool Extent
 - Delineated Perennial Stream
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 - Fence
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 - Berm
 - Gate
 - Culvert

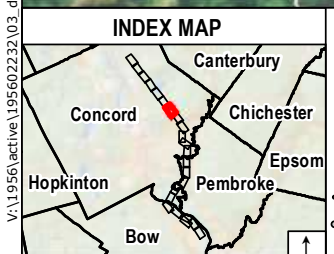
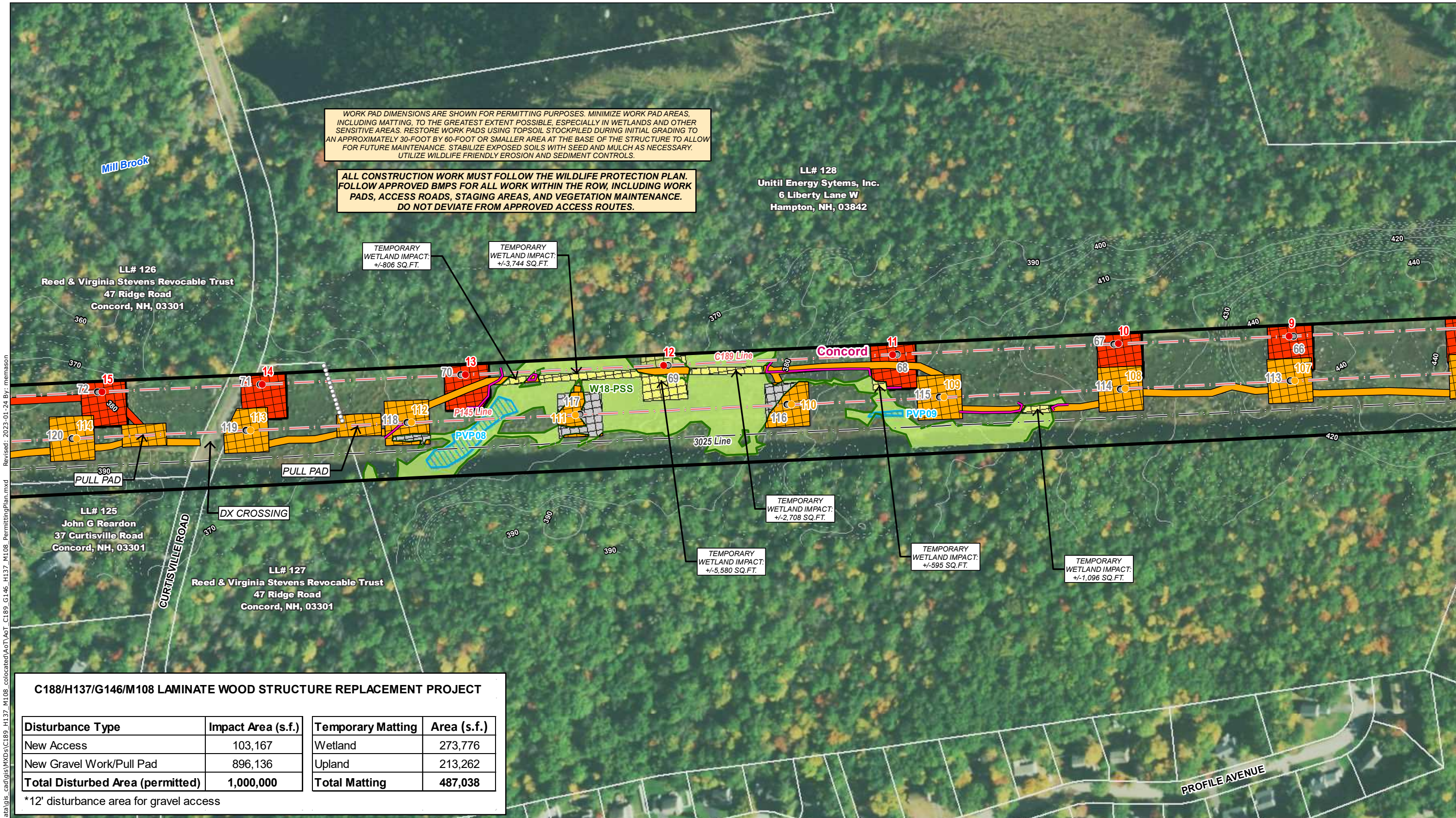
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 0 50 100 200 Feet



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Legend

- Proposed Structure (Red circle)
- Previously Permitted Structure (Yellow circle)
- Existing Structure (Black circle)
- Existing Structure to be Removed (Grey circle)
- Overhead Eversource Line (Red dashed line)
- Overhead Distribution Line (Black dashed line)
- Underground Distribution Line (Green dashed line)
- Existing Right-of-Way (ROW) (Black solid line)
- Proposed Access (Red dashed line)
- Proposed Access (Previously Permitted) (Yellow dashed line)
- Suggested Erosion and Sediment Control (TYP) (Pink line)
- AoT Disturbance Area - New Access (Red hatched area)
- AoT Disturbance Area - New Pad (Orange hatched area)
- AoT Disturbance Area - Access (Previously Permitted) (Yellow hatched area)
- AoT Disturbance Area - Pad (Previously Permitted) (Red hatched area)
- Temporary Construction Matting (Green hatched area)
- Temporary Construction Matting (Previously Permitted) (Yellow hatched area)
- Existing Gravel (Black hatched area)
- Stone Work Pad (Black hatched area)
- Stone Work Pad (Previously Permitted) (Grey hatched area)
- Eversource Owned Property (Red hatched area)
- State Owned Land (Red hatched area)
- LLN/Property Owner (Red hatched area)
- Parcel Boundary (Black solid line)
- Municipal Boundary (Black dashed line)
- 2' Contours (Black dashed line)
- 10' Contours (Black solid line)
- Potential Vernal Pool (Blue star)
- Potential Vernal Pool Extent (Blue star)
- Delineated Perennial Stream (Blue line)
- Delineated Intermittent Stream (Blue dashed line)
- Delineated Ephemeral Stream (Blue dashed line)
- Field Delineated Wetland Boundary (Green line)
- Field Delineated Wetland (Green area)
- Priority Resource Area (Green area)
- Open Water (Blue area)
- FEMA 100-Year Flood Zone (Blue area)
- NHDES Protected Shoreland (Blue area)
- Railroad (Black line with cross-ticks)
- GAS Approximate Gas Line (Black line with cross-ticks)
- Fence (Black line with cross-ticks)
- Stone Wall (Black line with cross-ticks)
- Berm (Black line with cross-ticks)
- Gate (Blue square)
- Culvert (Red circle)

Map Notes:
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EVERSOURCE ENERGY **Stantec**

C189/G146/H137/M108 Laminare Wood Alteration of Terrain Permitting Map Set

Concord, NH MAP SHEET

Date: January 24, 2023

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WORK PAD DIMENSIONS ARE SHOWN FOR PERMITTING PURPOSES. MINIMIZE WORK PAD AREAS, INCLUDING MATTING, TO THE GREATEST EXTENT POSSIBLE, ESPECIALLY IN WETLANDS AND OTHER SENSITIVE AREAS. RESTORE WORK PADS USING TOPSOIL STOCKPILED DURING INITIAL GRADING TO AN APPROXIMATELY 30-FOOT BY 60-FOOT OR SMALLER AREA AT THE BASE OF THE STRUCTURE TO ALLOW FOR FUTURE MAINTENANCE. STABILIZE EXPOSED SOILS WITH SEED AND MULCH AS NECESSARY. UTILIZE WILDLIFE FRIENDLY EROSION AND SEDIMENT CONTROLS.

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STRUCTURES 1, 2, 3, 4 ON THE C189 LINE AND 62, 63, AND 64 ON THE M108 LINE ARE RENUMBERED ONLY

CURTISVILLE SUBSTATION

LL# 129
Unitil Energy Sysyems, Inc.
6 Liberty Lane W
Hampton, NH, 03842

LL# 128
Unitil Energy Sysyems, Inc.
6 Liberty Lane W
Hampton, NH, 03842

INSTALL INSULATOR STRUTS

TEMPORARY WETLAND IMPACT: +/-9,986 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-9,024 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-781 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-2,667 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-415 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-1,034 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-843 SQ.FT.

TEMPORARY WETLAND IMPACT: +/-4,229 SQ.FT.

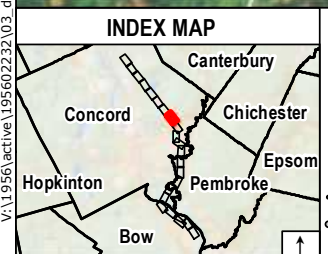
LL# 132
Hodges Properties, Inc.
201 Loudon Road
Concord, NH, 03301

C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

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*12' disturbance area for gravel access

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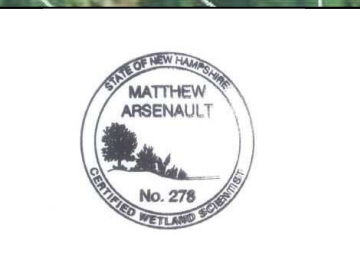
Legend

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- Overhead Distribution Line
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- Railroad
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- Culvert

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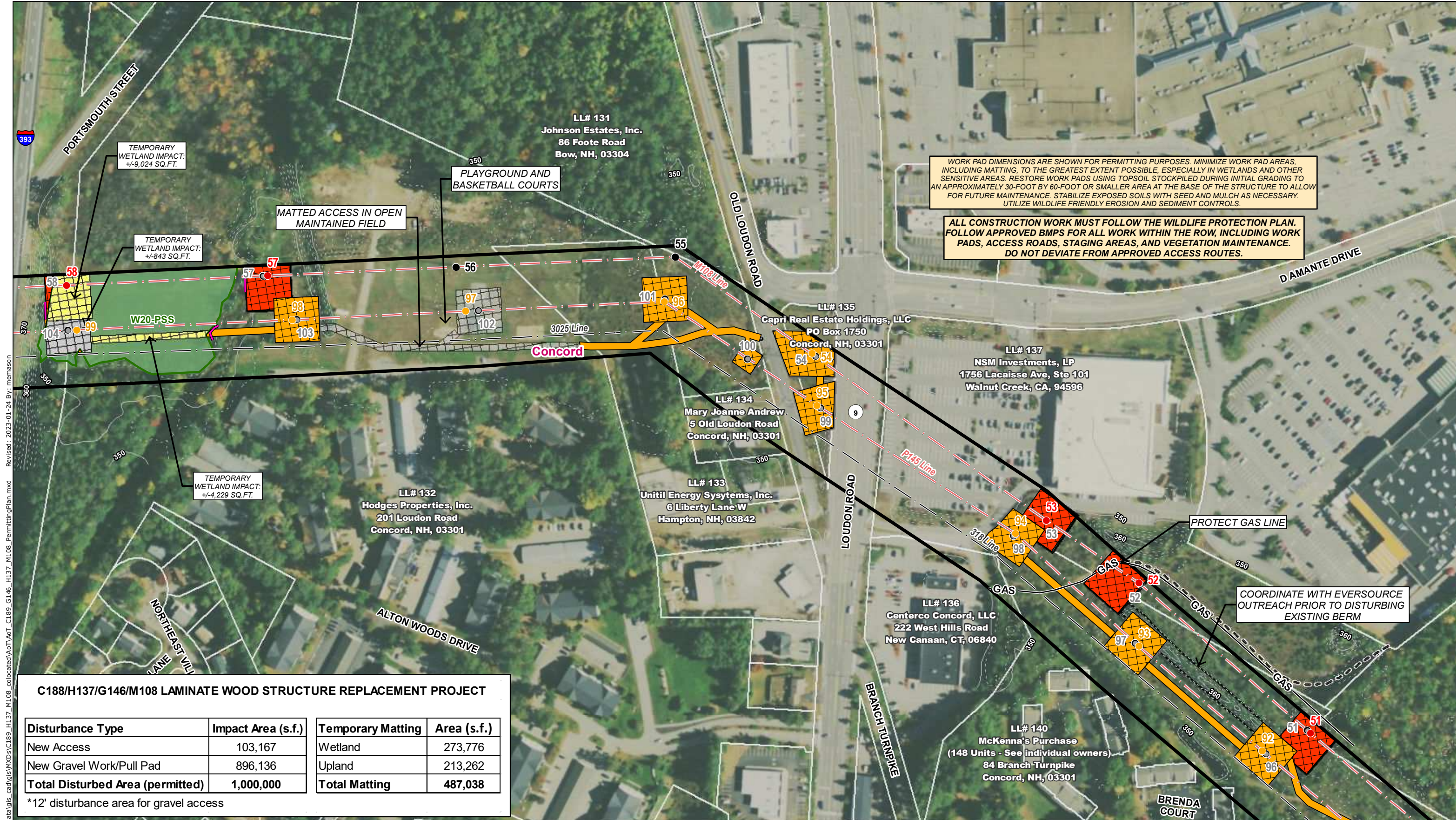
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EVERSOURCE ENERGY **Stantec**

C189/G146/H137/M108 Laminate Wood Alteration of Terrain Permitting Map Set

Concord, NH	MAP SHEET
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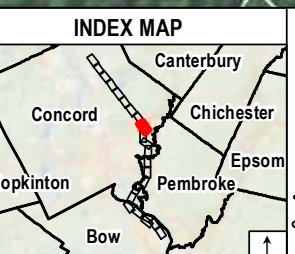


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 Revised: 2023-01-24 By: memason

C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

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*12' disturbance area for gravel access



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- Existing Access
- Proposed Access (Previously Permitted)
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- AoT Disturbance Area - New Access
- AoT Disturbance Area - New Pad
- AoT Disturbance Area - Access (Previously Permitted)
- AoT Disturbance Area - Pad (Previously Permitted)
- Temporary Construction Matting
- Temporary Construction Matting (Previously Permitted)
- Existing Gravel
- Stone Work Pad
- Stone Work Pad (Previously Permitted)
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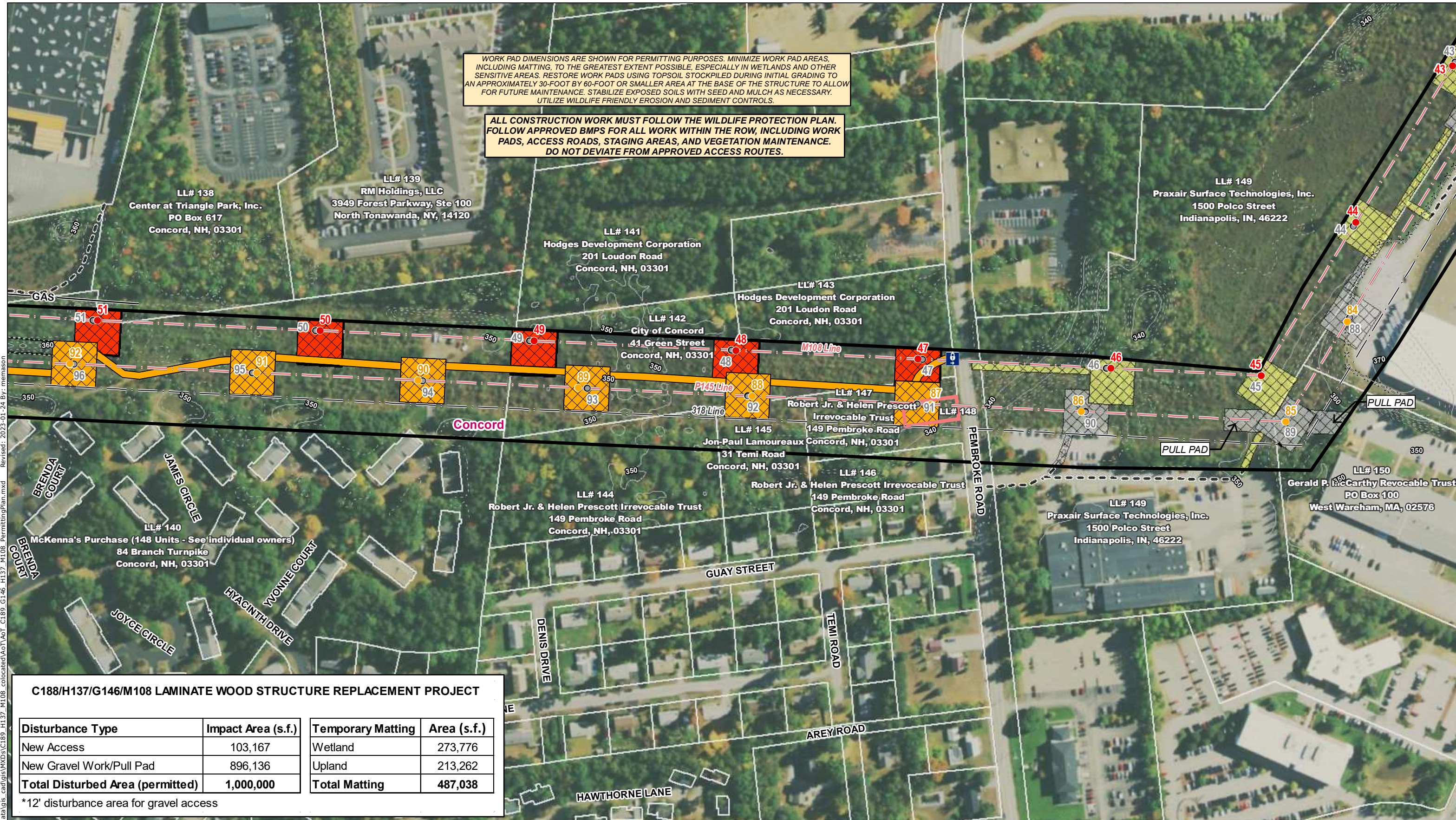
C189/G146/H137/M108 Laminare Wood Alteration of Terrain Permitting Map Set

Concord, NH	MAP SHEET
Date: January 24, 2023	9 of 23

STATE OF NEW HAMPSHIRE
 MATTHEW ARSENAULT
 No. 278
 CERTIFIED WETLAND SCIENTIST

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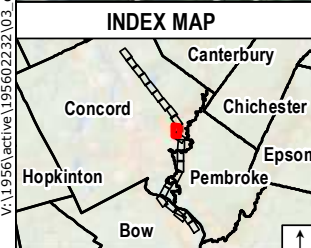
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C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

Disturbance Type	Impact Area (s.f.)	Temporary Matting	Area (s.f.)
New Access	103,167	Wetland	273,776
New Gravel Work/Pull Pad	896,136	Upland	213,262
Total Disturbed Area (permitted)	1,000,000	Total Matting	487,038

*12' disturbance area for gravel access

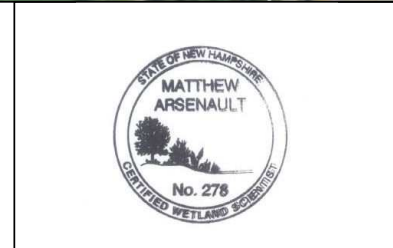


- Legend**
- Proposed Structure
 - Previously Permitted Structure
 - Existing Structure
 - Existing Structure to be Removed
 - Overhead Eversource Line
 - Overhead Distribution Line
 - Underground Distribution Line
 - Existing Right-of-Way (ROW)
 - Existing Access
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 - AoT Disturbance Area - New Access
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 - AoT Disturbance Area - Pad (Previously Permitted)
 - Temporary Construction Matting
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 - Existing Gravel
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 - Eversource Owned Property
 - State Owned Land
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 - Parcel Boundary
 - Municipal Boundary
 - 2' Contours
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 - Potential Vernal Pool Extent
 - Delineated Perennial Stream
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1 inch = 200 feet

Map Notes:
 Coordinate System: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
 Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.
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EVERSOURCE ENERGY **Stantec**

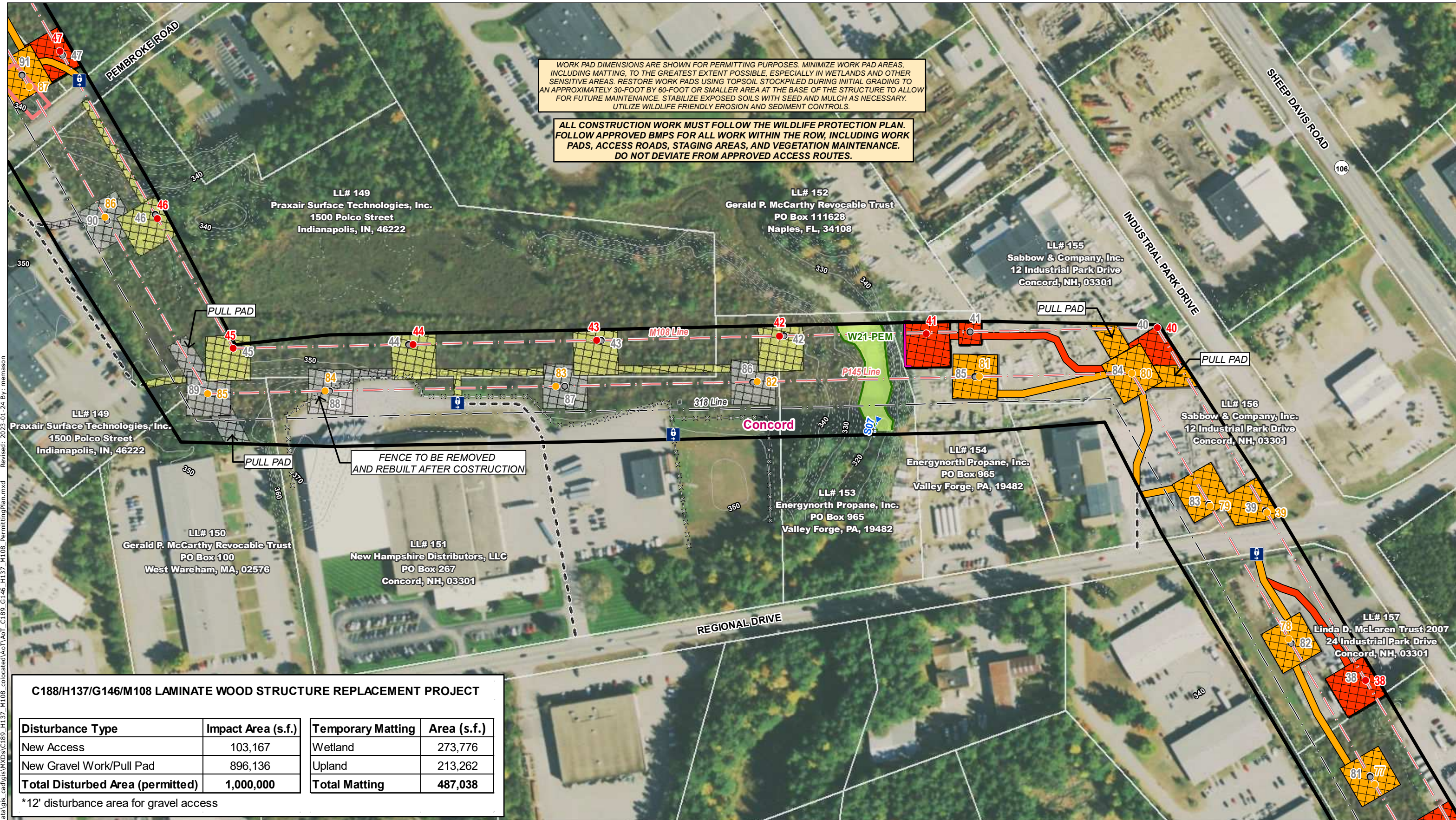
C189/G146/H137/M108 Laminate Wood Alteration of Terrain Permitting Map Set

Concord, NH	MAP SHEET
Date: January 24, 2023	10 of 23

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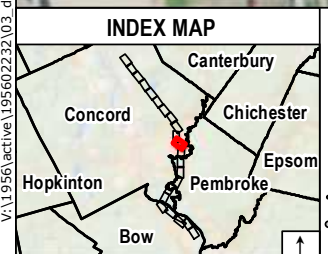


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C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

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*12' disturbance area for gravel access



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0 50 100 200 Feet

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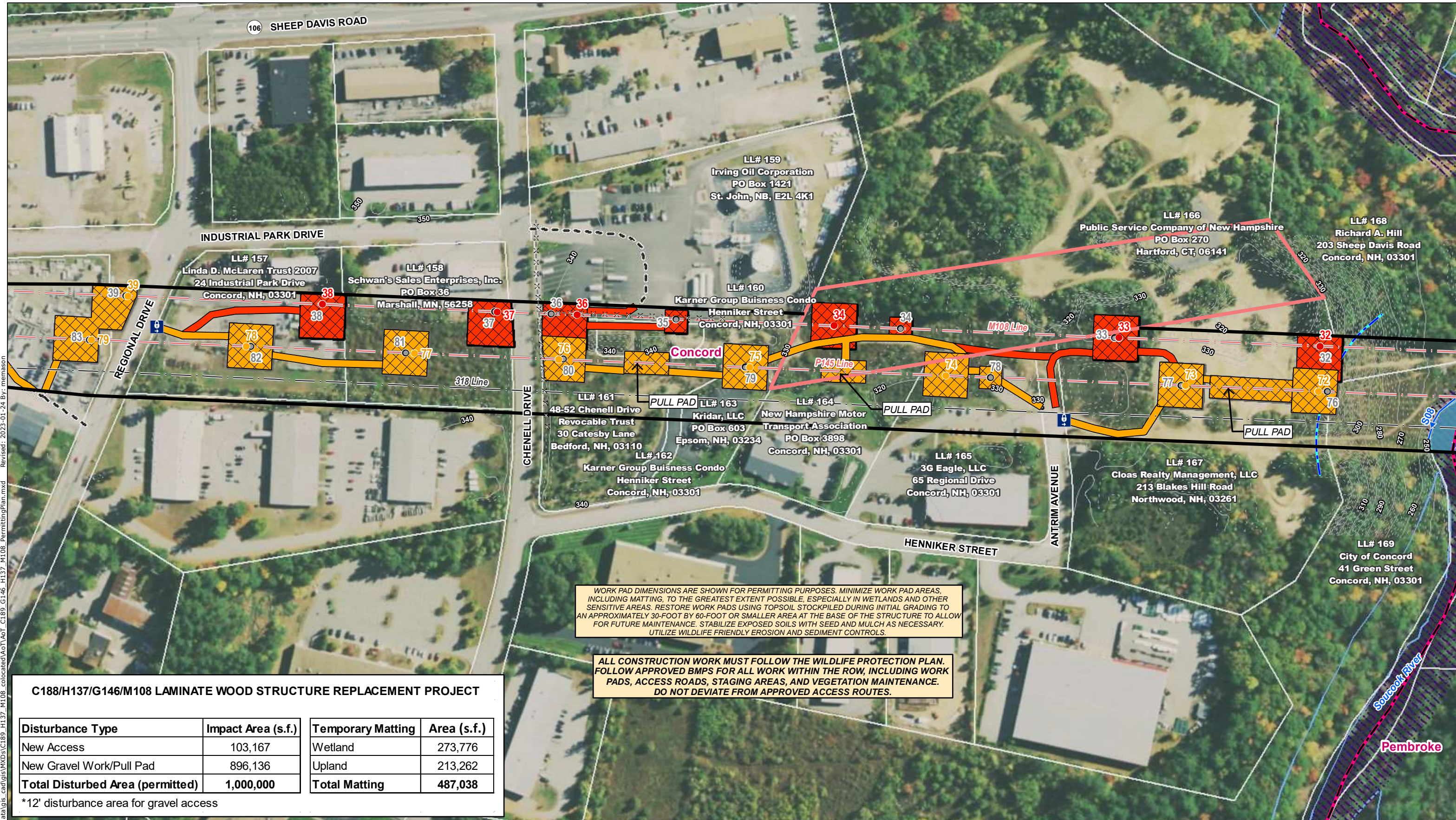


EVERSOURCE ENERGY **Stantec**

C189/G146/H137/M108 Laminate Wood Alteration of Terrain Permitting Map Set

Concord, NH	MAP SHEET
Date: January 24, 2023	11 of 23

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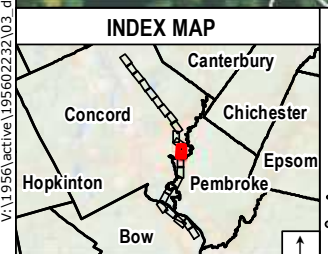
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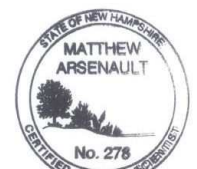


Legend

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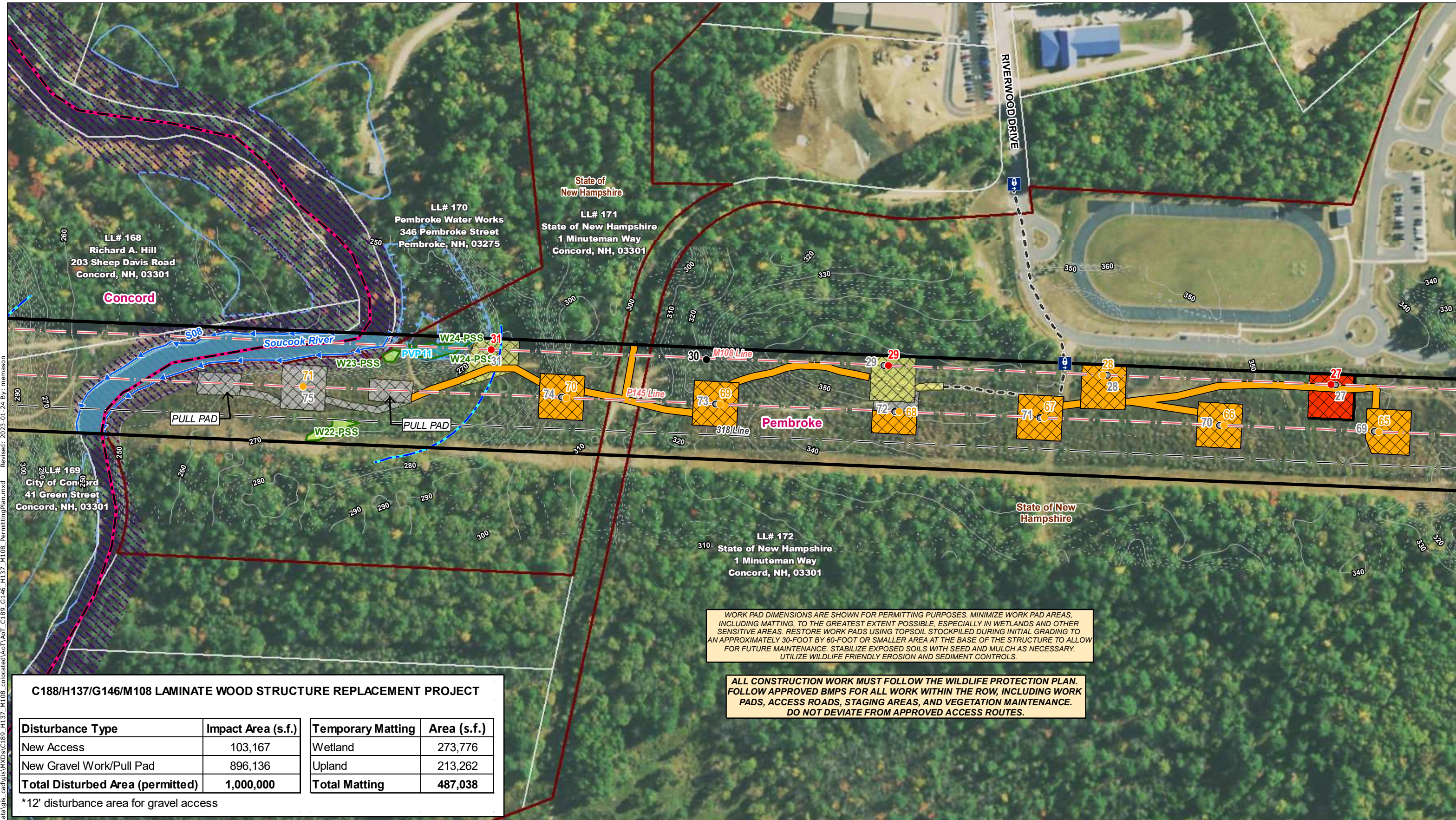


EVERSOURCE ENERGY **Stantec**

C189/G146/H137/M108 Laminate Wood Alteration of Terrain Permitting Map Set

Concord, NH	MAP SHEET
Date: January 24, 2023	12 of 23

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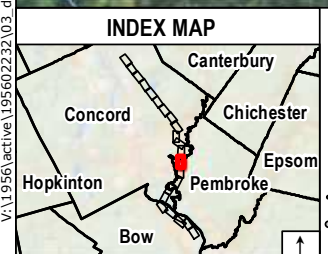
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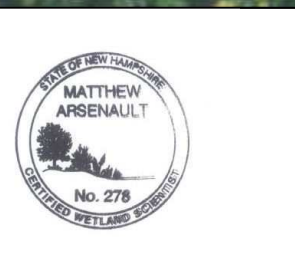


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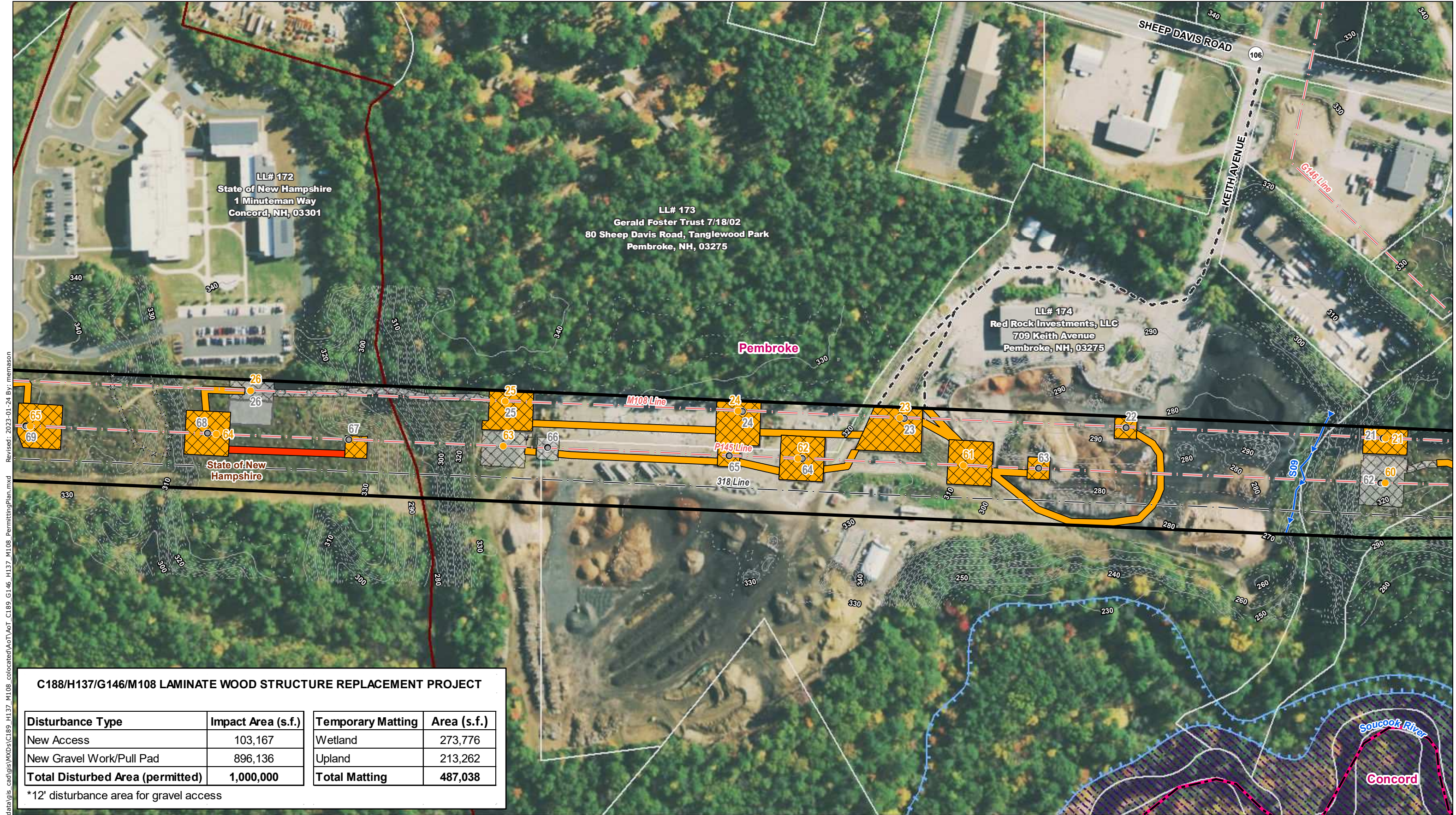
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C189/G146/H137/M108 Laminare Wood Alteration of Terrain Permitting Map Set	
Pembroke & Concord, NH	MAP SHEET
Date: January 24, 2023	13 of 23

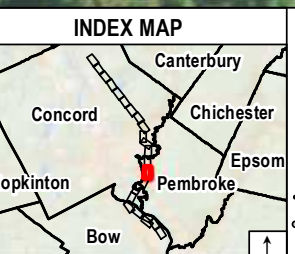


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 Revised: 2023-01-24 By: memason

C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

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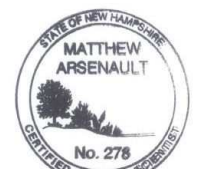
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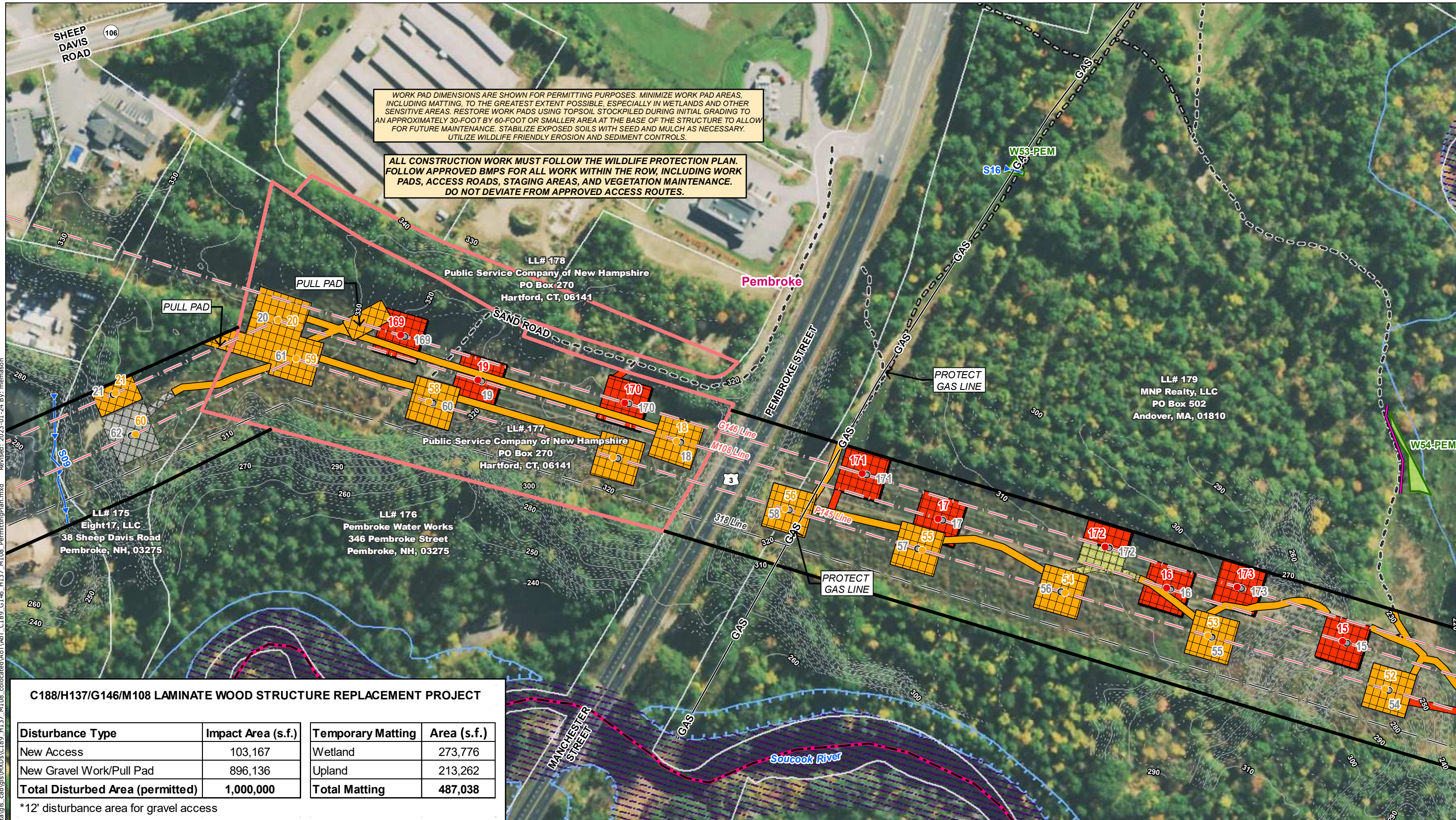


EVERSOURCE ENERGY **Stantec**

C189/G146/H137/M108 Laminate Wood Alteration of Terrain Permitting Map Set

Pembroke, NH	MAP SHEET
Date: January 24, 2023	14 of 23

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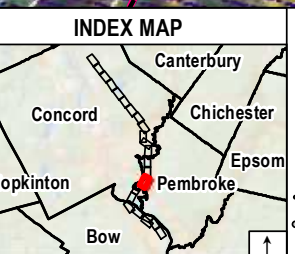
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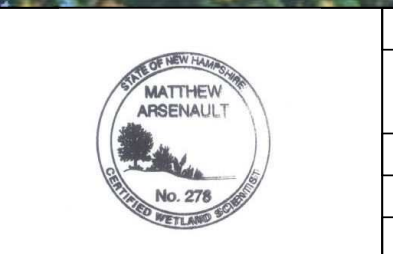
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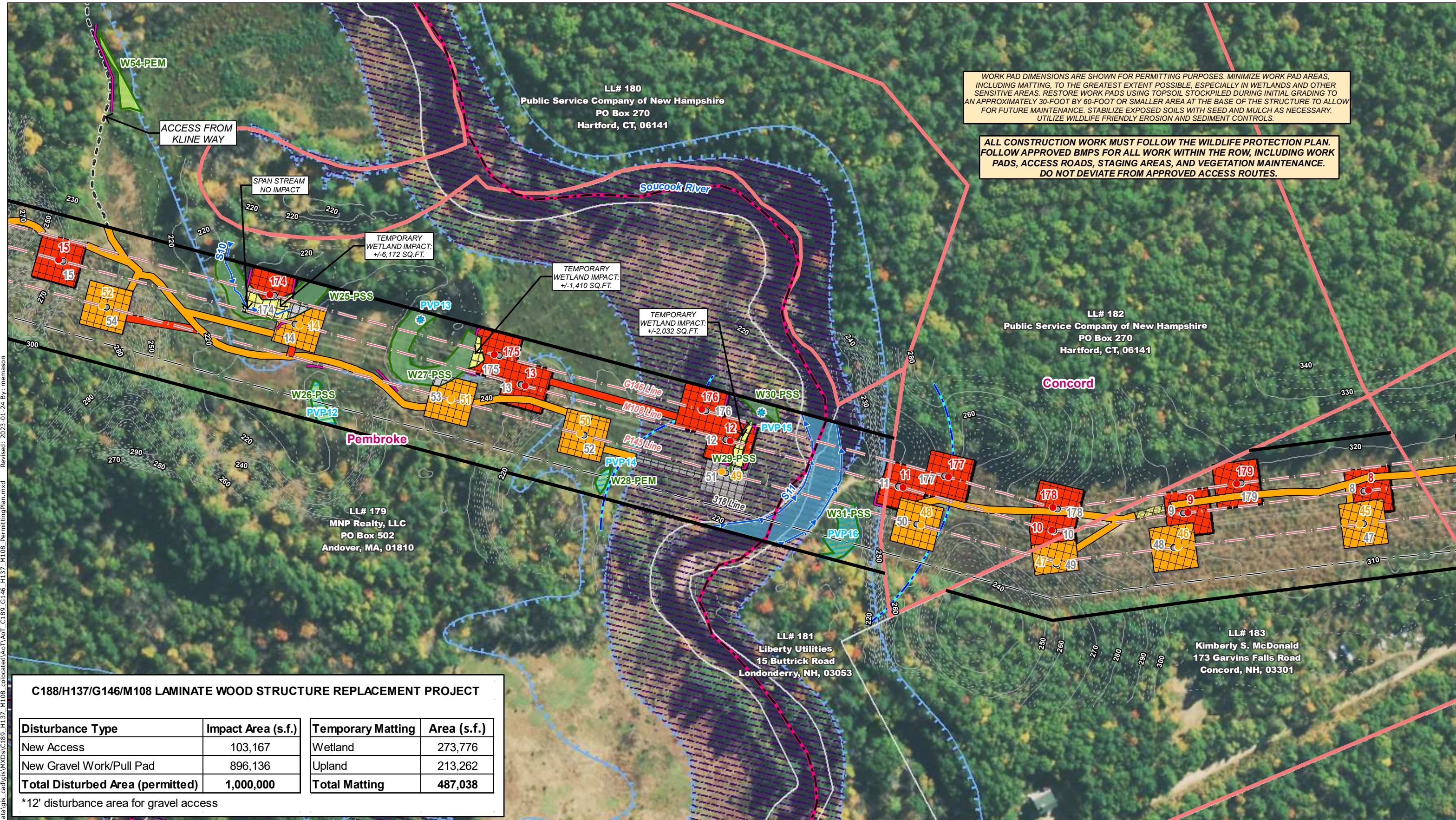
C189/G146/H137/M108 Laminated Wood Alteration of Terrain Permitting Map Set

Pembroke, NH MAP SHEET

Date: January 24, 2023

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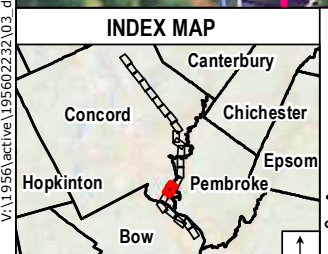
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C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

Disturbance Type	Impact Area (s.f.)	Temporary Matting	Area (s.f.)
New Access	103,167	Wetland	273,776
New Gravel Work/Pull Pad	896,136	Upland	213,262
Total Disturbed Area (permitted)	1,000,000	Total Matting	487,038

*12' disturbance area for gravel access



- Legend**
- Proposed Structure
 - Previously Permitted Structure
 - Existing Structure
 - Existing Structure to be Removed
 - Overhead Eversource Line
 - Overhead Distribution Line
 - Underground Distribution Line
 - Existing Right-of-Way (ROW)
 - Existing Access
 - Proposed Access (Previously Permitted)
 - Suggested Erosion and Sediment Control (TYP)
 - AoT Disturbance Area - New Access
 - AoT Disturbance Area - New Pad (Previously Permitted)
 - AoT Disturbance Area - Pad (Previously Permitted)
 - Temporary Construction Matting
 - Temporary Construction Matting (Previously Permitted)
 - Existing Gravel
 - Stone Work Pad
 - Stone Work Pad (Previously Permitted)
 - Eversource Owned Property
 - State Owned Land
 - LLN/Property Owner
 - Parcel Boundary
 - Municipal Boundary
 - 2' Contours
 - 10' Contours
 - Potential Vernal Pool
 - Potential Vernal Pool Extent
 - Delineated Perennial Stream
 - Delineated Intermittent Stream
 - Delineated Ephemeral Stream
 - Field Delineated Wetland Boundary
 - Field Delineated Wetland
 - Priority Resource Area
 - Open Water
 - FEMA 100-Year Flood Zone
 - FEMA Floodway
 - NHDES Protected Shoreland
 - Railroad
 - GAS Approximate Gas Line
 - Fence
 - Stone Wall
 - Berm
 - Gate
 - Culvert

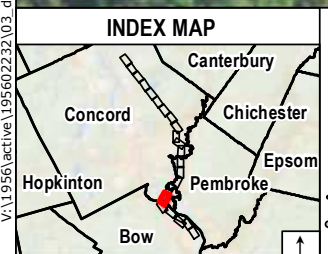
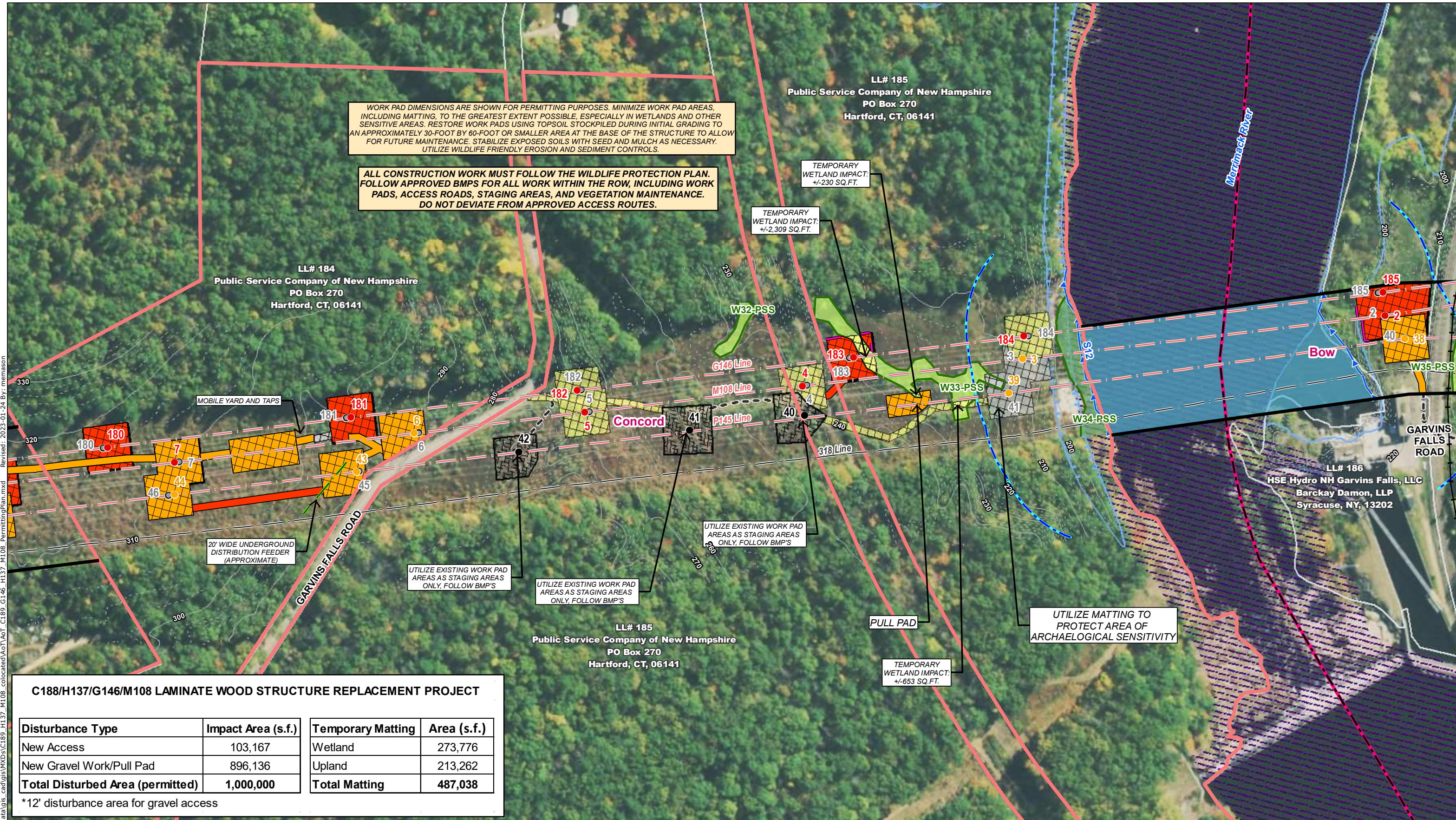
Map Notes:
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 Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.
 Basemap: 2018 National Agriculture Imagery Program (NAIP) aerial imagery
 Additional source include: NH Grant

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<p align="center">C189/G146/H137/M108 Laminare Wood Alteration of Terrain Permitting Map Set</p>	
Concord & Pembroke, NH	MAP SHEET
Date: January 24, 2023	16 of 23

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Legend

- Proposed Structure (Red circle)
- Previously Permitted Structure (Yellow circle)
- Existing Structure (Black circle)
- Existing Structure to be Removed (Black circle with slash)
- Overhead Eversource Line (Red dashed line)
- Overhead Distribution Line (Black dashed line)
- Underground Distribution Line (Green dashed line)
- Existing Right-of-Way (ROW) (Black dashed line)
- Existing Access (Black dashed line)
- Proposed Access (Red dashed line)
- Suggested Erosion and Sediment Control (TYP) (Red dashed line)
- AoT Disturbance Area - New Access (Red hatched area)
- AoT Disturbance Area - New Pad (Orange hatched area)
- AoT Disturbance Area - Access (Previously Permitted) (Yellow hatched area)
- AoT Disturbance Area - Pad (Previously Permitted) (Green hatched area)
- Temporary Construction Matting (Yellow hatched area)
- Temporary Construction Matting (Previously Permitted) (Green hatched area)
- Existing Gravel (Black hatched area)
- Stone Work Pad (Black hatched area)
- Stone Work Pad (Previously Permitted) (Black hatched area)
- Eversource Owned Property (Red hatched area)
- State Owned Land (Red hatched area)
- LLN/Property Owner (Black hatched area)
- Parcel Boundary (Black dashed line)
- Municipal Boundary (Black dashed line)
- 2' Contours (Black dashed line)
- 10' Contours (Black dashed line)
- Potential Vernal Pool (Blue star)
- Potential Vernal Pool Extent (Blue star)
- Delineated Perennial Stream (Blue line)
- Delineated Intermittent Stream (Blue dashed line)
- Delineated Ephemeral Stream (Blue dashed line)
- Field Delineated Wetland Boundary (Green line)
- Field Delineated Wetland (Green area)
- Priority Resource Area (Green area)
- Open Water (Blue area)
- FEMA 100-Year Flood Zone (Blue area)
- Stone Floodway (Blue area)
- NHDES Protected Shoreland (Blue area)
- Railroad (Black line)
- GAS Approximate Gas Line (Black line)
- Fence (Black line)
- Stone Wall (Black line)
- Berm (Black line)
- Gate (Blue square)
- Culvert (Black circle)

Map Notes:
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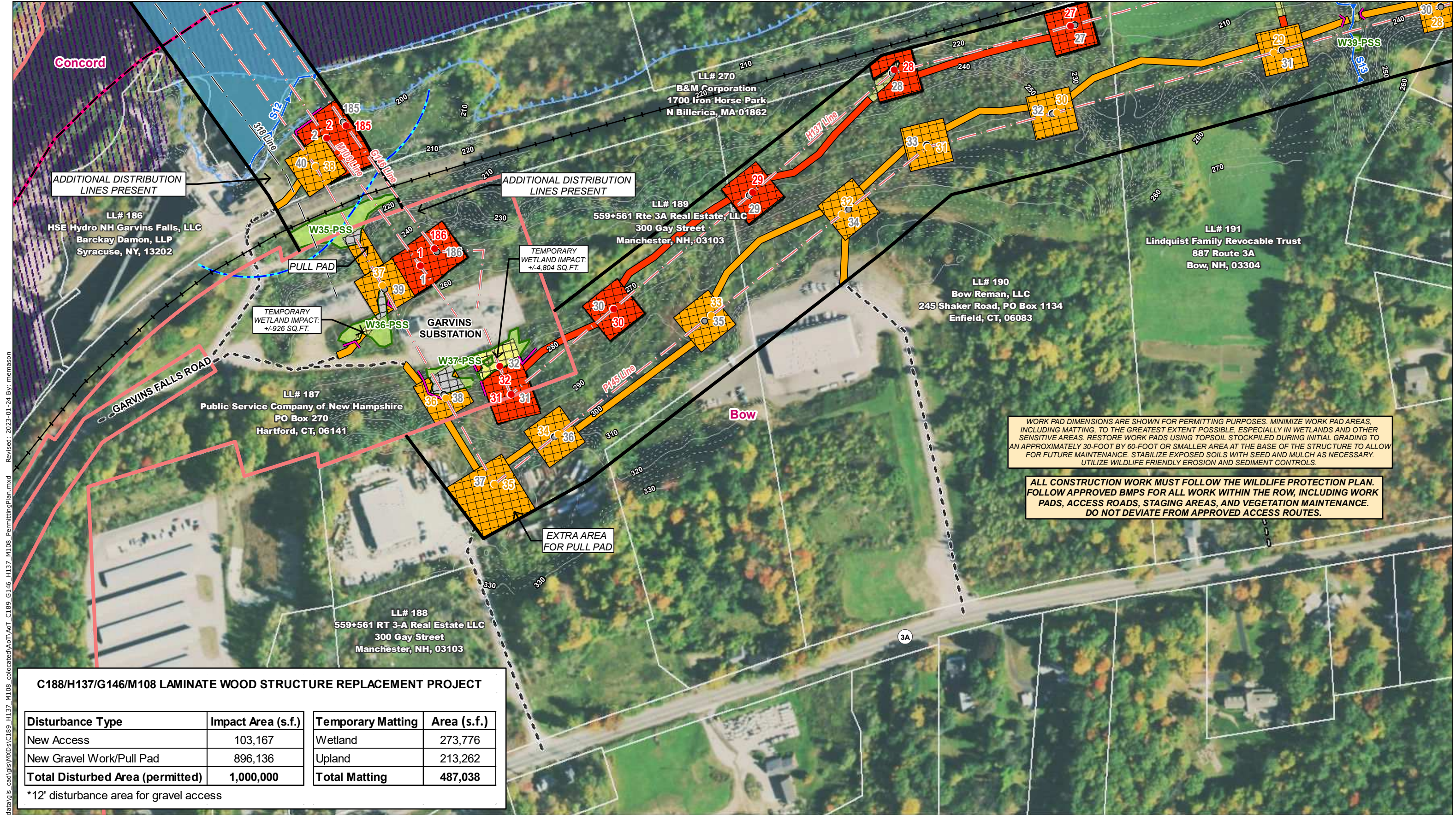
1 inch = 200 feet
 0 50 100 200 Feet



EVERSOURCE ENERGY **Stantec**

C189/G146/H137/M108 Laminare Wood Alteration of Terrain Permitting Map Set

Bow & Concord, NH	MAP SHEET
Date: January 24, 2023	17 of 23



WORK PAD DIMENSIONS ARE SHOWN FOR PERMITTING PURPOSES. MINIMIZE WORK PAD AREAS, INCLUDING MATTING, TO THE GREATEST EXTENT POSSIBLE, ESPECIALLY IN WETLANDS AND OTHER SENSITIVE AREAS. RESTORE WORK PADS USING TOPSOIL STOCKPILED DURING INITIAL GRADING TO AN APPROXIMATELY 30-FOOT BY 60-FOOT OR SMALLER AREA AT THE BASE OF THE STRUCTURE TO ALLOW FOR FUTURE MAINTENANCE. STABILIZE EXPOSED SOILS WITH SEED AND MULCH AS NECESSARY. UTILIZE WILDLIFE FRIENDLY EROSION AND SEDIMENT CONTROLS.

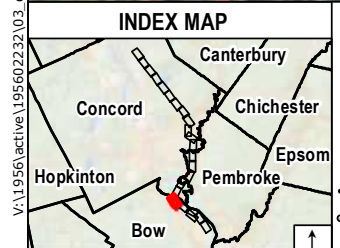
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C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

Disturbance Type	Impact Area (s.f.)	Temporary Matting	Area (s.f.)
New Access	103,167	Wetland	273,776
New Gravel Work/Pull Pad	896,136	Upland	213,262
Total Disturbed Area (permitted)	1,000,000	Total Matting	487,038

*12' disturbance area for gravel access

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 Revised: 2023-01-24 By: memason

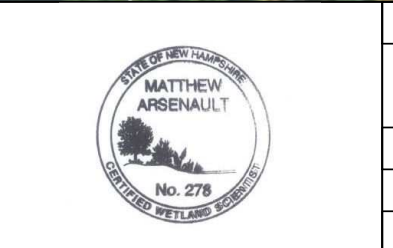


- Legend**
- Proposed Structure
 - Previously Permitted Structure
 - Existing Structure
 - Existing Structure to be Removed
 - Overhead Eversource Line
 - Overhead Distribution Line
 - Underground Distribution Line
 - Existing Right-of-Way (ROW)
 - Existing Access
 - Proposed Access (Previously Permitted)
 - Suggested Erosion and Sediment Control (TYP)
 - AoT Disturbance Area - New Access
 - AoT Disturbance Area - New Pad
 - AoT Disturbance Area - Access (Previously Permitted)
 - AoT Disturbance Area - Pad (Previously Permitted)
 - Temporary Construction Matting
 - Temporary Construction Matting (Previously Permitted)
 - Existing Gravel
 - Stone Work Pad
 - Stone Work Pad (Previously Permitted)
 - Eversource Owned Property
 - State Owned Land
 - LLN/Property Owner
 - Parcel Boundary
 - Municipal Boundary
 - 2' Contours
 - 10' Contours
 - Potential Vernal Pool
 - Potential Vernal Pool Extent
 - Delineated Perennial Stream
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 - Berm
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1 inch = 200 feet

0 50 100 200 Feet

Map Notes:
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EVERSOURCE ENERGY **Stantec**

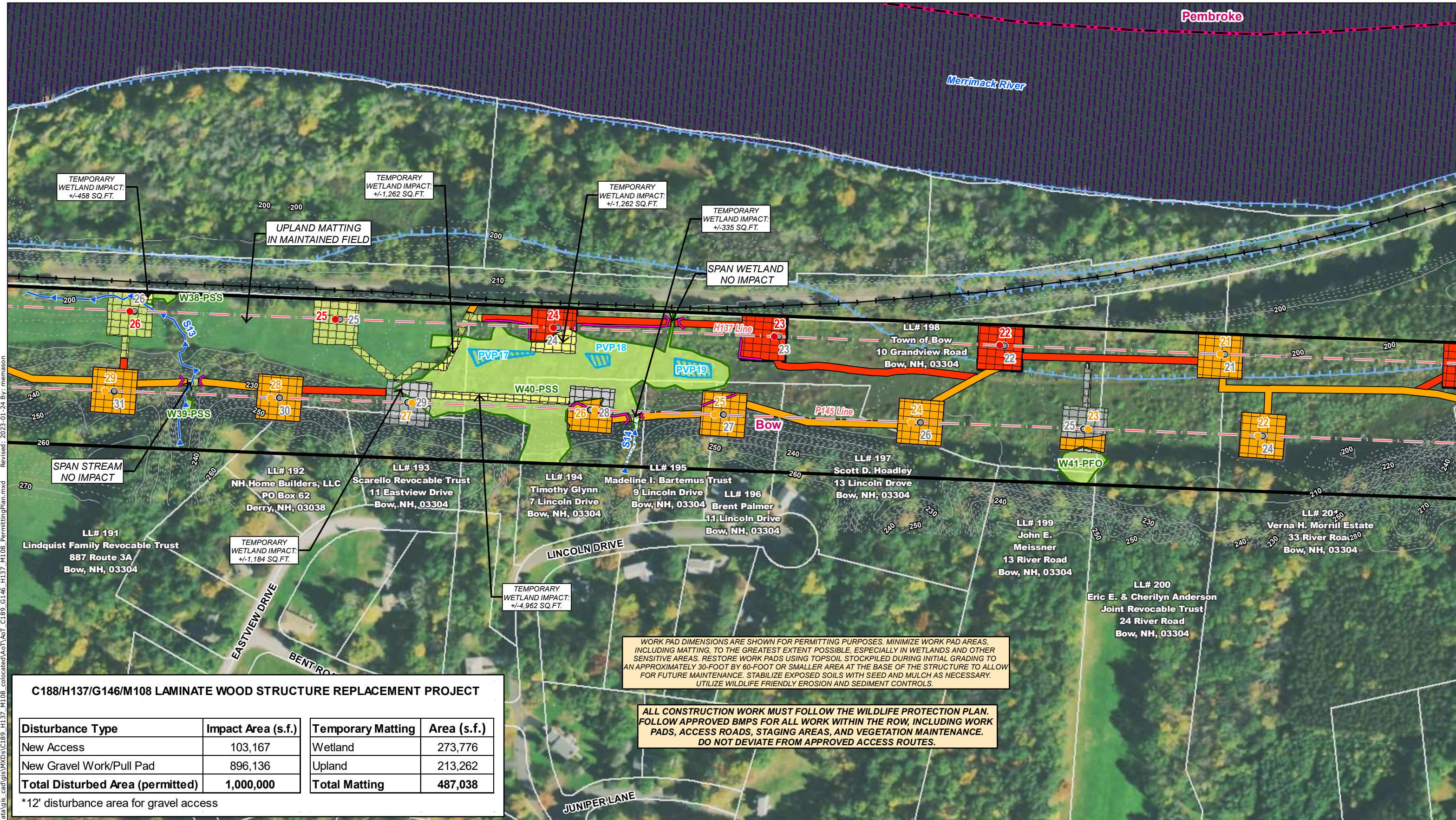
C189/G146/H137/M108 Laminated Wood Alteration of Terrain Permitting Map Set

Bow, NH MAP SHEET

Date: January 24, 2023

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Merrimack River



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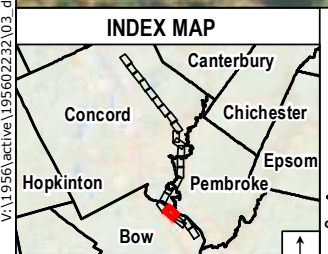
C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

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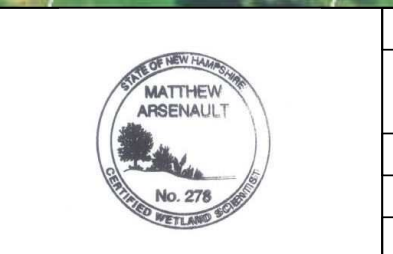
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Legend

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- AoT Disturbance Area - New Access
- AoT Disturbance Area - New Pad
- AoT Disturbance Area - Access (Previously Permitted)
- AoT Disturbance Area - Pad (Previously Permitted)
- Temporary Construction Matting
- Temporary Construction Matting (Previously Permitted)
- Existing Gravel
- Stone Work Pad
- Stone Work Pad (Previously Permitted)
- Eversource Owned Property
- State Owned Land
- LLN/Property Owner
- Parcel Boundary
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- 2' Contours
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- Potential Vernal Pool
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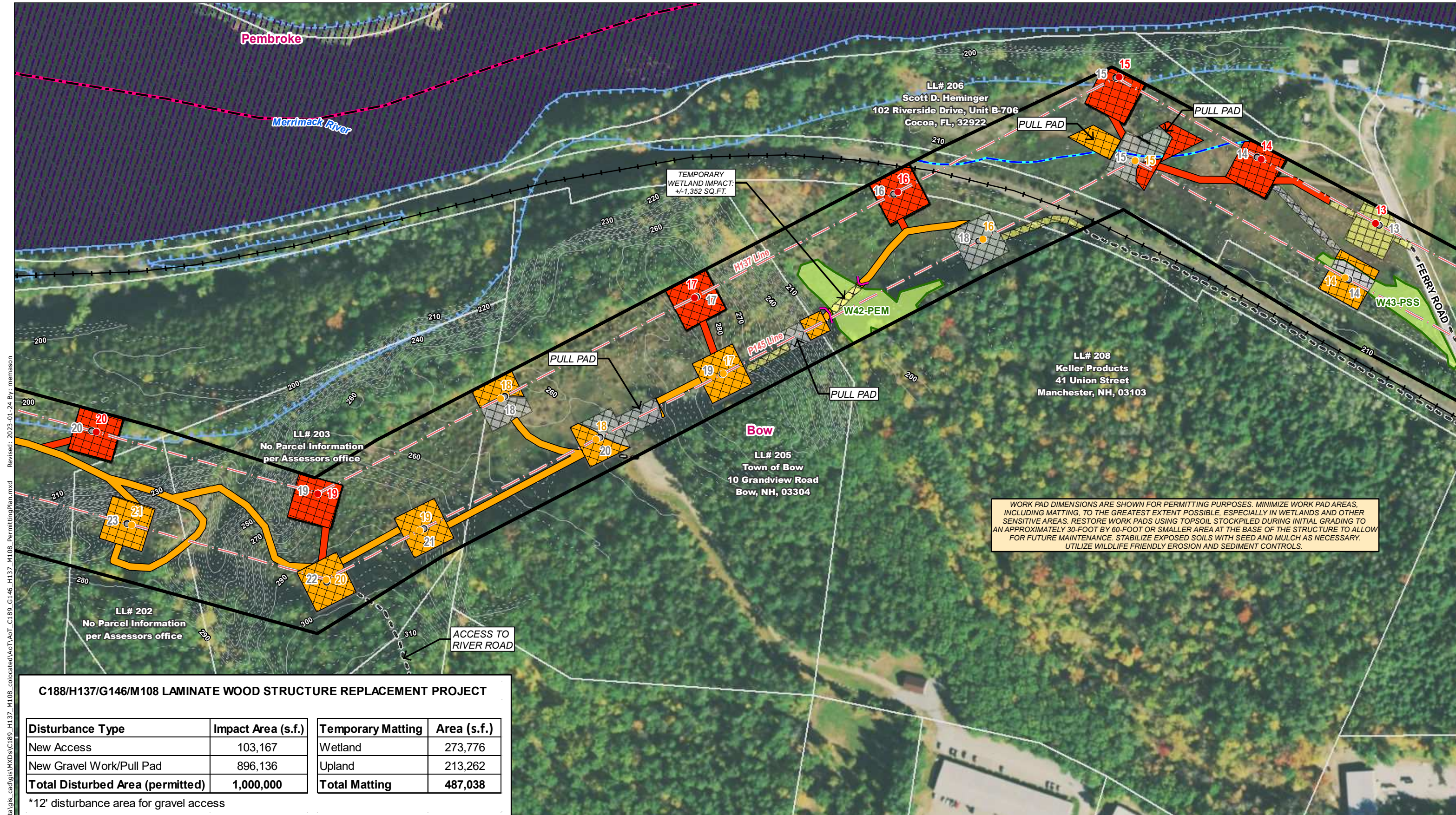
EVERSOURCE ENERGY **Stantec**

C189/G146/H137/M108 Laminate Wood Alteration of Terrain Permitting Map Set

Bow, NH MAP SHEET

Date: January 24, 2023

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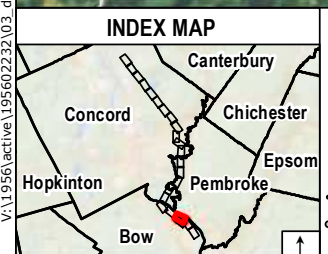
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C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

Disturbance Type	Impact Area (s.f.)	Temporary Matting	Area (s.f.)
New Access	103,167	Wetland	273,776
New Gravel Work/Pull Pad	896,136	Upland	213,262
Total Disturbed Area (permitted)	1,000,000	Total Matting	487,038

*12' disturbance area for gravel access

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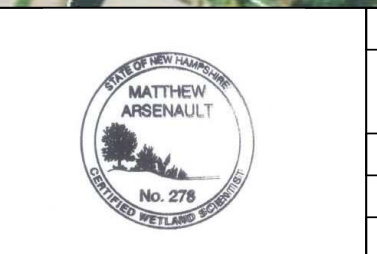
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 - AoT Disturbance Area - New Access
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 - AoT Disturbance Area - Access (Previously Permitted)
 - AoT Disturbance Area - Pad (Previously Permitted)
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0 50 100 200 Feet

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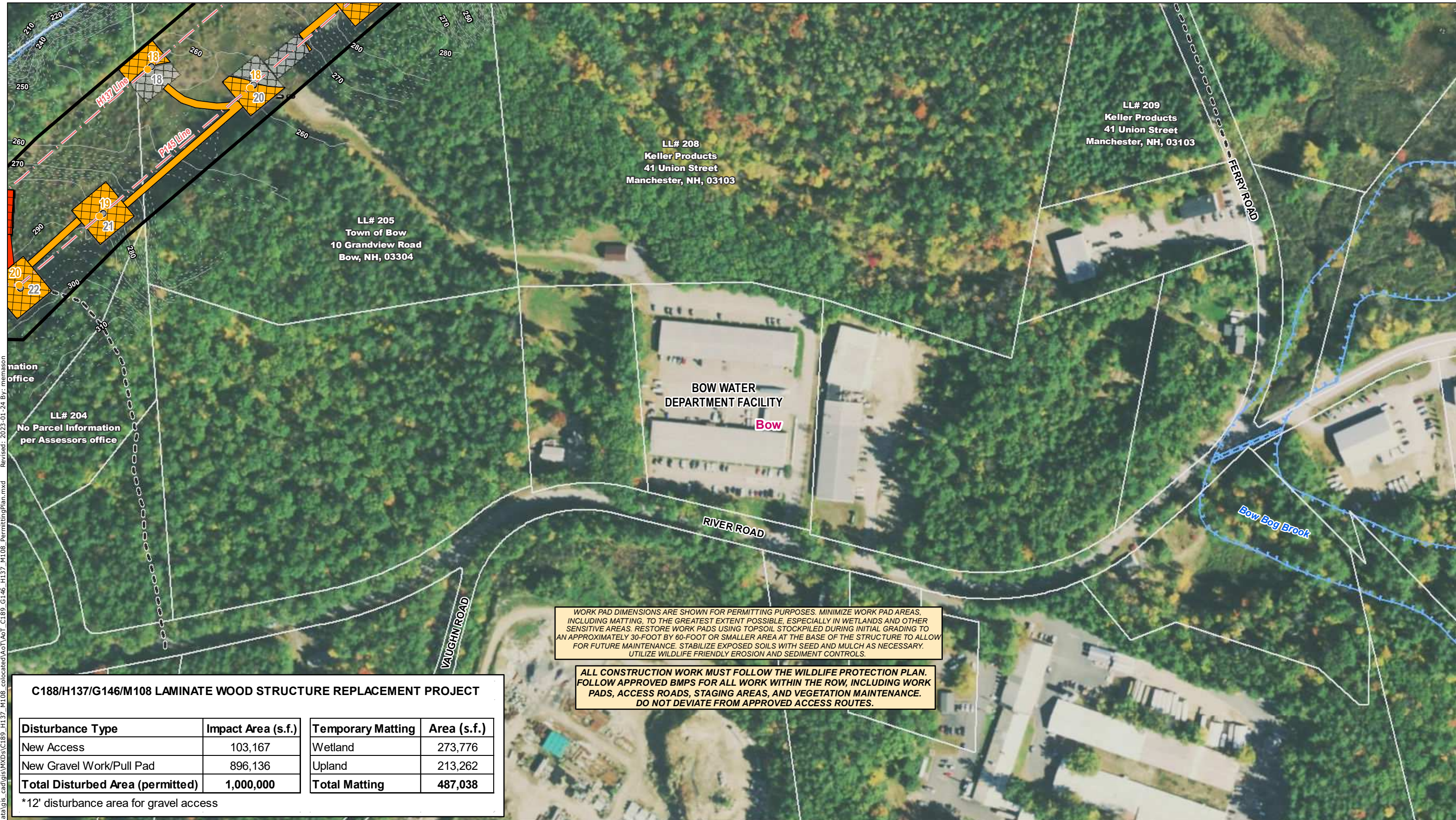
C189/G146/H137/M108 Laminate Wood Alteration of Terrain Permitting Map Set

Bow, NH MAP SHEET

Date: January 24, 2023

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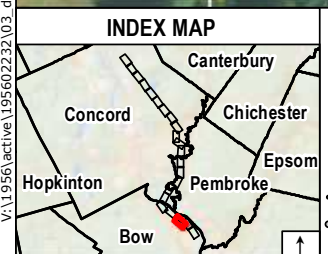
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C188/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

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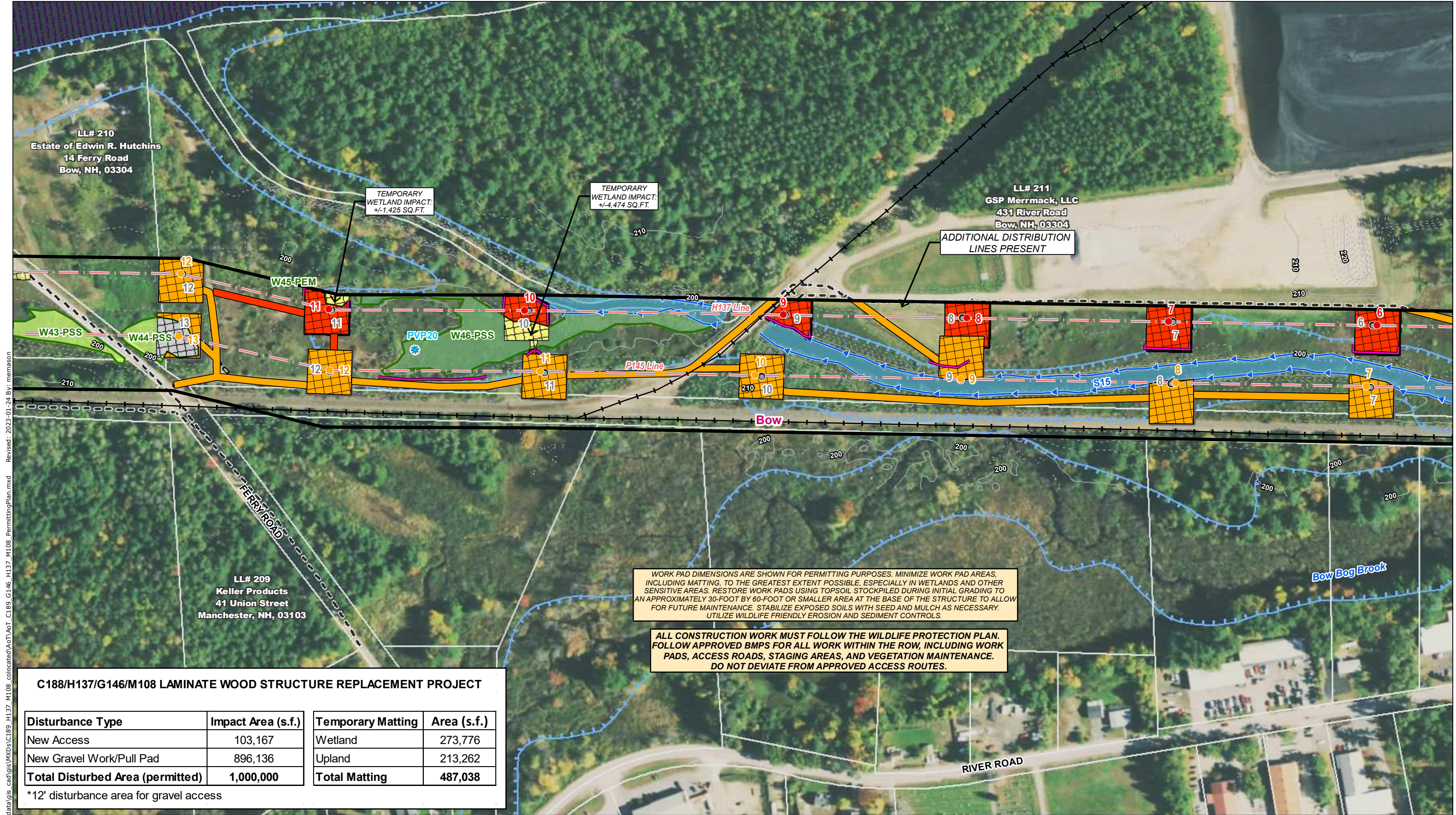
EVERSOURCE ENERGY **Stantec**

C189/G146/H137/M108 Laminate Wood Alteration of Terrain Permitting Map Set

Bow, NH MAP SHEET

Date: January 24, 2023

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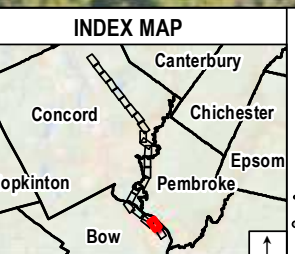
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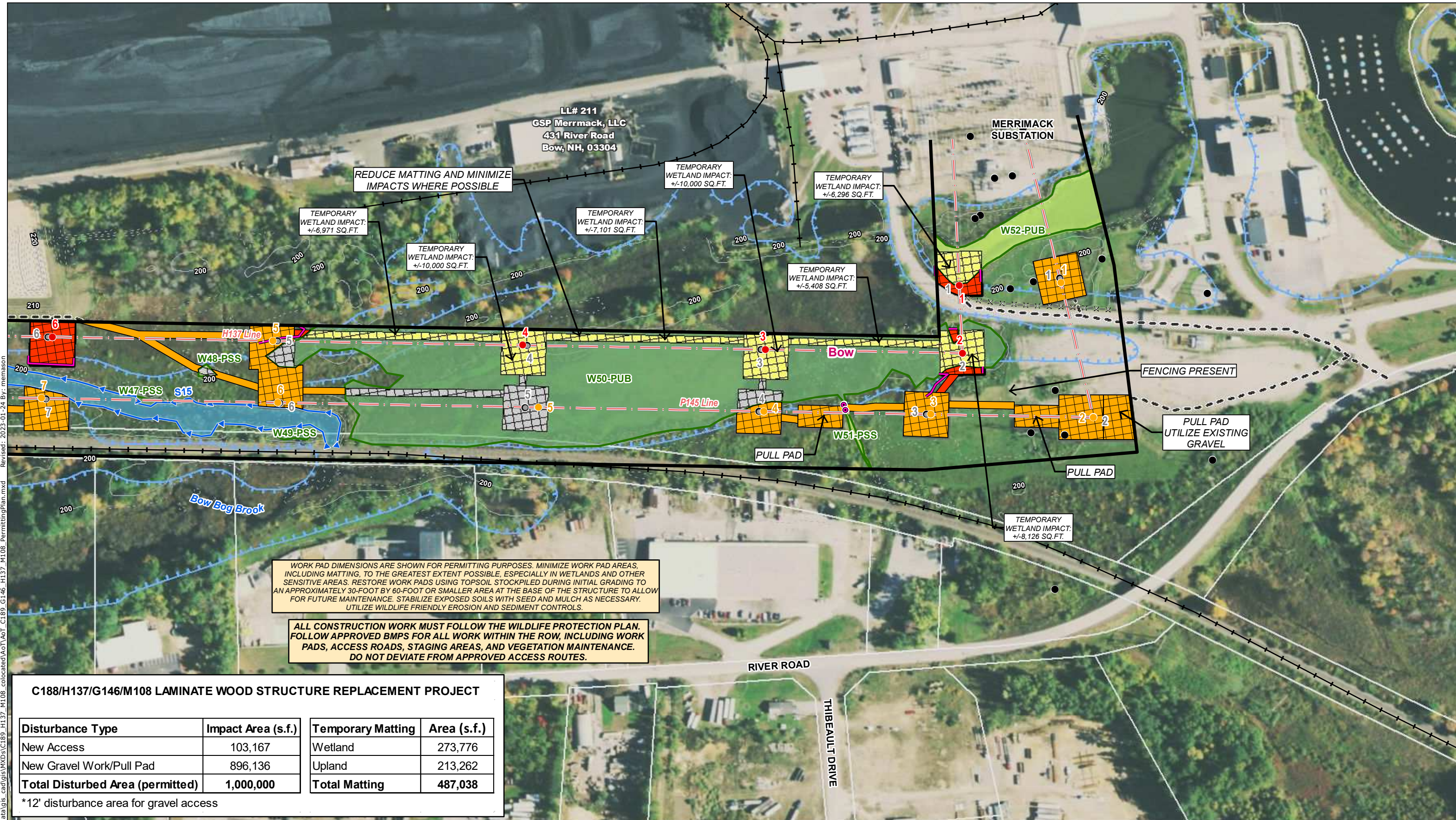
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 - Potential Vernal Pool
 - Potential Vernal Pool Extent
 - Delineated Perennial Stream
 - Delineated Intermittent Stream
 - Delineated Ephemeral Stream
 - Field Delineated Wetland Boundary
 - Field Delineated Wetland
 - Priority Resource Area
 - Open Water
 - FEMA 100-Year Flood Zone
 - FEMA Floodway
 - NHDES Protected Shoreland
 - Railroad
 - GAS Approximate Gas Line
 - Fence
 - Stone Wall
 - Berm
 - Gate
 - Culvert

Map Notes:
 Coordinate System: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
 Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.
 Additional source include: NH Grant Basemap: 2018 National Agriculture Imagery Program (NAIP) aerial imagery
 This mapping product has been created to comply with submittal requirements to obtain certain regulatory approvals and, as such, there is no reliance on the information contained herein for any other purpose.



EVERSOURCE ENERGY **Stantec**
C189/G146/H137/M108 Laminate Wood Alteration of Terrain Permitting Map Set
 Bow, NH MAP SHEET
 Date: January 24, 2023 **22 of 23**

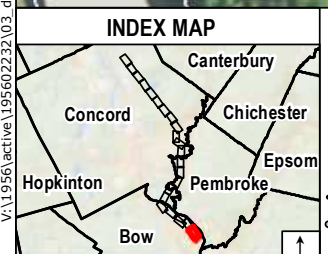
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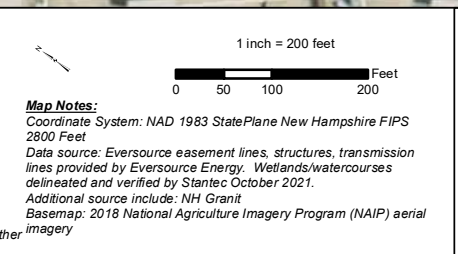
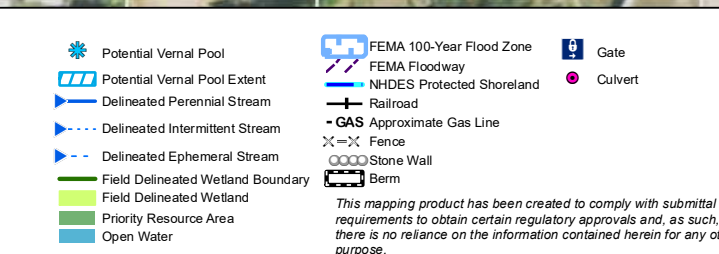
C189/H137/G146/M108 LAMINATE WOOD STRUCTURE REPLACEMENT PROJECT

Disturbance Type	Impact Area (s.f.)	Temporary Matting	Area (s.f.)
New Access	103,167	Wetland	273,776
New Gravel Work/Pull Pad	896,136	Upland	213,262
Total Disturbed Area (permitted)	1,000,000	Total Matting	487,038

*12' disturbance area for gravel access

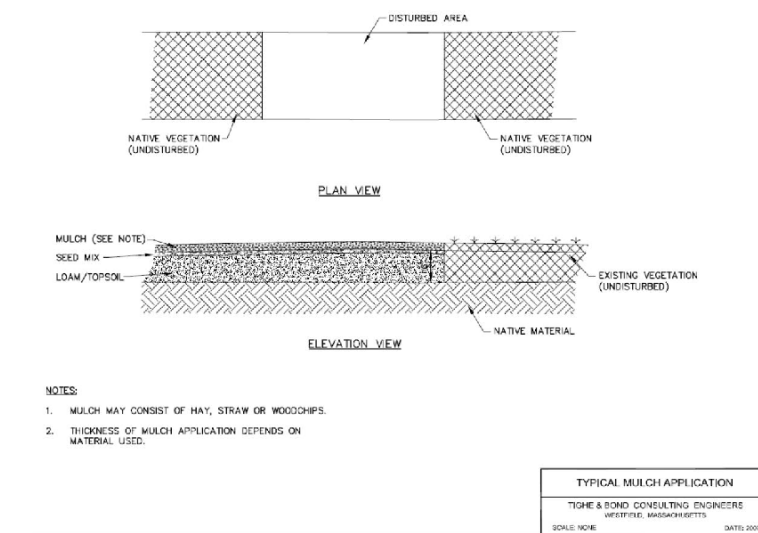
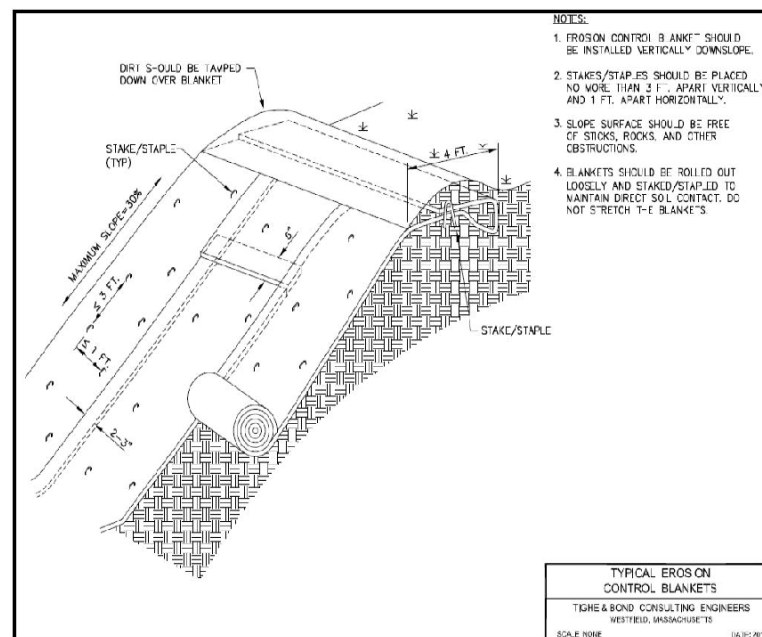
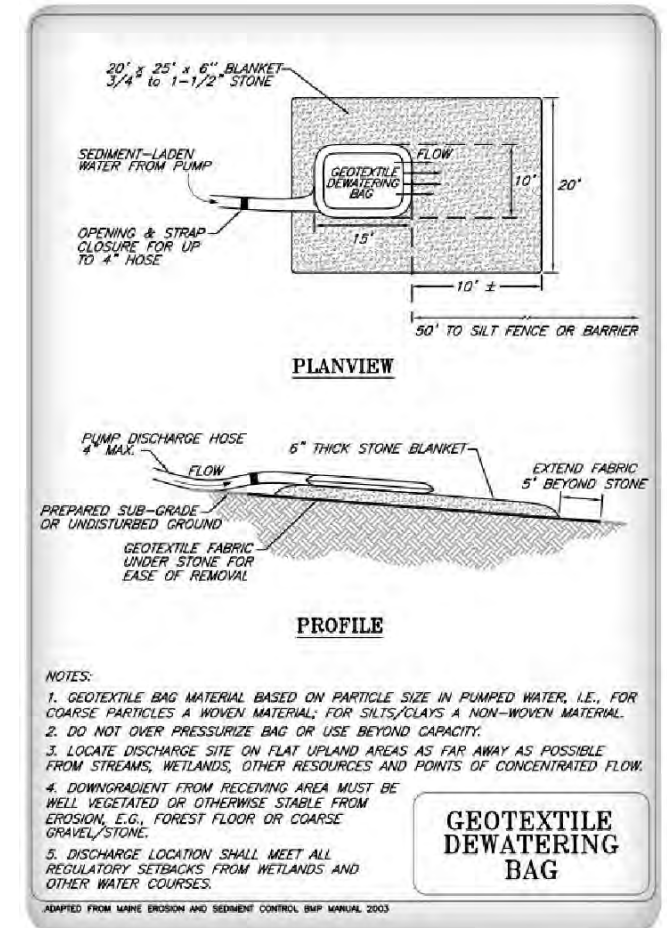
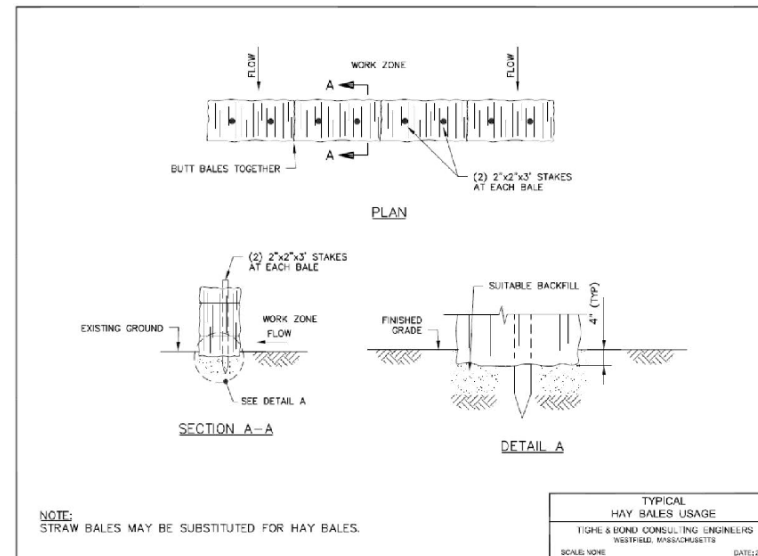
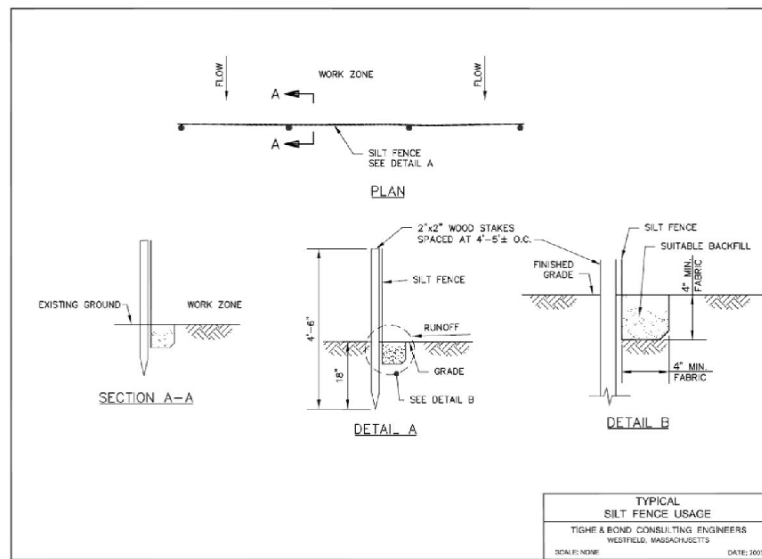
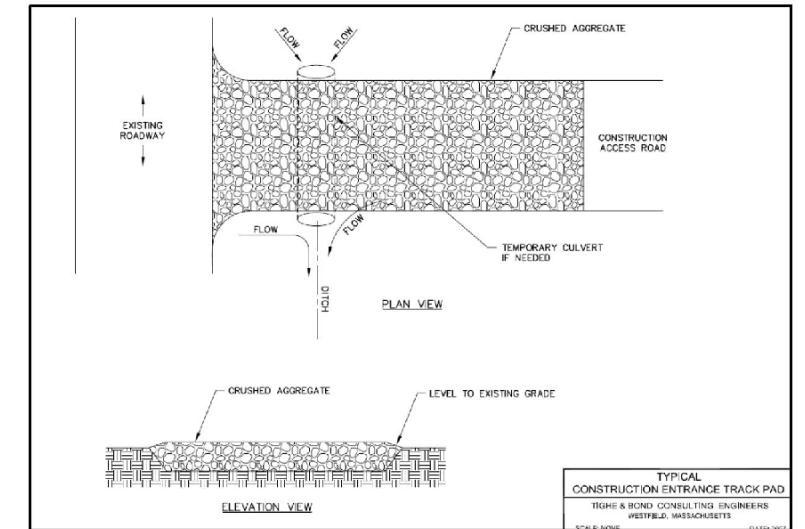
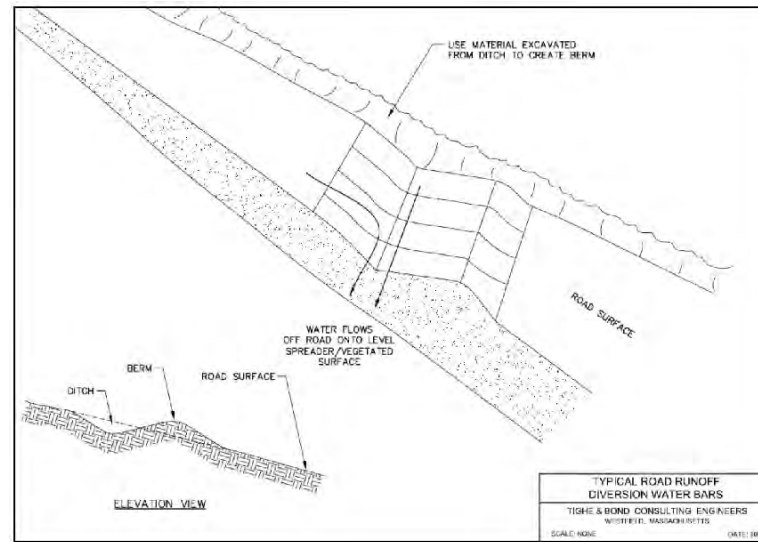
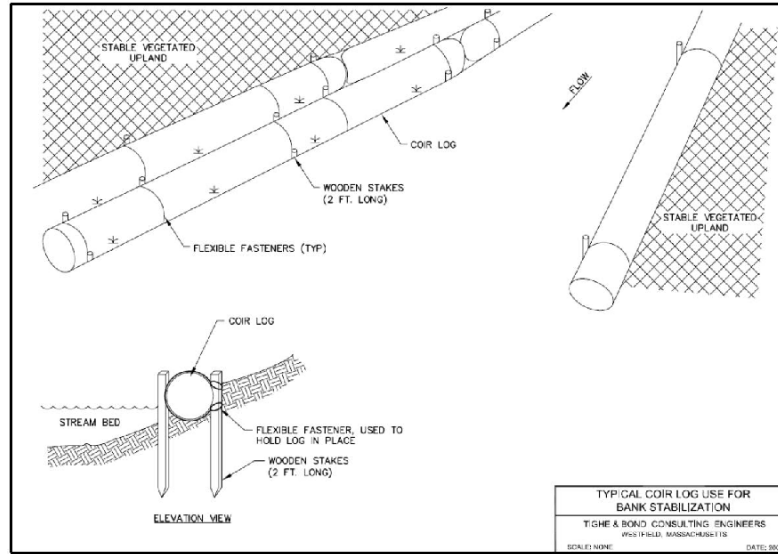


- Legend**
- Proposed Structure
 - Previously Permitted Structure
 - Existing Structure
 - Existing Structure to be Removed
 - Overhead Eversource Line
 - Overhead Distribution Line
 - Underground Distribution Line
 - Existing Right-of-Way (ROW)
 - Existing Access
 - Proposed Access (Previously Permitted)
 - Suggested Erosion and Sediment Control (TYP)
 - AoT Disturbance Area - New Access
 - AoT Disturbance Area - New Pad
 - AoT Disturbance Area - Access (Previously Permitted)
 - AoT Disturbance Area - Pad (Previously Permitted)
 - Temporary Construction Matting
 - Temporary Construction Matting (Previously Permitted)
 - Existing Gravel
 - Stone Work Pad
 - Stone Work Pad (Previously Permitted)
 - Eversource Owned Property
 - State Owned Land
 - LLN/Property Owner
 - Parcel Boundary
 - Municipal Boundary
 - 2' Contours
 - 10' Contours
 - Potential Vernal Pool
 - Potential Vernal Pool Extent
 - Delineated Perennial Stream
 - Delineated Intermittent Stream
 - Delineated Ephemeral Stream
 - Field Delineated Wetland Boundary
 - Field Delineated Wetland
 - Priority Resource Area
 - Open Water
 - FEMA 100-Year Flood Zone
 - FEMA Floodway
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 - Railroad
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 - Stone Wall
 - Berm
 - Gate
 - Culvert



C189/G146/H137/M108 Laminate Wood Alteration of Terrain Permitting Map Set	
Bow, NH	MAP SHEET
Date: January 24, 2023	
23 of 23	

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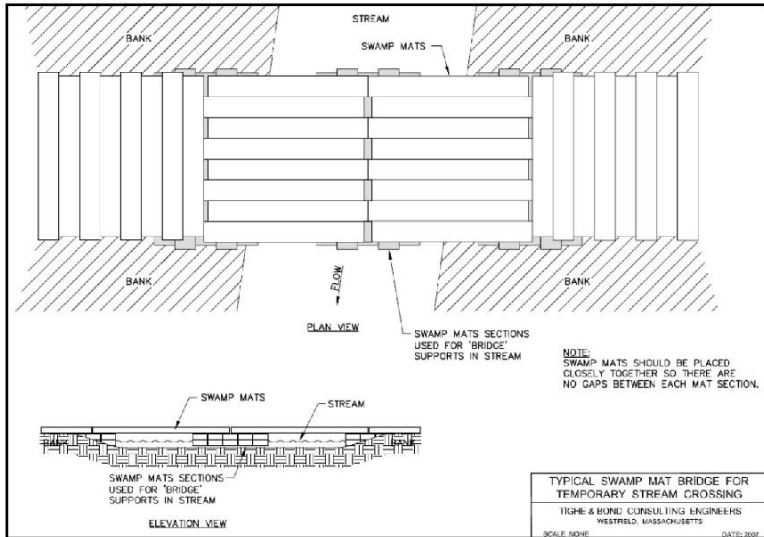
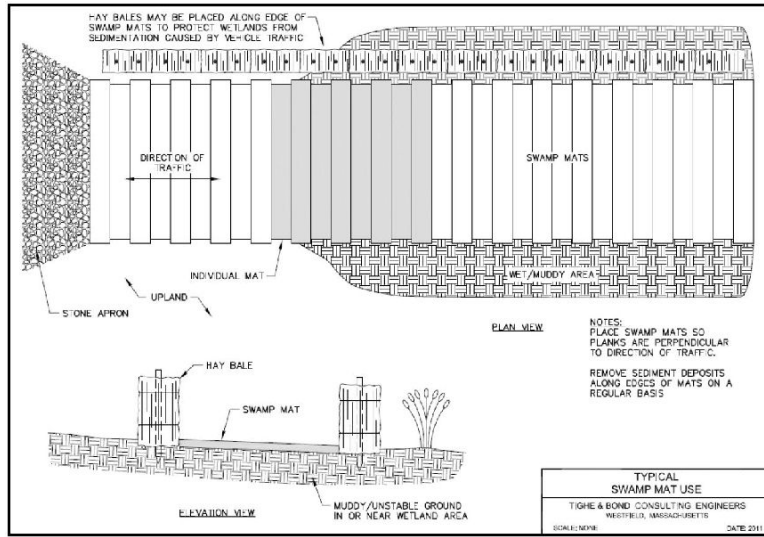


C189/G146/H137/M108
 Laminate Wood Structure
 Replacement
 Alteration of Terrain
 Concord, Pembroke, Bow, New
 Hampshire
 Notes and Details
 Page 2 of 3

EVERSOURCE
 ENERGY

Stantec

January 24, 2023



NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

January 27, 2023

**Appendix A ALTERATION OF TERRAIN PERMIT APPLICATION
FORM**





ALTERATION OF TERRAIN PERMIT APPLICATION



Water Division/ Alteration of Terrain Bureau/ Land Resources Management
Check the Status of your Application: www.des.nh.gov/onestop

RSA/ Rule: RSA 485-A:17, Env-Wq 1500

Administrative Use Only	Administrative Use Only	Administrative Use Only	File Number:
			Check No.
			Amount:
			Initials:

1. APPLICANT INFORMATION (INTENDED PERMIT HOLDER)			
Applicant Name: Public Service Co. of NH d/b/a Eversource Energy		Contact Name: Ashley Friend	
Email: ashley.friend@eversource.com		Daytime Telephone: 603-634-2992	
Mailing Address: 13 Legends Drive			
Town/City: Hooksett		State: NH	Zip Code: 03106
2. APPLICANT'S AGENT INFORMATION If none, check here: <input type="checkbox"/>			
Business Name: Stantec Consulting Services Inc.		Contact Name: Tom Tetreau	
Email: tom.tetreau@stantec.com		Daytime Telephone: 207-504-7231	
Address: 30 Park Drive			
Town/City: Topsham		State: ME	Zip Code: 04086
3. PROPERTY OWNER INFORMATION (IF DIFFERENT FROM APPLICANT)			
Applicant Name:		Contact Name:	
Email:		Daytime Telephone:	
Mailing Address:			
Town/City:		State:	Zip Code:
4. PROPERTY OWNER'S AGENT INFORMATION If none, check here: <input checked="" type="checkbox"/>			
Business Name:		Contact Name:	
Email:		Daytime Telephone:	
Address:			
Town/City:		State:	Zip Code:
5. CONSULTANT INFORMATION If none, check here: <input type="checkbox"/>			
Engineering Firm: Stantec Consulting Services Inc.		Contact Name: Tom Tetreau	
Email: tom.tetreau@stantec.com		Daytime Telephone: 207-504-7231	
Address: 30 Park Drive			
Town/City: Topsham		State: ME	Zip Code: 03086

6. PROJECT TYPE			
<input type="checkbox"/> Excavation Only	<input type="checkbox"/> Residential	<input type="checkbox"/> Commercial	<input type="checkbox"/> Golf Course
<input type="checkbox"/> Agricultural	<input type="checkbox"/> Land Conversion	<input checked="" type="checkbox"/> Other: Utility	<input type="checkbox"/> School <input type="checkbox"/> Municipal
7. PROJECT LOCATION INFORMATION			
Project Name: C189-M108-H137-G146 Structure Replacement Project			
Street/Road Address: Existing utility rights-of-way within two transmission line corridors			
Town/City: Concord, Pembroke, Bow		County: Merrimack	
Tax Map: multiple	Block: multiple	Lot Number: multiple	Unit: multiple
Location Coordinates: 43.19627°, -71.4872		<input checked="" type="checkbox"/> Latitude/Longitude	<input type="checkbox"/> UTM <input type="checkbox"/> State Plane
Post-development, will the proposed project withdraw from or directly discharge to any of the following? If yes, identify the purpose.			
1. Stream or Wetland Purpose:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Withdrawal	<input type="checkbox"/> Discharge
2. Man-made pond created by impounding a stream or wetland Purpose:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Withdrawal	<input type="checkbox"/> Discharge
3. Unlined pond dug into the water table Purpose:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Withdrawal	<input type="checkbox"/> Discharge
Post-development, will the proposed project discharge to:			
• A surface water impaired for phosphorus and/or nitrogen? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes - include information to demonstrate that project will not cause net increase in phosphorus and/or nitrogen			
• A Class A surface water or Outstanding Resource Water? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes - include information to demonstrate that project will not cause net increase in phosphorus and/or nitrogen			
• A lake or pond not covered previously? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes - include information to demonstrate that project will not cause net increase in phosphorus in the lake or pond			
Is the project a High Load area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, specify the type of high load land use or activity: _____			
Is the project within a Water Supply Intake Protection Area (WSIPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Is the project within a Groundwater Protection Area (GPA)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Will the well setbacks identified in Env-Wq 1508.02 be met? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Note: Guidance document titled " Using NHDES's OneStop WebGIS to Locate Protection Areas " is available online. For more details on the restrictions in these areas, read Chapter 3.1 in Volume 2 of the NH Stormwater Manual.			
Is any part of the property within the 100-year floodplain? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
If yes: Cut volume: <u>0</u> cubic feet within the 100-year floodplain			
Fill volume: <u>0</u> cubic feet within the 100-year floodplain			
<input checked="" type="checkbox"/> Project IS within ¼ mile of a designated river Name of River: Merrimack River			
<input type="checkbox"/> Project is NOT within ¼ mile of a designated river			
<input type="checkbox"/> Project IS within a Coastal/Great Bay Region community - include info required by Env-Wq 1503.08(I) if applicable			
<input checked="" type="checkbox"/> Project is NOT within a Coastal/Great Bay Region community			
8. BRIEF PROJECT DESCRIPTION (PLEASE DO NOT REPLY "SEE ATTACHED")			
Eversource Energy (Eversource) needs to replace existing wooden structures with new, steel structures along the existing C189, M108, H137, and G146 transmission lines (Project). Together the corridors are ~12.5 miles long, and the 115-kilovolt lines cross through the towns of Concord, Pembroke, and Bow.			
9. IF APPLICABLE, DESCRIBE ANY WORK STARTED PRIOR TO RECEIVING PERMIT			
Not applicable. Unless an emergency repair situation is identified, no work will be performed prior to receiving necessary permits. Eversource has begun previously permitted work on the co-located P145 Rebuild Project (AoT-2205) in the same corridor as the C189, M108, H137, and G146 Lines as well as several structures on the C189, M108, and H137 lines (AoT-2205A).			

10. ADDITIONAL REQUIRED INFORMATION

A. Date a copy of the application was sent to the municipality as required by Env-Wq 1503.05(e)¹: / / .
(Attach proof of delivery)

B. Date a copy of the application was sent to the local river advisory committee if required by Env-Wq 1503.05(e)²: / / .
(Attach proof of delivery)

C. Type of plan required: Land Conversion Detailed Development Excavation, Grading & Reclamation Steep Slope

D. Additional plans required: Stormwater Drainage & Hydrologic Soil Groups Source Control Chloride Management

E. Total area of disturbance: 1,000,000 square feet

F. Additional impervious cover as a result of the project: 0 square feet (use the “-” symbol to indicate a net reduction in impervious coverage).
 Total final impervious cover: 0 square feet

G. Total undisturbed cover: 0 square feet

H. Number of lots proposed: 0

I. Total length of roadway: 0 linear feet

J. Name(s) of receiving water(s): 0

K. Identify all other NHDES permits required for the project, and for each indicate whether an application has been filed and is pending, or if the required approval has been issued provide the permit number, registration date, or approval letter number, as applicable.

Type of Approval	Application Filed?	Status	
		Pending	If Issued:
1. Water Supply Approval	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/>	Permit number:
2. Wetlands Permit	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input checked="" type="checkbox"/>	Permit number:
3. Shoreland Permit	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input checked="" type="checkbox"/>	Permit number:
4. UIC Registration	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/>	Registration date:
5. Large/Small Community Well Approval	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/>	Approval letter date:
6. Large Groundwater Withdrawal Permit	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/>	Permit number:
7. Other:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/>	Permit number:

L. List all species identified by the Natural Heritage Bureau as threatened or endangered or of concern: See application narrative, Section 2.3.

M. Using NHDES’s Web GIS OneStop program (www2.des.state.nh.us/gis/onestop/), with the Surface Water Impairment layer turned on, list the impairments identified for each receiving water. If no pollutants are listed, enter “N/A.”
N/A

N. Did the applicant/applicant’s agent have a pre-application meeting with AOT staff? Yes No
 If yes, name of staff member: Ridge Mauck

O. Will blasting of bedrock be required? Yes No If yes, estimated quantity of blast rock: cubic yards
 If yes, standard blasting BMP notes must be placed on the plans, available at:
<http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-10-12.pdf>
NOTE: If greater than 5,000 cubic yards of blast rock will be generated, a groundwater monitoring program must be developed and submitted to NHDES. Contact AOT staff for additional detail.

¹ Env-Wq 1503.05(c)(6), requires proof that a completed application form, checklist, plans and specifications, and all other supporting materials have been sent or delivered to the governing body of each municipality in which the project is proposed.

² Env-Wq 1503.05(c)(6), requires proof that a completed application form, checklist, plans and specifications, and all other supporting materials have been sent or delivered to the Local River Advisory Committee, if the project is within ¼ mile of a designated river.

11. CHECK ALL APPLICATION ATTACHMENTS THAT APPLY (SUBMIT WITH APPLICATION IN ORDER LISTED)**LOOSE:**

- Signed application form: des.nh.gov/organization/divisions/water/aot/index.htm (with attached proof(s) of delivery)
- Check for the application fee: des.nh.gov/organization/divisions/water/aot/fees.htm
- Color copy of a USGS map with the property boundaries outlined (1" = 2,000' scale)
- If Applicant is not the property owner, proof that the applicant will have a legal right to undertake the project on the property if a permit is issued to the applicant.

BIND IN A REPORT IN THE FOLLOWING ORDER:

- Copy of the signed application form & application checklist (des.nh.gov/organization/divisions/water/aot/index.htm)
- Copy of the check
- Copy of the USGS map with the property boundaries outlined (1" = 2,000' scale)
- Narrative of the project with a summary table of the peak discharge rate for the off-site discharge points
- Web GIS printout with the "Surface Water Impairments" layer turned on - <http://www4.des.state.nh.us/onestopdatamapper/onestopmapper.aspx>
- Web GIS printouts with the AOT screening layers turned on - <http://www4.des.state.nh.us/onestopdatamapper/onestopmapper.aspx>
- NHB letter using DataCheck Tool – www.nhdf.org/about-forests-and-lands/bureaus/natural-heritage-bureau/
- The Web Soil Survey Map with project's watershed outlined – websoilsurvey.nrcs.usda.gov
- Aerial photograph (1" = 2,000' scale with the site boundaries outlined)
- Photographs representative of the site
- Groundwater Recharge Volume calculations (one worksheet for each permit application): des.nh.gov/organization/divisions/water/aot/documents/bmp_worksh.xls
- BMP worksheets (one worksheet for each treatment system): des.nh.gov/organization/divisions/water/aot/documents/bmp_worksh.xls
- Drainage analysis, stamped by a professional engineer (see Application Checklist for details)
- Riprap apron or other energy dissipation or stability calculations
- Site Specific Soil Survey report, stamped and with a certification note prepared by the soil scientist that the survey was done in accordance with the Site Specific Soil Mapping standards, *Site-Specific Soil Mapping Standards for NH & VT, SSSNNE Special Publication No. 3*.
- Infiltration Feasibility Report (example online) [Env-Wq 1503.08(f)(3)]
- Registration and Notification Form for Storm Water Infiltration to Groundwater (UIC Registration-for underground systems only, including drywells and trenches): http://des.nh.gov/organization/divisions/water/dwgb/dwspp/gw_discharge
- Inspection and maintenance manual with, if applicable, long term maintenance agreements [Env-Wq 1503.08(g)]
- Source control plan

PLANS:

- One set of design plans on 34 - 36" by 22 - 24" white paper (see Application Checklist for details)
- Pre & post-development color coded soil plans on 11" x 17" (see Application Checklist for details)
- Pre & post-development drainage area plans on 34 - 36" by 22 - 24" white paper (see Application Checklist for details)

100-YEAR FLOODPLAIN REPORT:

- All information required in Env-Wq 1503.09, submitted as a separate report.

ADDITIONAL INFORMATION RE: NUTRIENTS, CLIMATE

- See Checklist for Details

- REVIEW APPLICATION FOR COMPLETENESS & CONFIRM INFORMATION LISTED ON THE APPLICATION IS INCLUDED WITH SUBMITTAL.**

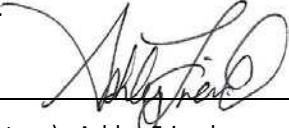
12. REQUIRED SIGNATURES

AF By initialing here, I acknowledge that I am required by Env-Wq 1503.20(e) to submit a copy of all approved documents to the department in PDF format on a CD within one week after permit approval.

By signing below, I certify that:

- The information contained in or otherwise submitted with this application is true, complete, and not misleading to the best of my knowledge and belief;
- I understand that the submission of false, incomplete, or misleading information constitutes grounds for the department to deny the application, revoke any permit that is granted based on the information, and/or refer the matter to the board of professional engineers established by RSA 310-A:3 if I am a professional engineer; and
- I understand that I am subject to the penalties specified in New Hampshire law for falsification in official matters, currently RSA 641.

APPLICANT



APPLICANT'S AGENT:

Signature: _____

Date: 1/27/2023

Name (print or type): Ashley Friend

Title: Specialist - Licensing & Permitting

PROPERTY OWNER

PROPERTY OWNER'S AGENT:

Signature: _____

Date: _____

Name (print or type): _____

Title: _____

ATTACHMENT A: ALTERATION OF TERRAIN PERMIT APPLICATION CHECKLIST

Check the box to indicate the item has been provided or provide an explanation why the item does not apply.

DESIGN PLANS

- Plans printed on 34 - 36" by 22 - 24" white paper
- PE stamp
- Wetland delineation
- Temporary erosion control measures
- Treatment for all stormwater runoff from impervious surfaces such as roadways (including gravel roadways), parking areas, and non-residential roof runoff. Guidance on treatment BMPs can be found in Volume 2, Chapter 4 of the NH Stormwater Management Manual.
- Pre-existing 2-foot contours
- Proposed 2-foot contours
- Drainage easements protecting the drainage/treatment structures
- Compliance with the Wetlands Bureau, RSA 482- A <http://des.nh.gov/organization/divisions/water/wetlands/index.htm>. Note that artificial detention in wetlands is not allowed.
- Compliance with the Comprehensive Shoreland Protection Act, RSA 483-B. <http://des.nh.gov/organization/divisions/water/wetlands/cspa>
- Benches. Benching is needed if you have more than 20 feet change in elevation on a 2:1 slope, 30 feet change in elevation on a 3:1 slope, 40 feet change in elevation on a 4:1 slope.
- Check to see if any proposed ponds need state Dam permits.
<http://des.nh.gov/organization/divisions/water/dam/documents/damdef.pdf>

DETAILS

- Typical roadway x-section
- Detention basin with inverts noted on the outlet structure
- Stone berm level spreader
- Outlet protection – riprap aprons
- A general installation detail for an erosion control blanket
- Silt fences or mulch berm
- Storm drain inlet protection. Note that since hay bales must be embedded 4 inches into the ground, they are not to be used on hard surfaces such as pavement.
- Hay bale barriers
- Stone check dams
- Gravel construction exit
- Temporary sediment trap
- The treatment BMP's proposed
- Any innovative BMP's proposed

CONSTRUCTION SEQUENCE/EROSION CONTROL

- Note that the project is to be managed in a manner that meets the requirements and intent of RSA 430:53 and Chapter Agr 3800 relative to invasive species.
- Note that perimeter controls shall be installed prior to earth moving operations.
- Note that temporary water diversion (swales, basins, etc) must be used as necessary until areas are stabilized.
- Note that ponds and swales shall be installed early on in the construction sequence (before rough grading the site).
- Note that all ditches and swales shall be stabilized prior to directing runoff to them.
- Note that all roadways and parking lots shall be stabilized within 72 hours of achieving finished grade.
- Note that all cut and fill slopes shall be seeded/loamed within 72 hours of achieving finished grade
- Note that all erosion controls shall be inspected weekly AND after every half-inch of rainfall.
- Note the limits on the open area allowed, see Env-Wq 1505.02 for detailed information.

Example note: The smallest practical area shall be disturbed during construction, but in no case shall exceed 5 acres at any one time before disturbed areas are stabilized.

- Note the definition of the word “stable”

Example note: An area shall be considered stable if one of the following has occurred:

- Base course gravels have been installed in areas to be paved.
- A minimum of 85 percent vegetated growth has been established.
- A minimum of 3 inches of non-erosive material such stone or riprap has been installed.
- Or, erosion control blankets have been properly installed.

- Note the limit of time an area may be exposed
Example note: All areas shall be stabilized within 45 days of initial disturbance.

- Provide temporary and permanent seeding specifications. (Reed canary grass is listed in the Green Book; however, this is a problematic species according to the Wetlands Bureau and therefore should not be specified)

- Provide winter construction notes that meet or exceed our standards.

Standard Winter Notes:

- All proposed vegetated areas that do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting, elsewhere. The installation of erosion control blankets or mulch and netting shall not occur over accumulated snow or on frozen ground and shall be completed in advance of thaw or spring melt events.
 - All ditches or swales which do not exhibit a minimum of 85 percent vegetative growth by October 15, or which are disturbed after October 15, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions.
 - After October 15, incomplete road or parking surfaces, where work has stopped for the winter season, shall be protected with a minimum of 3 inches of crushed gravel per NHDOT item 304.3.
- Note at the end of the construction sequence that “Lot disturbance, other than that shown on the approved plans, shall not commence until after the roadway has the base course to design elevation and the associated drainage is complete and stable.” – This note is applicable to single/duplex family subdivisions, when lot development is not part of the permit.

DRAINAGE ANALYSES

Please double-side 8 1/2" x 11" sheets where possible but, **do not** reduce the text such that more than one page fits on one side.

- PE stamp
- Rainfall amount obtained from the Northeast Regional Climate Center- <http://precip.eas.cornell.edu/>. Include extreme precipitation table as obtained from the above referenced website.
- Drainage analyses, in the following order:
 - Pre-development analysis: Drainage diagram.
 - Pre-development analysis: Area Listing and Soil Listing.
 - Pre-development analysis: Node listing 1-year (if applicable), 2-year, 10-year and 50-year.
 - Pre-development analysis: Full summary of the 10-year storm.
 - Post-development analysis: Drainage diagram.
 - Post-development analysis: Area Listing and Soil Listing.
 - Post-development analysis: Node listing for the 2-year, 10-year and 50-year.
 - Post-development analysis: Full summary of the 10-year storm.
- Review the Area Listing and Soil Listing reports
 - Hydrologic soil groups (HSG) match the HSGs on the soil maps provided.
 - There is the same or less HSG A soil area after development (check for each HSG).
 - There is the same or less "woods" cover in the post-development.
 - Undeveloped land was assumed to be in "good" condition.
 - The amount of impervious cover in the analyses is correct.

Note: A good check is to subtract the total impervious area used in the pre analysis from the total impervious area used in the post-analysis. For residential projects without demolition occurring, a good check is to take this change in impervious area, subtract out the roadway and divide the remaining by the number of houses/units proposed. Do these numbers make sense?

- Check the storage input used to model the ponds.
- Check to see if the artificial berms pass the 50-year storm, i.e., make sure the constructed berms on ponds are not overtopped.
- Check the outlet structure proposed and make sure it matches that modeled.
- Check to see if the total areas in the pre and post analyses are same.
- Confirm the correct NRCS storm type was modeled (Coos, Carroll & Grafton counties are Type II, all others Type III).

PRE- AND POST-DEVELOPMENT DRAINAGE AREA PLANS

- Plans printed on 34 - 36" by 22 - 24" on white paper.
- Submit these plans separate from the soil plans.
- A north arrow.
- A scale.
- Labeled subcatchments, reaches and ponds.
- Tc lines.
- A clear delineation of the subcatchment boundaries.
- Roadway station numbers.
- Culverts and other conveyance structures.

PRE AND POST-DEVELOPMENT COLOR-CODED SOIL PLANS

- 11" × 17" sheets suitable, as long as it is readable.
- Submit these plans separate from the drainage area plans.
- A north arrow.
- A scale.
- Name of the soil scientist who performed the survey and date the soil survey took place.
- 2-foot contours (5-foot contours if application is for a gravel pit) as well as other surveyed features.
- Delineation of the soil boundaries and wetland boundaries.
- Delineation of the subcatchment boundaries.
- Soil series symbols (e.g., 26).
- A key or legend which identifies each soil series symbol and its associated soil series name (e.g., 26 = Windsor).
- The hydrologic soil group color coding (A = Green, B = yellow, C= orange, D=red, Water=blue, & Impervious = gray).

Please note that excavation projects (e.g., gravel pits) have similar requirements to that above, however the following are common exceptions/additions:

- Drainage report is not needed if site does not have off-site flow.
- 5 foot contours allowed rather than 2 foot.
- No PE stamp needed on the plans.
- Add a note to the plans that the applicant must submit to the Department of Environmental Services a written update of the project and revised plans documenting the project status every five years from the date of the Alteration of Terrain permit.
- Add reclamation notes.

See NRCS publication titled: *Vegetating New Hampshire Sand and Gravel Pits* for a good resource, it is posted online at: <http://des.nh.gov/organization/divisions/water/aot/categories/publications>.

ADDITIONAL INFORMATION RE: NUTRIENTS, CLIMATE

- If project will discharge stormwater to a surface water impaired for phosphorus and/or nitrogen, include information to demonstrate that project will not cause net increase in phosphorus and/or nitrogen.
- If project will discharge stormwater to a Class A surface water or Outstanding Resource Water, include information to demonstrate that project will not cause net increase in phosphorus and/or nitrogen.
- If project will discharge stormwater to a lake or pond not covered previously, include information to demonstrate that project will not cause net increase in phosphorus in the lake or pond.
- If project is within a Coastal/Great Bay Region community, include info required by Env-Wq 1503.08(I) if applicable.

NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

January 27, 2023

Appendix B ABUTTERS LIST



Appendix B: Abutters List

C189, M108, H137, G146 Structure Replacement Project

Concord, Pembroke, Bow, New Hampshire

LL NUMBER	MBLU	OWNER NAME (First)	OWNER NAME (Last)
Concord			
100	12Z-71	Public Service Company of New Hampshire	
101	11Z-8	Klee	Dienes
102	11Z-6	Donald R.	Hunter
103	11Z-5	Charles	Dore
104	21Z-11	Viocal, LLC	
105	22Z-4	Viocal, LLC	
106	22Z-3	Lawrence Family Revocable Trust of 2016	
107	22Z-2	Viocal, LLC	
108	224Z-58	Elizabeth	Terrell
109	22Z-19	City of Concord	
110	28Z-35	Elizabeth	Terrell
111	28Z-92	Dean Wilbur Trust & Margaret Wilbur Trust	
112	28Z-91	Kurt, Justin & Susan	Gualteri
113	28Z-90	Ryan R.	Towle
114	28Z-89	Jeffrey W.	Holt
115	28Z-97	Kevin	Perron
116	28Z-98	City of Concord	
117	28Z-110	21 & 23 Jennifer Drive Condominium	
118	28Z-111	25 & 27 Jennifer Drive Condominium	
119	27Z-2	29 & 31 Jennifer Drive Condominium	
120	27Z-3	Sarah A.	Chevraflis
121	42Z-5	Harold	Turner, Jr.
122	42Z-2	Jennifer B.	Dusavitch
123	42Z-9	Clarence Nelson Trust of 2019	
124	42Z-10	SLP Investments, LTD	
125	42Z-21	John G	Reardon
126	42Z-22	Reed & Virginia Stevens Revocable Trust	
127	42Z-28	Reed & Virginia Stevens Revocable Trust	
128	473Z-16	Unitil Energy Systems, Inc.	
129	46Z-9	Unitil Energy Systems, Inc.	
130	46Z-11	City of Concord	
131	611Z-32	Johnson Estates, Inc.	
132	611Z-25	Hodges Properties, Inc.	
133	611Z-29	Unitil Energy Systeems, Inc.	
134	611Z-31	Mary Joanne	Andrew
135	611Z-35	Capri Real Estate Holdings, LLC	
136	611Z-43	Centerco Concord, LLC	
137	611Z-42	NSM Investments, LP	
138	614Z-66	Center at Triangle Park, Inc.	
139	614Z-65	RM Holdings, LLC	
140	614Z-3	McKenna's Purchase (148 Units - See individual owners)	
141	621Z-18	Hodges Development Corporation	
142	614Z-60	City of Concord	
143	621Z-16	Hodges Development Corporation	
144	621Z-14	Robert Jr. & Helen Prescott Irrevocable Trust	
145	614Z-59	Jon-Paul	Lamoureux
146	621Z-14	Robert Jr. & Helen Prescott Irrevocable Trust	
147	621Z-14	Robert Jr. & Helen Prescott Irrevocable Trust	
148	621Z-15	Public Service Company of New Hampshire	
149	621Z-27	Praxair Surface Technologies, Inc.	
150	621Z-31	Gerald P. McCarthy Revocable Trust	
151	621Z-32	New Hampshire Distributors, LLC	
152	621Z-25	Gerald P. McCarthy Revocable Trust	
153	624Z-1	Energynorth Propane, Inc.	
154	624Z-2	Energynorth Propane, Inc.	
155	622Z-19	Sabbow & Company, Inc.	
156	624Z-3	Sabbow & Company, Inc.	
157	623Z-6	Linda D. McLaren Trust 2007	
158	623Z-5	Schwan's Sales Enterprises, Inc.	
159	623Z-4	Irving Oil Corporation	
160	624Z-14	Karner Group Buisness Condo	
161	624Z-13	48-52 Chenell Drive Revocable Trust	
162	624Z-15	Karner Group Buisness Condo	
163	624Z-16	Kridar, LLC	
164	76Z-6	New Hampshire Motor Transport Association	
165	76Z-7	3G Eagle, LLC	
166	76Z-5	Public Service Company of New Hampshire	
167	76Z-8	Cloas Realty Management, LLC	

168	76Z-3	Richard A.	Hill
169	633Z-3	City of Concord	
Pembroke			
170	632-0018-012-000	Pembroke Water Works	
171	632-0018-014-000	State of New Hampshire	
172	632-0018-000-000	State of New Hampshire	
173	632-0011-000-000	Gerald Foster Trust 7/18/02	
174	632-0008-000-000	Red Rock Investments, LLC	
175	632-0004-000-000	Eight17, LLC	
176	632-0003-000-000	Pembroke Water Works	
177	632-0002-000-000	Public Service Company of New Hampshire	
178	632-0001-000-000	Public Service Company of New Hampshire	
179	634-0047-000-000	MNP Realty, LLC	
Concord			
180	89Z-12	Public Service Company of New Hampshire	
181	77Z-11	Liberty Utilities	
182	89Z-13	Public Service Company of New Hampshire	
183	89Z-11	Kimberly S.	McDonald
184	89Z-10	Public Service Company of New Hampshire	
185	89Z-14	Public Service Company of New Hampshire	
Bow			
186	21-5-3-A	HSE Hydro NH Garvins Falls, LLC	
187	21-5-3	Public Service Company of New Hampshire	
188	21-5-5-A	559+561 RT 3-A Real Estate LLC	
189	26-5-5-B	559+561 Rte 3A Real Estate, LLC	
190	26-5-5	Bow Reman, LLC	
191	26-5-7	Lindquist Family Revocable Trust	
192	26-5-7-H	NH Home Builders, LLC	
193	26-5-7-I	Scarello Revocable Trust	
194	26-5-9-N	Timothy	Glynn
195	26-5-9-P	Madeline I. Bartemus Trust	
196	26-5-9-Q	Brent	Palmer
197	26-5-9-R	Scott D.	Hoadley
198	26-5-9-U	Town of Bow	
199	31-5-12	John E.	Meissner
200	31-5-13	Eric E. & Cherylyn Anderson Joint Revocable Trust	
201	31-5-15	Verna H. Morrill Estate	
202	31-5-16-C	No parcel information per Assessor's office	
203	31-5-16-D	No parcel information per Assessor's office	
204	31-5-16-E	No parcel information per Assessor's office	
205	31-5-17-A	Town of Bow	
206	36-5-20-A	Scott D.	Heminger
207	16-1-81	B&M Corporation	
208	36-5-19	Keller Products	
209	36-5-18-B	Keller Products	
210	36-5-20	Estate of Edwin R. Hutchins	
211	41-2-200	GSP Merrimack, LLC	

NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

January 27, 2023

Appendix C NHB AND NHFG CORRESPONDENCE



Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

Please note: portions of this document are confidential.

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To: Elizabeth Annand, Stantec Consulting Services Inc.
136 West Street, Suite 203
Northampton, MA 01060

From: NHB Review, NH Natural Heritage Bureau

Date: 12/6/2022 (valid until 12/06/2023)

Re: Review by NH Natural Heritage Bureau

Permits: MUNICIPAL POR - Pembroke, NHDES - Alteration of Terrain Permit, NHDES - Utility Statutory Permit by Notification (SPN), USACE - General Permit, USEPA - Stormwater Pollution Prevention

NHB ID: NHB22-3395

Town: Pembroke

Location: ROW

Description: Eversource is proposing to replace 160 wooden structures within the existing P145 transmission line corridor in Concord, Pembroke, and Bow, NH. The wooden poles are deteriorating due to age, cracking, rot, and woodpecker damage and will be replaced with similar steel structures. Existing roads and trails will be utilized to the greatest extent possible, but some new gravel roads and work pads will be created in uplands. Temporary wetland matting will be used to cross wetlands and access wetland structures. Potential vernal pools were identified during November 2021 and will be avoided. Construction is planned for Summer 2023 through Summer 2024.

cc: NHFG Review

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments **NHB: Please provide existing and proposed conditions plans. Please provide representative photos during the growing season. Contact NHB regarding specific survey locations, and species.**

F&G: Please refer to NHFG consultation requirements below. Please coordinate with Kat Wadiak.

Invertebrate Species	State ¹	Federal	Notes
Barrens Itame (<i>Macaria exonerata</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Barrens Xylotype (<i>Xylotype capax</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Karner Blue Butterfly (<i>Lycaeides melissa samuelis</i>)	E	E	Contact the NH Fish & Game Dept and the US Fish & Wildlife Service (see below).
Phyllira Tiger Moth (<i>Apantesis phyllira</i>)	SC	--	Contact the NH Fish & Game Dept (see below).

Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

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Pine Barrens Zanclognatha Moth (<i>Zanclognatha martha</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Rapids Clubtail (<i>Phanogomphus quadricolor</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Sleepy Duskywing (<i>Erynnis brizo brizo</i>)	SC	--	Contact the NH Fish & Game Dept (see below).

Natural Community

	State ¹	Federal	Notes
Pitch pine - scrub oak woodland	--	--	The primary threat to this natural community is development and fire suppression.

Plant species

	State ¹	Federal	Notes
butterfly milkweed (<i>Asclepias tuberosa</i> ssp. <i>tuberosa</i>)	E	--	
clasping milkweed (<i>Asclepias amplexicaulis</i>)	T	--	This species grows in sandplains and disturbed openings, and is sensitive to disturbances that eliminate its habitat.
dry land sedge (<i>Carex siccata</i>)	E	--	
golden heather (<i>Hudsonia ericoides</i>)*	E	--	Probably sensitive to trampling. Shade-intolerant.
hollow Joe-Pye weed (<i>Eutrochium fistulosum</i>)	E	--	Threats include changes to the hydrology (e.g., water levels) of its habitat and increased sedimentation or nutrients and pollutants in stormwater runoff.
Houghton's umbrella sedge (<i>Cyperus houghtonii</i>)*	E	--	Threats include destruction of natural habitat, fire suppression and/or succession, trampling by hikers, and off-road vehicles. However, since the plants require open habitat, some disturbances (e.g., logging, mowing, and even off-road vehicle use) could actually benefit populations. Site-specific evaluation of conditions will aid in the conservation of this species.
incurved umbrella sedge (<i>Cyperus squarrosus</i>)	T	--	Changes to local hydrology, or recreational activities along the shoreline, could threaten this species, which occurs on river or streambanks..
licorice goldenrod (<i>Solidago odora</i> ssp. <i>odora</i>)	T	--	
red threeawn (<i>Aristida longespica</i> var. <i>geniculata</i>)	T	--	The pond or lake shore natural communities where this species occurs are extremely vulnerable to trampling, and tend to disappear from areas that experience even moderate recreational use. They are also vulnerable to changes to the lake's hydrology. Additional habitats include sandplains and disturbed openings.
red-root umbrella sedge (<i>Cyperus erythrorhizos</i>)	E	--	
upright false bindweed (<i>Calystegia spithamea</i> ssp. <i>spithamea</i>)	E	--	

Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

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wild lupine (*Lupinus perennis* ssp. *perennis*) T --

Vertebrate species	State ¹	Federal	Notes
Blanding's Turtle (<i>Emydoidea blandingii</i>)	E	--	Contact the NH Fish & Game Dept (see below).
Common Nighthawk (<i>Chordeiles minor</i>)	E	--	Contact the NH Fish & Game Dept (see below).
Eastern Hognose Snake (<i>Heterodon platirhinos</i>)	E	--	Contact the NH Fish & Game Dept (see below).
Fowler's Toad (<i>Anaxyrus fowleri</i>)	T	--	Contact the NH Fish & Game Dept (see below).
Northern Black Racer (<i>Coluber constrictor constrictor</i>)	T	--	Contact the NH Fish & Game Dept (see below).
Northern Leopard Frog (<i>Lithobates pipiens</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Smooth Green Snake (<i>Opheodrys vernalis</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Wood Turtle (<i>Glyptemys insculpta</i>)	SC	--	Contact the NH Fish & Game Dept (see below).

¹Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

For all animal reviews, refer to 'IMPORTANT: NHFG Consultation' section below.

Disclaimer: A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

IMPORTANT: NHFG Consultation

If this NHB Datacheck letter DOES NOT include ANY wildlife species records, then, based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

If this NHB Datacheck letter includes a record for a threatened (T) or endangered (E) wildlife species, consultation with the New Hampshire Fish and Game Department under Fis 1004 may be required. To review the Fis 1000 rules (effective February 3, 2022), please go to <https://wildlife.state.nh.us/wildlife/environmental-review.html>. All requests for consultation and submittals should be sent via email to NHFGreview@wildlife.nh.gov or can be sent by mail, and **must include the NHB Datacheck results letter number and "Fis 1004 consultation request" in the subject line.**

If the NHB DataCheck response letter does not include a threatened or endangered wildlife species but includes other wildlife species (e.g., Species of Special

Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

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Concern), consultation under Fis 1004 is not required; however, some species are protected under other state laws or rules, so coordination with NH Fish & Game is highly recommended or may be required for certain permits. While some permitting processes are exempt from required consultation under Fis 1004 (e.g., *statutory permit by notification, permit by rule, permit by notification, routine roadway registration, docking structure registration, or conditional authorization by rule*), coordination with NH Fish & Game may still be required under the rules governing those specific permitting processes, and it is recommended you contact the applicable permitting agency. For projects not requiring consultation under Fis 1004, but where additional coordination with NH Fish and Game is requested, please email: Kim Tuttle kim.tuttle@wildlife.nh.gov with a copy to NHFGreview@wildlife.nh.gov, and include the NHB Datacheck results letter number and “review request” in the email subject line.

Contact NH Fish & Game at (603) 271-0467 with questions.

CONFIDENTIAL DNCR

CONFIDENTIAL DNCR

CONFIDENTIAL DNCR

Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

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To: Elizabeth Annand, Stantec Consulting Services Inc.
136 West Street, Suite 203
Northampton, MA 01060

From: NHB Review, NH Natural Heritage Bureau

Date: 12/6/2022 (valid until 12/06/2023)

Re: Review by NH Natural Heritage Bureau

Permits: MUNICIPAL POR - Concord, NHDES - Alteration of Terrain Permit, NHDES - Utility Statutory Permit by Notification (SPN), USACE - General Permit, USEPA - Stormwater Pollution Prevention

NHB ID: NHB22-3396 Town: Concord

Location: ROW

Description: Eversource is proposing to replace 160 wooden structures within the existing P145 transmission line corridor in Concord, Pembroke, and Bow, NH. The wooden poles are deteriorating due to age, cracking, rot, and woodpecker damage and will be replaced with similar steel structures. Existing roads and trails will be utilized to the greatest extent possible, but some new gravel roads and work pads will be created in uplands. Temporary wetland matting will be used to cross wetlands and access wetland structures. Potential vernal pools were identified during November 2021 and will be avoided. Construction is planned for Summer 2023 through Summer 2024.

cc: NHFG Review

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments **NHB: Please provide existing and proposed conditions plans. Please provide representative photos during the growing season. Please coordinate with NHB regarding survey locations, and species.**

F&G: Please refer to NHFG consultation requirements below. Please coordinate with Kat Wadiak.

Invertebrate Species	State ¹	Federal	Notes
Barrens Itame (<i>Macaria exonerata</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Barrens Xylotype (<i>Xylotype capax</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Karner Blue Butterfly (<i>Lycaeides melissa samuelis</i>)	E	E	Contact the NH Fish & Game Dept and the US Fish & Wildlife Service (see below).
Phyllira Tiger Moth (<i>Apantesis phyllira</i>)	SC	--	Contact the NH Fish & Game Dept (see below).

Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

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Pine Barrens Zanclognatha Moth (<i>Zanclognatha martha</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Rapids Clubtail (<i>Phanogomphus quadricolor</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Sleepy Duskywing (<i>Erynnis brizo brizo</i>)	SC	--	Contact the NH Fish & Game Dept (see below).

Natural Community

	State ¹	Federal	Notes
Pitch pine - scrub oak woodland	--	--	The primary threat to this natural community is development and fire suppression.

Plant species

	State ¹	Federal	Notes
butterfly milkweed (<i>Asclepias tuberosa</i> ssp. <i>tuberosa</i>)	E	--	
clasping milkweed (<i>Asclepias amplexicaulis</i>)	T	--	This species grows in sandplains and disturbed openings, and is sensitive to disturbances that eliminate its habitat.
dry land sedge (<i>Carex siccata</i>)	E	--	
hollow Joe-Pye weed (<i>Eutrochium fistulosum</i>)	E	--	Threats include changes to the hydrology (e.g., water levels) of its habitat and increased sedimentation or nutrients and pollutants in stormwater runoff.
Houghton's umbrella sedge (<i>Cyperus houghtonii</i>)*	E	--	Threats include destruction of natural habitat, fire suppression and/or succession, trampling by hikers, and off-road vehicles. However, since the plants require open habitat, some disturbances (e.g., logging, mowing, and even off-road vehicle use) could actually benefit populations. Site-specific evaluation of conditions will aid in the conservation of this species.
incurved umbrella sedge (<i>Cyperus squarrosus</i>)	T	--	Changes to local hydrology, or recreational activities along the shoreline, could threaten this species, which occurs on river or streambanks..
licorice goldenrod (<i>Solidago odora</i> ssp. <i>odora</i>)	T	--	
red threeawn (<i>Aristida longespica</i> var. <i>geniculata</i>)	T	--	The pond or lake shore natural communities where this species occurs are extremely vulnerable to trampling, and tend to disappear from areas that experience even moderate recreational use. They are also vulnerable to changes to the lake's hydrology. Additional habitats include sandplains and disturbed openings.
red-root umbrella sedge (<i>Cyperus erythrorhizos</i>)	E	--	
upright false bindweed (<i>Calystegia spithamea</i> ssp. <i>spithamea</i>)	E	--	
wild lupine (<i>Lupinus perennis</i> ssp. <i>perennis</i>)	T	--	

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Vertebrate species	State ¹	Federal	Notes
Blanding's Turtle (<i>Emydoidea blandingii</i>)	E	--	Contact the NH Fish & Game Dept (see below).
Common Nighthawk (<i>Chordeiles minor</i>)	E	--	Contact the NH Fish & Game Dept (see below).
Eastern Hognose Snake (<i>Heterodon platirhinos</i>)	E	--	Contact the NH Fish & Game Dept (see below).
Fowler's Toad (<i>Anaxyrus fowleri</i>)	T	--	Contact the NH Fish & Game Dept (see below).
Northern Black Racer (<i>Coluber constrictor constrictor</i>)	T	--	Contact the NH Fish & Game Dept (see below).
Northern Leopard Frog (<i>Lithobates pipiens</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Smooth Green Snake (<i>Opheodrys vernalis</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Spotted Turtle (<i>Clemmys guttata</i>)	T	--	Contact the NH Fish & Game Dept (see below).
Wood Turtle (<i>Glyptemys insculpta</i>)	SC	--	Contact the NH Fish & Game Dept (see below).

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If the NHB DataCheck response letter does not include a threatened or endangered wildlife species but includes other wildlife species (e.g., Species of Special

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CONFIDENTIAL DNCR

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Memo

NH Natural Heritage Bureau
NHB DataCheck Results Letter

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Northampton, MA 01060

From: NHB Review, NH Natural Heritage Bureau

Date: 12/6/2022 (valid until 12/06/2023)

Re: Review by NH Natural Heritage Bureau

Permits: MUNICIPAL POR - Bow, NHDES - Alteration of Terrain Permit, NHDES - Utility Statutory Permit by Notification (SPN), USACE - General Permit, USEPA - Stormwater Pollution Prevention

NHB ID: NHB22-3399

Town: Bow

Location: ROW

Description: Eversource is proposing to replace 160 wooden structures within the existing P145 transmission line corridor in Concord, Pembroke, and Bow, NH. The wooden poles are deteriorating due to age, cracking, rot, and woodpecker damage and will be replaced with similar steel structures. Existing roads and trails will be utilized to the greatest extent possible, but some new gravel roads and work pads will be created in uplands. Temporary wetland matting will be used to cross wetlands and access wetland structures. Potential vernal pools were identified during November 2021 and will be avoided. Construction is planned for Summer 2023 through Summer 2024.

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F&G: Please refer to NHFG consultation requirements below. Please coordinate with Kat Wadiak.

Invertebrate Species	State ¹	Federal	Notes
Rapids Clubtail (<i>Phanogomphus quadricolor</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Plant species	State ¹	Federal	Notes
dry land sedge (<i>Carex siccata</i>)	E	--	

Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

Please note: portions of this document are confidential.

Maps and NHB record pages are confidential and should be redacted from public documents.

golden heather (<i>Hudsonia ericoides</i>)*	E	--	Probably sensitive to trampling. Shade-intolerant.
Houghton's umbrella sedge (<i>Cyperus houghtonii</i>)*	E	--	Threats include destruction of natural habitat, fire suppression and/or succession, trampling by hikers, and off-road vehicles. However, since the plants require open habitat, some disturbances (e.g., logging, mowing, and even off-road vehicle use) could actually benefit populations. Site-specific evaluation of conditions will aid in the conservation of this species.
incurved umbrella sedge (<i>Cyperus squarrosus</i>)	T	--	Changes to local hydrology, or recreational activities along the shoreline, could threaten this species, which occurs on river or streambanks..

Vertebrate species	State ¹	Federal	Notes
Blanding's Turtle (<i>Emydoidea blandingii</i>)	E	--	Contact the NH Fish & Game Dept (see below).
Eastern Hognose Snake (<i>Heterodon platirhinos</i>)	E	--	Contact the NH Fish & Game Dept (see below).
Fowler's Toad (<i>Anaxyrus fowleri</i>)	T	--	Contact the NH Fish & Game Dept (see below).
Northern Black Racer (<i>Coluber constrictor constrictor</i>)	T	--	Contact the NH Fish & Game Dept (see below).
Northern Leopard Frog (<i>Lithobates pipiens</i>)	SC	--	Contact the NH Fish & Game Dept (see below).
Peregrine Falcon (<i>Falco peregrinus anatum</i>)	T	--	Contact the NH Fish & Game Dept (see below).
Wood Turtle (<i>Glyptemys insculpta</i>)	SC	--	Contact the NH Fish & Game Dept (see below).

¹Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

For all animal reviews, refer to 'IMPORTANT: NHFG Consultation' section below.

Disclaimer: A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

IMPORTANT: NHFG Consultation

If this NHB Datacheck letter DOES NOT include ANY wildlife species records, then, based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

If this NHB Datacheck letter includes a record for a threatened (T) or endangered (E) wildlife species, consultation with the New Hampshire Fish and Game

Memo

NH Natural Heritage Bureau NHB DataCheck Results Letter

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Department under Fis 1004 may be required. To review the Fis 1000 rules (effective February 3, 2022), please go to <https://wildlife.state.nh.us/wildlife/environmental-review.html>. All requests for consultation and submittals should be sent via email to NHFGreview@wildlife.nh.gov or can be sent by mail, and **must include the NHB Datacheck results letter number and “Fis 1004 consultation request” in the subject line.**

If the NHB DataCheck response letter does not include a threatened or endangered wildlife species but includes other wildlife species (e.g., Species of Special Concern), consultation under Fis 1004 is not required; however, some species are protected under other state laws or rules, so coordination with NH Fish & Game is highly recommended or may be required for certain permits. While some permitting processes are exempt from required consultation under Fis 1004 (e.g., *statutory permit by notification*, *permit by rule*, *permit by notification*, *routine roadway registration*, *docking structure registration*, or *conditional authorization by rule*), coordination with NH Fish & Game may still be required under the rules governing those specific permitting processes, and it is recommended you contact the applicable permitting agency. For projects not requiring consultation under Fis 1004, but where additional coordination with NH Fish and Game is requested, please email: Kim Tuttle kim.tuttle@wildlife.nh.gov with a copy to NHFGreview@wildlife.nh.gov, and include the NHB Datacheck results letter number and “review request” in the email subject line.

Contact NH Fish & Game at (603) 271-0467 with questions.

CONFIDENTIAL DNCR



**P145 Line Structure Replacement
Project Threatened and
Endangered Plant Survey Report**

Bow, Concord, and Pembroke, New
Hampshire

NHB21-3593, NHB21-3594, NHB21-
3595

October 4, 2022

Prepared for:

Public Service Company of New
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P145 LINE STRUCTURE REPLACEMENT PROJECT THREATENED AND ENDANGERED PLANT SURVEY REPORT

October 4, 2022

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1.0 INTRODUCTION

Public Service Company of New Hampshire d/b/a Eversource Energy (Eversource) owns and maintains the P145 electrical transmission line (P145 line; Project) in Concord, Pembroke, and Bow, New Hampshire (see attached Rare Plant Map Set). The P145 line was constructed in the 1960s and runs within an existing right-of-way (ROW) between the Farmwood Substation off Farmwood Road in Concord and the Merrimack Substation off River Road in Bow. Eversource has identified that all wooden structures will need to be replaced within the 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. Once the structures are replaced, Eversource also plans on replacing the overhead static wires with optical ground wire. The collective structure replacement and optical ground wire activities are hereafter referred to as the Project. Efforts are also underway to replace structures on the adjacent lines, that share the existing ROW with the P145 line.

In support of permitting requirements for the proposed Project activities, the New Hampshire Natural Heritage Bureau (NHB) was consulted using the DataCheck tool to identify occurrences of threatened and endangered (T&E) species known from the Project vicinity. NHB DataCheck results letters were received by Stantec Consulting Services Inc. (Stantec) in November 2021 and provided information about several state-listed T&E species within the vicinity of the Project (NHB21-3593, NHB21-3594, and NHB21-3595). Through follow-up consultation with NHB in January 2021, target field surveys for several of the state-listed T&E plant species identified in the DataCheck results letter were requested within select ROW areas ahead of Project construction. This report summarizes the field surveys for state-listed T&E plant species.

2.0 TARGET SPECIES BACKGROUND

According to the NHB DataCheck results letters (NHB21-3593, NHB21-3594, and NHB21-3595), the following state-listed T&E plant species have been identified at or near the Project area:

- Butterfly milkweed (*Asclepias tuberosa* ssp. *tuberosa*); state-Endangered
- Clasping milkweed (*Asclepias amplexicaulis*); state-Threatened
- Golden heather (*Hudsonia ericoides*); state-Threatened
- Hollow Joe-Pye weed (*Eutrochium fistulosum*); state-Endangered
- Houghton's umbrella sedge (*Cyperus houghtonii*); state-Endangered
- Incurved umbrella sedge (*Cyperus squarrosus*); state-Threatened
- Licorice goldenrod (*Solidago odora*); state-Threatened
- Red threeawn (*Aristida longespica* var. *geniculata*); state-Threatened
- Upright false bindweed (*Calystegia spithamea* ssp. *spithamea*); state-Endangered
- Wild lupine (*Lupinus perennis* ssp. *perennis*); state-Threatened



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The Project area is also within the geographic range of small whorled pogonia (*Isotria medeoloides*), a federally Threatened species, according to a U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) database query. Small whorled pogonia is also state-listed as Threatened but was not a species identified as occurring proximal to the Project in the NHB DataCheck results letters.

2.1 BUTTERFLY MILKWEED

Butterfly milkweed is in the dogbane family (Apocynaceae) and is one of seven members of the milkweed genus (*Asclepias*) in New Hampshire. Butterfly milkweed is a conspicuous species with vibrant orange 5-parted flowers in a terminal umbel or cyme. The leaves are alternate, oblong-ovate and broadest above the middle, and sessile or with a short petiole. The vibrant orange inflorescence makes butterfly milkweed readily identifiable compared with other milkweeds in New Hampshire. In addition, unlike most milkweeds, butterfly milkweed has alternate leaves and clear sap. Butterfly milkweed is associated with dry fields, sandplains, roadsides, and disturbed areas (Fernald 1950; Haines 2011). It flowers from early July to early August according to data provided by NHB.

In their January 21, 2022, correspondence, NHB requested surveys for butterfly milkweed from existing structure 98 in Concord south to existing structure 41 north of the Merrimack River in Pembroke. Information provided by NHB noted that this species previously occurred in the ROW approximately between existing structures 85 to 91 but that this population had been intentionally planted and subsequently removed.

2.2 CLASPING MILKWEED

Clasping milkweed is also in the dogbane family. It has pinkish green 5-parted reflexed petals and a pink to tan-colored corona. The flowers are borne in a terminal and solitary umbel that is well-exserted above the uppermost pair of leaves. The leaves are opposite and clasp the stem. The leaves are waxy and have a wavy margin. The clasping leaves and their wavy margin readily separate clasping milkweed from other milkweeds in New Hampshire. Clasping milkweed is associated with dry soils of woodlands and sandy fields (Fernald 1950; Haines 2011). It flowers from mid-June to late July according to data provided by NHB.

In their January 21, 2022, correspondence, NHB requested surveys for clasping milkweed from existing structure 98 in Concord south to existing structure 41 north of the Merrimack River in Pembroke. NHB also noted an existing occurrence near the ROW between existing structures 85 to 91.

2.3 GOLDEN HEATHER

Golden heather is a member of the rockrose family (Cistaceae) and is one of two species in the false heather genus (*Hudsonia*) in New Hampshire. Golden heather is a low growing bushy heath-like plant with small linear leaves that are sparsely hairy and are erect to spreading on the stem. It produces small bright yellow 5-parted flowers on pedicels that are 5 to 10 millimeters (mm) long. Golden heather is associated with dry sandy woodlands, sandy roadsides, grasslands, rocky balds, and sandy beaches. It is morphologically similar to hairy hudsonia (*Hudsonia tomentosa*), but golden heather has linear leaves that



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are free and not appressed to the stem and sparse pubescence (vs. leaves that are tightly appressed scale-like leaves and dense pubescence in hairy hudsonia) (Fernald 1950; Haines 2011). It flowers from late May through July.

In their January 21, 2022, correspondence, NHB did not request surveys targeting golden heather as the Project avoided the known location along the Merrimack River.

2.4 HOLLOW JOE-PYE WEED

Hollow Joe-Pye weed is a member of the aster family (Asteraceae) and is one of four member of the Joe-Pye weed genus (*Eutrochium*) in New Hampshire. Hollow Joe-Pye weed has whorled leaves (4 to 7 per whorl) that are narrowly to broadly lanceolate with crenate margins. It has purple flowers that are borne in composite heads (capitula), each head with typically five to eight flowers. The capitulescence is rounded to domed (convex) and not evidently flat-topped. Hollow Joe-Pye weed is best recognized by its strongly glaucous purple hollow stem. It occurs in wet meadows, along shorelines, and wetland margins. It is morphologically similar to and may share similar habitats with other Joe-Pye weed species in New Hampshire, including spotted Joe-Pye weed (*Eutrochium maculatum*) and coastal plain Joe-Pye weed (*Eutrochium dubium*) (Fernald 1950; Haines 2011). It flowers and fruits from mid-July to late August according to data provided by NHB.

In their January 21, 2022, correspondence, NHB did not request surveys targeting hollow Joe-Pye weed as the known species occurrence locations or suspected potential habitats for this species were being avoided by the Project.

2.5 HOUGHTON'S UMBRELLA SEDGE

Houghton's umbrella sedge is a member of the sedge family (Cyperaceae) and is 1 of 13 members of the flatsedge (*Cyperus*) genus in New Hampshire. Flatsedges are generally recognized by their three-ranked stems, linear grass-like leaves, terminal inflorescences that are subtended by numerous leaf-like bracts, and spikelets that are often flattened with floral scales oriented in two vertical rows. Houghton's umbrella sedge is a tufted perennial with spikelets borne and ascending in a hemispherical cluster. The spikelets are compressed and are up to 15 mm long. The floral scales are often reddish brown and are broadly ovate in outline with a short terminal tip and more than seven evident veins. It is associated with dry sandy areas such as roadsides, woodlands, shorelines and ledges. Houghton's umbrella sedge is somewhat similar to and may share the same habitats as toothed flatsedge (*Cyperus dentatus*) or Great Plains flatsedge (*Cyperus lupulinus*) but the nearly orbicular floral scales of Houghton's umbrella sedge aids in distinguishing it from similar flatsedges (Arsenault et al. 2013). It produces fruit from mid-July to late August according to data provided by NHB.

In their January 21, 2022, correspondence, NHB requested surveys targeting Houghton's umbrella sedge from existing structure 45 to the Merrimack River in Pembroke as Houghton's umbrella sedge had been previously documented from this area.



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2.6 INCURVED UMBRELLA SEDGE

Incurved umbrella sedge is also a member of the sedge family and is 1 of 13 members of the flatsedge genus in New Hampshire. Incurved umbrella sedge is a small, tufted annual that grows up to 15 centimeters tall. It has a densely-flowered ovoid inflorescence. The inflorescence appears bristly as a result of floral scales with a conspicuously reflexed awn at the apex. It is associated with sandy shores of rivers and lakes as well as mesic disturbed areas. The reflexed floral scales of incurved umbrella sedge are unique amongst other flatsedge species in New Hampshire and is not likely to be confused with other species (Arsenault et al. 2013). It produces fruit from mid-July to late August.

In their January 21, 2022, correspondence, NHB did not request surveys targeting incurved umbrella sedge as the known or suspected locations were avoided by the Project.

2.7 LICORICE GOLDENROD

Licorice goldenrod is a member of the aster family and is 1 of 23 members of the goldenrod (*Solidago*) genus in New Hampshire. Like most goldenrods, licorice goldenrod has yellow composite flower heads in a terminal capitulescence and simple alternate leaves. Licorice goldenrod has capitulescence branches with secund flower heads and glossy green leaves that are largely uniform in size throughout the plant. The leaves have entire margins and emit a conspicuous anise or licorice odor when bruised. It is associated with dry woodlands, sandy fields, and roadsides (Fernald 1950; Haines 2011). The glossy anise-scented leaves with entire margins are distinct and help to readily identify licorice goldenrod both vegetatively and when in flower. It flowers from late July to September based on data provided by NHB.

In their January 21, 2022, correspondence, NHB requested surveys for licorice goldenrod from existing structure 98 in Concord south to existing structure 41 north of the Merrimack River in Pembroke. NHB also noted an existing occurrence in the ROW from existing structures 63 to 71.

2.8 RED THREEAWN

Red threeawn is a member of the grass family (Poaceae) and is one of five members of the threeawn (*Aristida*) genus in New Hampshire. Threeawn species are recognized by their very narrow, single-flowered spikelets borne in an open panicle or raceme and lemmas with three awns originating from the summit. Compared with other threeawn species, red threeawn is an annual with fibrous roots. The awns of the lemma are not coiled at their base and the two lateral awns are only 2/3 as long as the central awn. It is associated with dry sandy areas, including fields, roadsides, woodlands, and disturbed sites (Fernald 1950; Haines 2011). The growth and reproductive period is July 1 to October 15 based on data provided by NHB.

In their January 21, 2022, correspondence, NHB identified six previously documented locations for red threeawn in the ROW in Concord and Pembroke and recommended avoidance measures during construction at these locations.



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2.9 UPRIGHT FALSE BINDWEED

Upright false bindweed is a member of the morning glory family (Convolvulaceae) and is one of three members of the bindweed (*Calystegia*) genus in New Hampshire. Upright false bindweed has one to four large funnel-like white flowers that are borne on simple upright non- or weakly-twining stems. The leaves are alternate, simple oblong leaves with a broad-cuneate to weakly cordate base and short petioles. Upright false bindweed is readily identifiable from other bindweeds based on its upright stem and oblong leaves. It is associated with sandy fields, roadsides, sandplain grasslands, and woodlands (Fernald 1950; Haines 2011). It flowers from mid-June to mid-July based on data provided by NHB.

In their January 21, 2022, correspondence, NHB did not request surveys targeting upright false bindweed but noted that it occurs in similar habitats nearby.

2.10 WILD LUPINE

Wild lupine is a member of the bean family (Fabaceae) and is one of two members of the lupine (*Lupinus*) genus in New Hampshire. It has palmate leaves with typically 5 to 7 leaflets and 2-lipped purple, lavender, or pink flowers borne in a terminal raceme or spike that is 10 to 20 centimeters tall. Wild lupine is a somewhat sprawling plant with low-growing stems emerging from a creeping subterranean caudex. The fewer leaflets, sprawling habit, and shorter inflorescence distinguishes wild lupine from blue lupine (*Lupinus polyphyllus*), a widespread non-native species. It is associated with sandy soils of fields, sandplains, roadsides, utility line corridors, and other disturbed areas (Fernald 1950; Haines 2011). It flowers in May through June and is identifiable using vegetative characteristics throughout the summer.

In their January 21, 2022, correspondence, NHB requested surveys for wild lupine from existing structure 109 in Concord south to existing structure 41 north of the Merrimack River in Pembroke. NHB noted multiple known occurrences in the ROW within this requested survey area.

3.0 SURVEY METHODOLOGY

The survey was conducted and led by Matt Arsenault, a professional botanist and Certified Ecologist (resume provided in Appendix A), and it consisted of meander surveys within potentially suitable habitat for the target species within the NHB-requested ROW survey areas, approximately between existing structure 109 and the Merrimack River. In addition, a segment of ROW from Ferry Road to existing structure 23 in Bow was surveyed as previous fieldwork conducted by Stantec in this section of ROW had observed sandplain grassland type habitat conditions and suitable scrub oak (*Quercus ilicifolia*) habitat. These conditions are potentially suitable for several of the target species, such as wild lupine, licorice goldenrod, red threeawn, clasping milkweed, butterfly milkweed, upright false bindweed, and Houghton's umbrella sedge, so the ROW from Ferry Road to structure 23 was included in the 2022 field survey. Field surveys were conducted during the appropriate part of the growing season for a positive identification of the target species based on flowering, fruiting, and/or vegetative characteristics. For observed T&E plants, data were recorded on associated natural community conditions including dominant and



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characteristic vegetation, as well as other notable plant species, hydrology, evidence of disturbances, and overall landscape context and a NHB Special Plant Survey Form was completed for observed populations. Populations of T&E plant species were located with a global positioning system (GPS) receiver capable of submeter accuracy. Representative photographs were taken of existing habitat conditions and diagnostic morphological features of observed T&E plants.

4.0 RESULTS

Field surveys were conducted on May 6, May 16, May 17, May 18, July 18, July 19, July 21, and July 22, 2022. The following state-listed T&E plant species were observed:

- Dy land sedge (*Carex siccata*)
- Hollow Joe-Pye weed
- Incurved umbrella sedge
- Licorice goldenrod
- Red-root umbrella sedge (*Cyperus erythrorhizos*)
- Red threeawn
- Wild lupine

Butterfly milkweed, clasping milkweed, golden heather, Houghton's umbrella sedge, and upright false bindweed were not observed during the surveys. No federally listed plant species were observed.

The locations of the observed T&E plant populations as well as the survey area and survey path are provided on the attached map set. Representative photographs are provided in Appendix B. NHB Special Plant Survey Forms are provided in Appendix C. The following summarizes the observed T&E plant populations and the general ecological conditions of the ROW survey area.

4.1 GENERAL ECOLOGICAL CHARACTERISTICS

Existing Structure 114 to Portsmouth Street

The ROW from existing structure 114 to Portsmouth Street in Concord traverses a primarily softwood and hardwood mixed forested and undeveloped landscape with rolling topography southeasterly to Portsmouth Street. Elevations range from approximately 370 feet to 420 feet above mean sea level (msl) based on Project mapping. The southern portion of the ROW is intersected by public hiking and biking trails as part of the Broken Ground Trail network in Concord.

Upland habitats are dominated by scrub oak with scrub oak areal coverages varying between approximately 20% and 40%. Additional dry-site associates include sweet-fern (*Comptonia peregrina*), little bluestem (*Schizachyrium scoparium*), Blue Ridge sedge (*Carex lucorum*), common lowbush blueberry (*Vaccinium angustifolium*), sheep-laurel (*Kalmia angustifolia*), black huckleberry (*Gaylussacia baccata*), wintergreen (*Gaultheria procumbens*), and bracken fern (*Pteridium aquilinum*). The soil is well



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drained sandy loam to loamy sand. Glossy false buckthorn (*Frangula alnus*), a non-native invasive species, becomes prevalent in the southern portion of the ROW near Portsmouth Street.

A large scrub-shrub and emergent wetland community is present to the north of Portsmouth Street and is associated with existing structure 107. It is dominated by glossy false buckthorn around its periphery, with gay birch (*Betula populifolia*) saplings, maleberry (*Lyonia ligustrina*), white meadowsweet (*Spiraea alba*), steeplebush (*Spiraea tomentosa*), and sheep-laurel shrubs also present. The interior of the wetland is fen-like with a graminoid marsh dominated by swollen-beaked sedge (*Carex utricularia*), tussock sedge (*Carex stricta*), and steeplebush. Large cranberry (*Vaccinium macrocarpon*) is also abundant in this area. The interior of the wetland is semi-permanently inundated.

I-393 to Louden Road

I-393 to Louden Road in Concord is a short section of ROW between I-393 and Louden Road. It traverses a landscaped area characterized by residential and commercial development interspersed by small blocks of forest with generally flat topography at an elevation of approximately 350 feet msl.

The upland habitats associated with the ROW are primarily developed and consist primarily of a lawn and recreation area associated with a neighboring residential development complex. A small area of dry scrub oak shrubland is present between existing structure 101 and Old Louden Road. There is one wetland area in this segment of ROW. It is a peatland dominated by dwarf shrubs of leatherleaf (*Chamaedaphne calyculata*) along with maleberry, steeplebush, white meadowsweet, and highbush blueberry (*Vaccinium corymbosum*). Tussock sedge dominates the herbaceous stratum. The wetland has permanently saturated hydrology.

Louden Road to Soucook River

The ROW from Louden Road to the Soucook River in Concord traverses an urban landscape dominated by commercial and residential development with generally flat microtopography before the ROW drops steeply down to the Soucook River. Small fragments of mixed forest are present adjacent to the ROW.

Upland habitats in this segment of ROW consist of dry scrub oak-dominated areas. Scrub oak vegetative cover 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*), white meadowsweet, and prairie willow (*Salix humilis*). Soils are sandy and excessively drained. The off-site forested areas traversed by the ROW support red oak (*Quercus rubra*) and pitch pine (*Pinus rigida*) 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 near Antrim Avenue. Wetlands in this ROW segment include only a single emergent and impounded wetland east of existing structure 82. Species such as broad-leaved cat-tail (*Typha latifolia*), barber-pole 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 (*Castor canadensis*), 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.



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Soucook River to Pembroke Street

From the Soucook River on the Concord / Pembroke municipal boundary, the ROW continues south and traverses an undeveloped forested block associated with the riparian areas of the Suncook River and property associated with the New Hampshire Army National Guard. The ROW soon re-enters a landscape associated with commercial development and rolling topography south of the Soucook River to Pembroke Street in Pembroke. Elevations here range from approximately 250 feet to 320 feet msl.

The upland habitats in this segment of ROW are dominated by scrub oak and other dry sandy site associates such as little bluestem, sweet-fern, black huckleberry, common lowbush blueberry, downy goldenrod (*Solidago puberula*), and gray birch. The adjacent forests are dominated by red oak and white pine (*Pinus strobus*). Wetlands are limited in this segment of ROW and include three small scrub shrub wetland depressions near the Soucook River

Pembroke Street to Merrimack River

From Pembroke Street in Pembroke, the ROW traverses a primarily undeveloped upland landscape with flat to rolling topography and elevations ranging from 200 feet to 320 feet msl. It crosses the Soucook River and Garvins Falls Road before reaching the Merrimack River in Concord.

The upland habitats in this ROW segment 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, white 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 white meadowsweet, common wrinkle-leaved goldenrod (*Solidago rugosa*), Canada goldenrod (*Solidago canadensis*), quaking aspen (*Populus tremuloides*) 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 pin cherry (*Prunus pensylvanica*) becoming more prevalent in the ROW as hydrology becomes more mesic closer to the Merrimack River. American hazelnut (*Corylus americana*) covers approximately 70% of the ROW closer to the Merrimack River.

Wetland habitats in this ROW segment are limited to depressional scrub-shrub wetlands in the floodplain of the Soucook River and seepage wetlands near the Merrimack River. Several wetlands are within oxbows of the Soucook River and are seasonally inundated.



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Existing Structure 23 to Ferry Road

From existing structure 23 in Bow, the ROW traverses easterly on a sandy terrace to the south of the Merrimack River through a rolling to flat landscape containing residential and commercial development as well as undeveloped forest blocks. Elevations range from approximately 210 feet to 300 feet msl based on Project mapping.

The upland habitats are characterized by sandplain grassland species such as scrub oak, sweet-fern, common lowbush blueberry, little bluestem, bracken fern, poverty grass (*Danthonia spicata*), bush-clovers, red oak, eastern hay-scented fern (*Dennstaedtia punctilobula*), pinweeds (*Lechea* spp.), and common wrinkle-leaved goldenrod. The adjacent habitats are dominated by red oak and white pine and are largely undeveloped.

East of existing 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 (*Rhus hirta*), 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 white meadowsweet are scattered along with herbs such as flax-leaved stiff aster, Pennsylvania sedge (*Carex pensylvanica*), and arching blackberry. The soils are sandy, and the topography is flat.

An emergent wetland dominated by tussock sedge is present at the base of a steep slope west of existing structure 18.

4.2 DRY LAND SEDGE

Dry land sedge (state-Endangered) was incidentally observed in multiple locations from approximately existing structure 72 on the New Hampshire Army National Guard property in Pembroke to Ferry Road in Bow. Tens of thousands of flowering culms were observed. The observed populations were associated with herbaceous plant-dominated areas with dry sandy soils in the open ROW including edges of existing access roads and sandplain grassland patches and were typically associated with scrub oak, Blue Ridge sedge, sweet fern, Pennsylvania sedge, pin cherry, common wrinkle-leaf goldenrod, common cinquefoil (*Potentilla simplex*), and little bluestem. Table 1 summarizes the mapped locations.



P145 LINE STRUCTURE REPLACEMENT PROJECT THREATENED AND ENDANGERED PLANT SURVEY REPORT

October 4, 2022

Table 1. Dry Land Sedge Observations

Field Identifier	Approximate Location	Approximate Population Size*	Comments
Pop1	East of existing structure 72 (Pembroke)	500	Along west edge of existing access road
Pop2	East of existing structure 72 (Pembroke)	200	In "V"-shaped area at junction of two existing access roads
Pop3	East of existing structure 72 (Pembroke)	150	Along east edge of existing access road
Pop4	Southeast of existing structure 72 (Pembroke)	50	Along east edge of existing access road
Pop5	South of existing structure 62 (Pembroke)	300	Along west edge of existing access road
Pop6	South of existing structure 56 (Pembroke)	2000+	Large colony south of existing access road
Pop7	East of existing structure 51 (Pembroke)	75	Small patch in sandy floodplain terrace
Pop8	Southwest of existing structure 47 (Concord)	2500+	Large colony surrounded by dense shrubs in open ROW
Pop9	Northwest of existing structure 49 (Concord)	100	Plants are overtopped by gray birch, scrub oak, sheep-laurel
Pop10	West of existing structure 50 (Concord)	100	Small colony
Pop11	North of existing structure 50 (Concord)	500	At top of steep sandy slope south of Soucook River
Pop12	East of existing structure 48 (Concord)	10	On sandy edge of existing access trail
Pop13	East of existing structure 45 (Concord)	25	On sandy edge of existing access trail
Pop14	Southwest of existing structure 40 (Concord)	25	Along southern edge of existing trail bisecting ROW
Pop15	Between existing structures 40 and 41 (Concord)	250	Along western edge of existing access trail
Pop16	West of existing structure 41 (Concord)	15	Along western edge of existing access trail
Pop17	South of existing structure 41 (Concord)	2000+	Large colony growing along exposed sandy slope above the Merrimack River
Pop18	East of existing structure 41 (Concord)	300+	Small population area north of Merrimack River
Pop19	East of existing structure 41 (Concord)	1000+	Large colony in open grassy terrace north of Merrimack River
Pop20	East of existing structure 41 (Concord)	80	Along east edge of existing gravel access road
Pop21	Northeast of existing structure 41 (Concord)	250	Along east edge of existing gravel access road



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Field Identifier	Approximate Location	Approximate Population Size*	Comments
Pop22	Northeast of existing structure 41 (Concord)	200	Along west edge of existing gravel access road
Pop23	Southeast of existing structure 42 (Concord)	25	Along east edge of existing gravel access road
Pop24	Southeast of existing structure 42 (Concord)	250	Along east edge of existing gravel access road
Pop25	East of existing structure 19 (Bow)	150	On steep east-facing slope
Pop26	East of existing structure 19 (Bow)	30	On steep east-facing slope
Pop27	West of existing structure 18 (Bow)	750+	On terrace west of railroad tracks
Pop28	East of existing structure 18 (Bow)	3000+	On terrace west of railroad tracks
Pop29	West of existing structure 18 (Bow)	3000+	On terrace east of railroad tracks
Pop30	North and east of existing structure 14 (Bow)	5000+	Large colony in sandplain grassland habitat north of Ferry Road
Pop31	East of existing structure 15 (Bow)	1000	Large colony east of existing access trail
Pop32	Existing structure 15 (Bow)	100	Small colony west of existing access trail under existing structure
PopA	North of existing structure 14 (Bow)	1000+	Large colony in sandplain grassland habitat north of Ferry Road

*Count represents flowering culms

Dry land sedge is a strongly colonial species, spreading by rhizomes and can form large colonies in open habitats with typically sandy soils (M. Arsenault, Stantec, personal observations). It was readily identifiable during the field surveys based on its strongly rhizomatous growth, inflorescences consisting of 4 to 12 sessile spikes with an androgynous terminal spike (i.e., male flowers borne above the female flowers in the spike, and perigynia (i.e., the female flower structure) flattened with a slightly winged margin.

4.3 HOLLOW JOE-PYE WEED

Hollow Joe-Pye weed was observed in two locations along the Soucook River where it crosses the ROW in Concord and Pembroke. A total of 43 flowering stems were observed along the banks of the Soucook River the adjacent floodplain terrace at the northern ROW crossing. Ten plants were located along the northern shoreline of the Soucook River in Concord and 33 plants were observed along the southern shoreline in Pembroke between existing structures 75 and 76. The plants were associated with American hazelnut, fringed sedge (*Carex crinita*), tussock sedge, red maple (*Acer rubrum*), tall meadow-rue (*Thalictrum pubescens*), and sensitive fern (*Onoclea sensibilis*). Spotted Joe-Pye weed (*Eutrochium maculatum*) was observed nearby.



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A second population of hollow Joe-Pye weed was observed at the southern ROW crossing of the Soucook River. A total of 17 flowering stems were observed along the edge of a small scrub-shrub wetland in the floodplain of the Soucook River in Concord. The plants were associated with Morrow's honeysuckle (*Lonicera morrowii*), common blackberry (*Rubus allegheniensis*), and Virginia virgin's-bower (*Clematis virginiana*).

4.4 INCURVED UMBRELLA SEDGE

A large population of approximately 230 incurved umbrella sedge plants was located along the northern shoreline of the Soucook River in Pembroke south of existing structure 51. The plants were growing in exposed mesic to wet sands below the high water mark of the river. The habitat is sparsely to moderately vegetated with low-growing plants such as yellow-seeded false pimpernel (*Lindernia dubia* var. *dubia*), creeping bentgrass (*Agrostis stolonifera*), green carpetweed (*Mollugo verticillata*), rough cocklebur (*Xanthium strumarium*), woolgrass (*Scirpus cyperinus*), deer-tongue rosette-panicgrass (*Dichanthelium clandestinum*), dwarf St. John's-wort (*Hypericum mutilum*), American bur-reed (*Sparganium americanum*), and blunt spikesedge (*Eleocharis obtusa*). The associated habitat for incurved umbrella sedge is maintained by seasonal scour events that remove competing vegetation and favor open substrate conditions for germination and growth of incurved umbrella sedge.

4.5 LICORICE GOLDENROD

Licorice goldenrod occurs in several locations across an approximately 0.2-mile section of ROW from existing structure 69 on the New Hampshire Army National Guard Property to existing structure 66 on the Dirt Doctors property in Pembroke. A total of approximately 1,157 flowering stems were observed amongst over 200 ramets. The plants were associated with dry, open habitats with sparse shrub coverage and were directly associated with dry-site species such as little bluestem, redtop bentgrass (*Agrostis gigantea*), downy goldenrod (*Solidago puberula*), sweet-fern, switch panicgrass (*Panicum virgatum*), early goldenrod (*Solidago juncea*), gray birch, flattened oatgrass (*Danthonia compressa*), scrub oak, and Blue Ridge sedge.

4.6 RED-ROOT UMBRELLA SEDGE

A small population of red-root umbrella sedge (state-listed Endangered) was incidentally observed along the northern shoreline of the Soucook River in Pembroke south of existing structure 51. A total of eight plants were observed in mesic to wet sands below the high water mark of the river and was growing with a portion of the incurved umbrella sedge population. Plants in direct association with red-root umbrella sedge included incurved umbrella sedge, rough cocklebur, straw-colored flatsedge (*Cyperus strigosus*), rice cut grass (*Leersia oryzoides*), and purple loosestrife (*Lythrum salicaria*).

Red-root umbrella sedge was readily identifiable in the field based on its cylindrical bottle brush-like spikes, red fibrous roots, and very small floral scales (up to 1.5 mm long).



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4.7 RED THREEAWN

A suspected population of red threeawn was observed at existing structure 66 on the Dirt Doctors property in Pembroke. Two areas, totaling approximately 2,142 square feet and containing thousands of plants (approximately 55% areal coverage in the mapped areas), were observed at the north edge of a disturbed and sparsely vegetated lot associated with a commercial wholesale landscape material company. The plants were observed within an existing gravel roadway and an existing equipment and material storage area. All the observed plants were vegetative, and no diagnostic reproductive floral features were observed. However, the vegetative specimens observed during the field survey are conservatively assumed to be red threeawn for the purposes of Project planning and impact avoidance. Suspected specimens of red threeawn were recognized vegetatively by an annual grass with fibrous roots, pale green flat to weakly involute leaves that are sparsely pilose, and a minute ligule (i.e., less than 0.5 mm long). As an annual, red threeawn often forms large populations with hundreds to thousands of stems in open sandy upland habitats. These characteristics supported a conservative positive identification as red threeawn during the surveys. Previous data provided by NHB indicated that a known red threeawn population had been previously documented in this same general area.

As noted previously, in their January 21, 2022, correspondence, NHB provided maps illustrating the previously documented red threeawn populations within the ROW. In addition to the previously known location at existing structure 66 (proposed structure 63), Stantec surveyed the areas where red threeawn had been previously documented but did not observe additional populations (including potential populations) of red threeawn in these areas. The following areas were surveyed:

- Proposed access road between existing structures 147 and 148 west of Snow Pond Road in Concord
- Existing structures 99 and 100 associated with Loudon Road and Old Loudon Road in Concord
- Near existing structure 79 south of Chenell Drive in Concord
- Near existing structure 75 south of the Soucook River in Pembroke
- Near existing structure 61 in Pembroke

Many of these areas were densely vegetated with herbaceous and/or shrub vegetation and lacked sufficient open sandy substrates for red threeawn germination due to the observed successional stage of ROW vegetation at the time of the survey.

4.8 WILD LUPINE

Wild lupine was observed at two previously known locations within the ROW during the field surveys. The largest population is located south of Pembroke Road extending to the existing structure 88 in Concord and is largely associated with property owned by Praxair Surface Technologies, Inc. Over 750 wild lupine plants were observed in this ROW segment and the population continues easterly beyond the limits of the ROW. The plants are associated with a dry shrub-dominated habitat with scrub oak, common lowbush blueberry, sweet-fern, pitch pine saplings, quaking aspen, Blue Ridge sedge, little bluestem, and early goldenrod.



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A second wild lupine population was observed between existing structures 68 and 69 on the New Hampshire Army National Guard property in Pembroke. A total of 59 plants were observed within an approximately 0.35-acre enclosed fence area previously established around the wild lupine plants within the ROW. The plants are associated with a sandy south facing slope and are growing with sweet-fern, little bluestem, Blue Ridge sedge, and scrub oak.

5.0 PROTECTION MEASURES

The following best management practices (BMPs) will be implemented to protect occurrences of state-listed plant species during construction. NHB provided concurrence of these BMPs on August 18, 2022.¹

Dry Land Sedge

Dry land sedge populations have been avoided by the Project design to the extent feasible. For areas that are unavoidable during construction, temporary construction mats will be placed over the plants on or after August 1 and removed by April 15. In areas subject to additional time of year restrictions, such as in areas in Concord and Pembroke where NHFG has requested that all work be conducted between October 15 and March 31, these more stringent time of year restrictions will apply for dry land sedge occurrences (see Rare Plant Survey Map Set). Dry land sedge is dependent on open and often disturbed habitats. It emerges early in the growing season and spreads primarily by rhizomes, often forming large colonies. Observations of dehiscing seeds were observed during the July survey event and, therefore, support the August 1 proposed construction start period as a means of avoiding the portion of the growing season when plants are in the reproductive stages. Plants proximal (e.g., within approximately 100 feet) to the construction work limits have been flagged to minimize the potential for inadvertent impacts. Ongoing ROW vegetation management will similarly be conducted between August 1 and April 15 (or the during more stringent time of year restriction) in areas occupied by dry land sedge.

Hollow Joe-Pye Weed

Hollow Joe-Pye weed will be avoided by the construction activities. Mechanized vegetation management for ROW maintenance is not anticipated along the banks of the Soucook River where the plants occur and is, therefore, not likely to adversely affect hollow Joe-Pye weed.

Incurved Umbrella Sedge

Incurved umbrella sedge will be avoided by the construction activities. Mechanized vegetation management for ROW maintenance is not anticipated along the banks of the Soucook River where the plants occur and is, therefore, not likely to adversely affect incurved umbrella sedge.

¹ August 18, 2022, email correspondence between Jessica Bouchard (NHB) and Tom Tetreau (Stantec); RE: P145 Rare Plant Survey & BMPs (NHB21-3593, NHB21-3594, NHB21-3595)



P145 LINE STRUCTURE REPLACEMENT PROJECT THREATENED AND ENDANGERED PLANT SURVEY REPORT

October 4, 2022

Licorice Goldenrod

Most of the licorice goldenrod plants will be avoided during construction, including the larger subpopulation areas. For plants that cannot be avoided during construction, temporary construction mats will be placed over the plants following the first frost event or November 1, whichever occurs first, and will be removed by March 31. The plants that will be affected by the project are largely restricted to the edges of existing access roads/trails that will require improvements to accommodate construction equipment. Plants proximal (e.g., within approximately 100 feet) to the construction work limits have been flagged to minimize the potential for inadvertent impacts. Vegetation management in areas occupied by licorice goldenrod will similarly be conducted between the first fall frost event or November 1 (whichever occurs first) and March 31.

Red-root umbrella sedge

Red-root umbrella sedge will be avoided by the construction activities. Mechanized vegetation management for ongoing ROW maintenance is not anticipated along the banks of the Soucook River where the plants occur and is, therefore, not likely to adversely affect red-root umbrella sedge.

Red Threawn

To protect red threawn, temporary construction mats are proposed to be placed on or after October 1 and removed by July 1 if the plants cannot be avoided entirely during construction. These BMPs are consistent with past NHB recommendations for this species on a previous project in Londonderry, New Hampshire. Plants proximal (e.g., within approximately 100 feet) to the construction work limits will be flagged to minimize the potential for inadvertent impacts. Vegetation management in areas occupied by red threawn is proposed to similarly be conducted between October 1 and July 1.

Wild Lupine

Based on site visits in 2022 with NHB and NHFG, all activities associated with wild lupine plants between Pembroke Road and proposed structure 82 in Concord will be conducted between November 1 and March 31. All construction activities will be conducted from temporary construction mats and there will be no grubbing or grading of soil in this location. Mechanized vegetation management in this area will only be conducted during winter when snow depths are approximately 2 feet deep, otherwise vegetation management will be limited to hand cutting in coordination with the New Hampshire Fish and Game Department.

An additional wild lupine population occurs in the ROW on the New Hampshire Army National Guard regional training facility between proposed structures 64 and 65 in Pembroke. There will be no impacts to plants at this location during construction or ongoing ROW vegetation management.



P145 LINE STRUCTURE REPLACEMENT PROJECT THREATENED AND ENDANGERED PLANT SURVEY REPORT

October 4, 2022

6.0 REFERENCES

- Arsenault, M., G.H. Mittelhauser, D. Cameron, A. Dibble, A. Haines, S.C. Rooney, and J.E. Webber. 2013. *Sedges of Maine – A Field Guide to Cyperaceae*. University of Maine Press, Orono, Maine.
- Fernald, M.L. 1950. *Grays Manual of Botany*, 8th Edition. D. Van Nostrad Company, New York, New York.
- Haines, A. 2011. *Flora Novae Angliae – A Manual for the Identification of Native and Naturalized Higher Vascular Plants of New England*. Yale University Press. New Haven, Connecticut.



**P145 LINE STRUCTURE REPLACEMENT PROJECT THREATENED AND ENDANGERED PLANT
SURVEY REPORT**

October 4, 2022

FIGURES

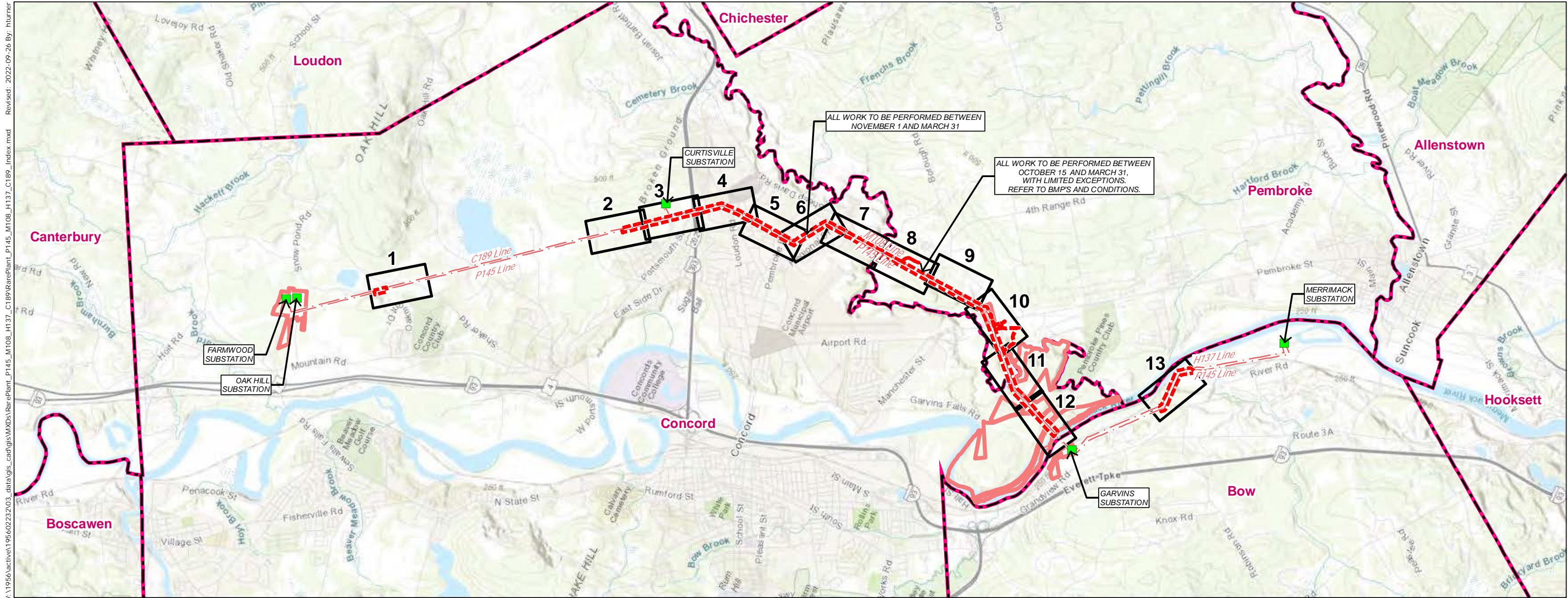


P145 Rebuild and H137/M108/C189 Structure Replacement

Concord, Pembroke, Bow, NH

Rare Plant Map Set

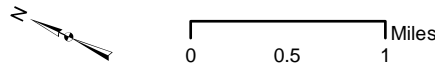
Date: September 26, 2022



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- Substation
- Approximate Rare Plant Survey Area
- Map Sheet
- Eversource Owned Property
- Overhead Eversource Line
- Municipal Boundary

Legend



INDEX OF FIGURES

Title Sheet / Index Map
Map Sheets 1-13

NO.	DATE	REVISIONS

PREPARED FOR:



107 Selden Street
Berlin, CT 06037

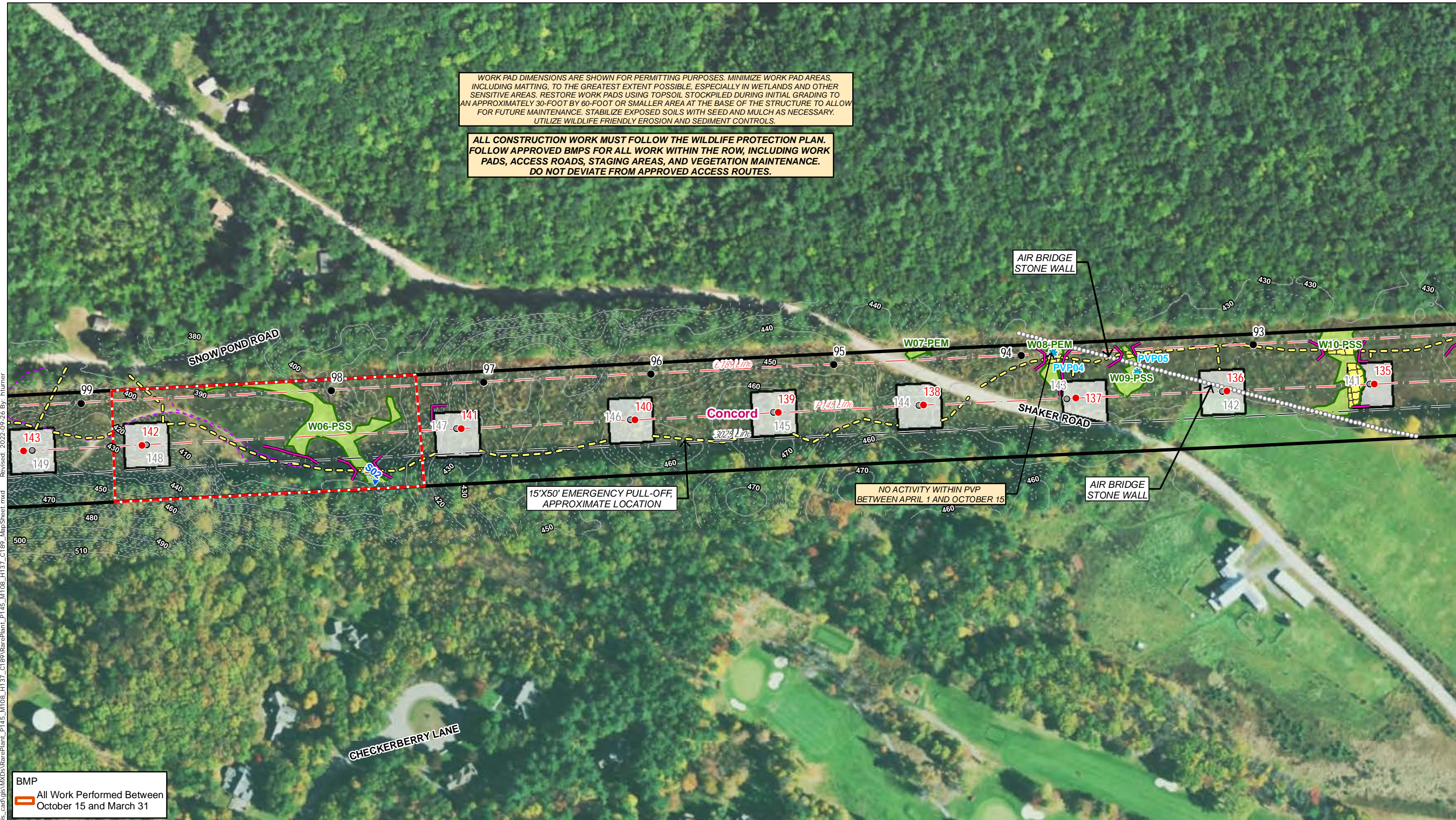
PREPARED BY:



30 Park Drive
Topsham, ME 04086

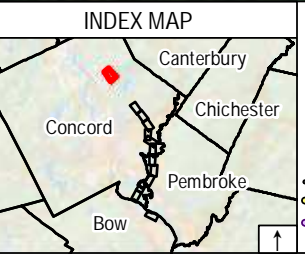
WORK PAD DIMENSIONS ARE SHOWN FOR PERMITTING PURPOSES. MINIMIZE WORK PAD AREAS, INCLUDING MATTING, TO THE GREATEST EXTENT POSSIBLE, ESPECIALLY IN WETLANDS AND OTHER SENSITIVE AREAS. RESTORE WORK PADS USING TOPSOIL STOCKPILED DURING INITIAL GRADING TO AN APPROXIMATELY 30-FOOT BY 60-FOOT OR SMALLER AREA AT THE BASE OF THE STRUCTURE TO ALLOW FOR FUTURE MAINTENANCE. STABILIZE EXPOSED SOILS WITH SEED AND MULCH AS NECESSARY. UTILIZE WILDLIFE FRIENDLY EROSION AND SEDIMENT CONTROLS.

ALL CONSTRUCTION WORK MUST FOLLOW THE WILDLIFE PROTECTION PLAN. FOLLOW APPROVED BMPs FOR ALL WORK WITHIN THE ROW, INCLUDING WORK PADS, ACCESS ROADS, STAGING AREAS, AND VEGETATION MAINTENANCE. DO NOT DEVIATE FROM APPROVED ACCESS ROUTES.



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BMP
 All Work Performed Between October 15 and March 31



<p>Legend</p> <ul style="list-style-type: none"> Proposed Structure Existing Structure Existing Structure to be Removed Overhead Eversource Line Overhead Distribution Line Underground Distribution Line Existing Right-of-Way (ROW) Existing Access Proposed Access Off-ROW Access Pending Rights Temporary Construction Matting Stone Work Pad Existing Gravel Eversource Owned Property Municipal Boundary Sediment Control Barrier 2' Contours 10' Contours Fence Railroad Potential Vernal Pool Potential Vernal Pool Extent Delineated Perennial Stream Delineated Intermittent Stream Delineated Ephemeral Stream Field Delineated Wetland Boundary Outline Field Delineated Wetland Priority Resource Area Open Water FEMA 100-Year Flood Zone FEMA Floodway NHDES Protected Shoreland GAS Approximate Gas Line Stone Wall Berm Culvert Rare Species Rare Plant Survey Photo Location and Direction Approximate Rare Plant Survey Area Rare Plant Survey Tracks May 2022 July 2022 	<p>Map Notes: Coordinate System: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021. Additional source include: NH Grant Basemap: 2018 National Agriculture Imagery Program (NAIP) aerial imagery This mapping product has been created to comply with submittal requirements to obtain certain regulatory approvals and, as such, there is no reliance on the information contained herein for any other purpose.</p>
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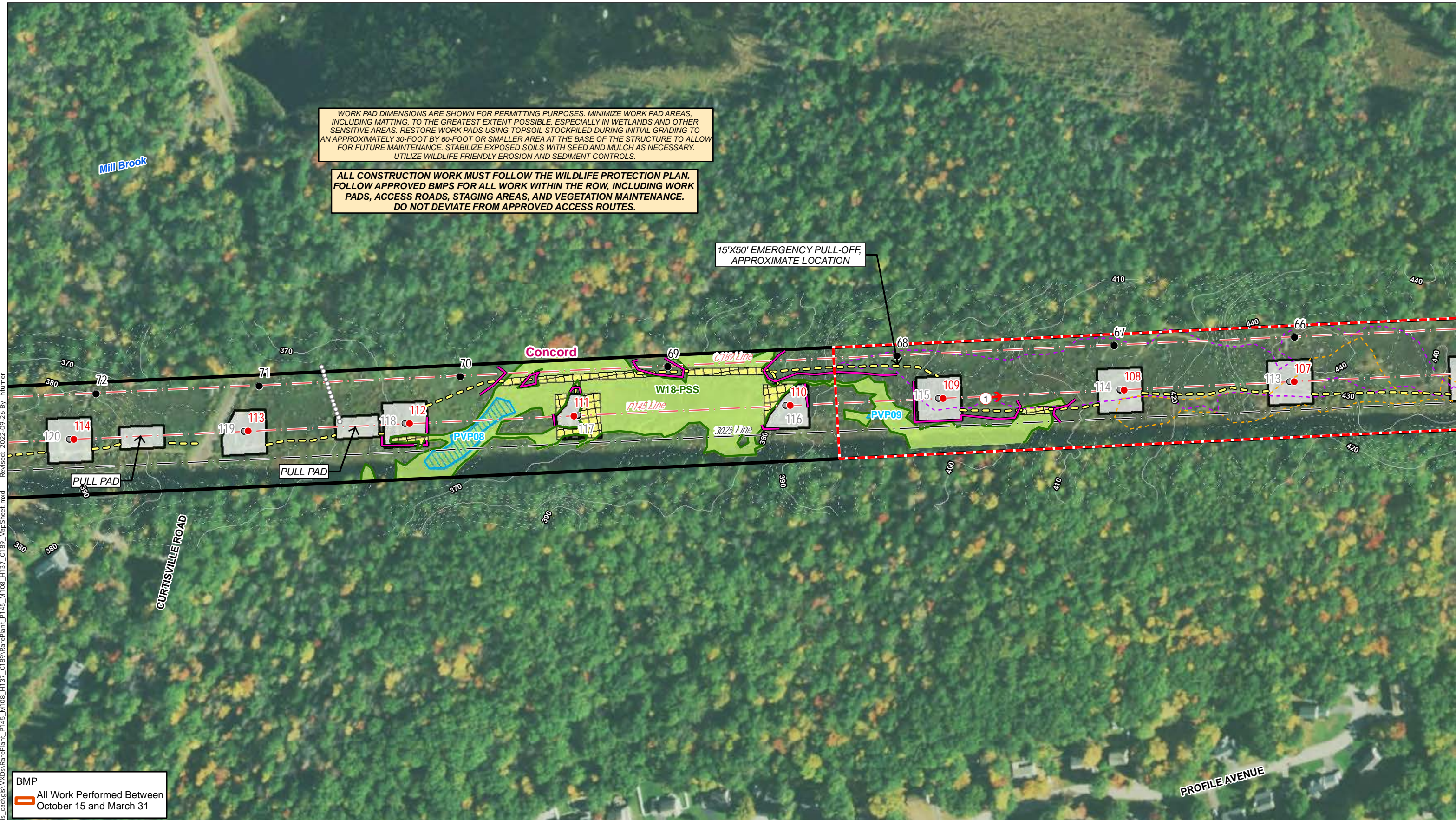


P145 Rebuild & H137/M108/C189 Structure Replacement Rare Plant Map Set	
Concord, NH	MAP SHEET
Date: September 26, 2022	
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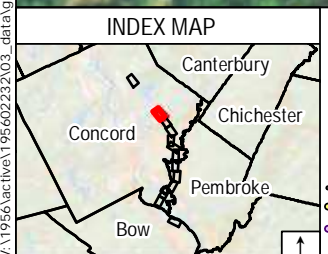
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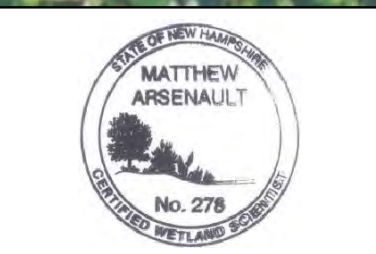
15'X50' EMERGENCY PULL-OFF, APPROXIMATE LOCATION



BMP
 All Work Performed Between October 15 and March 31

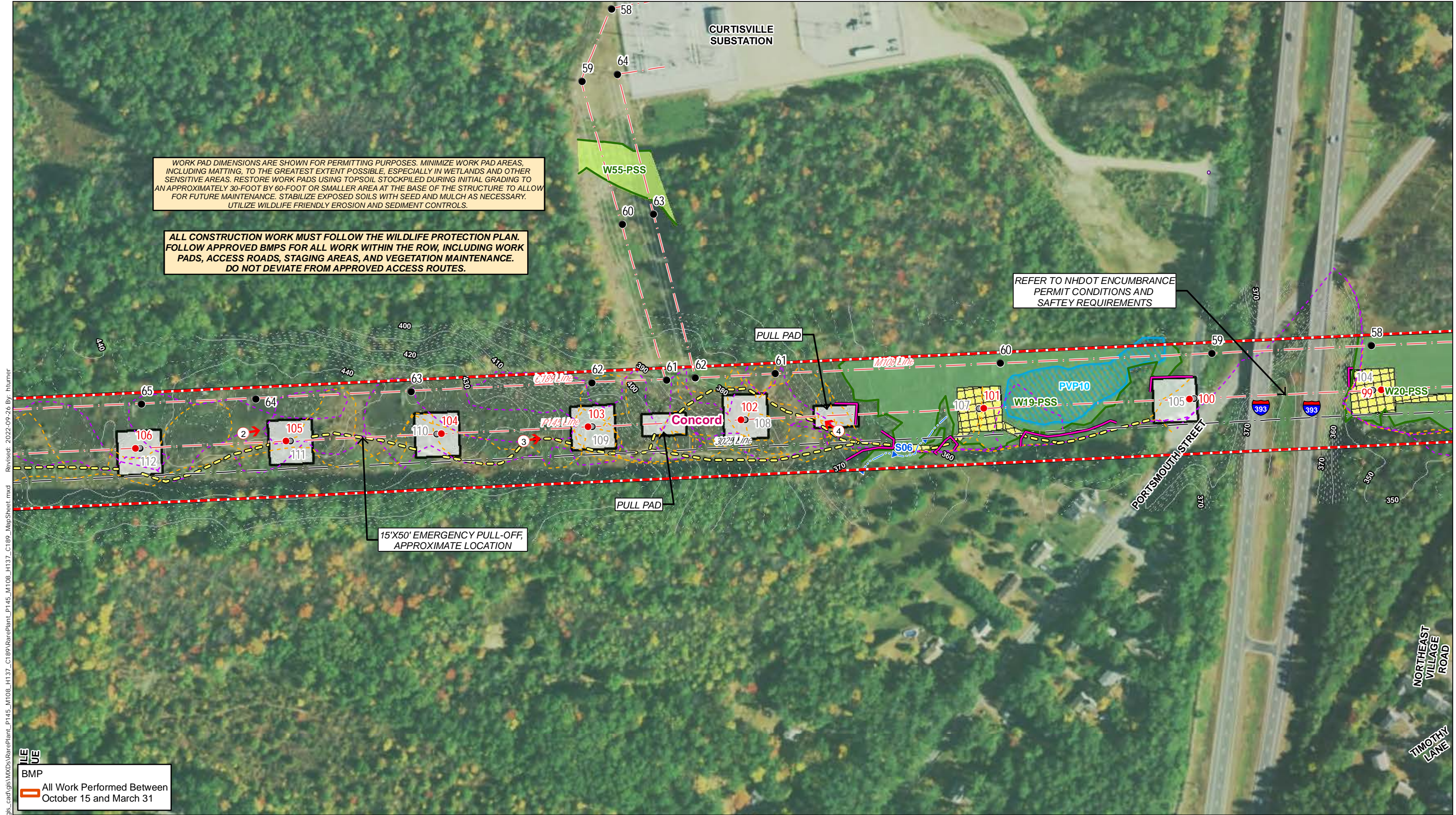


Legend	
● Proposed Structure	Temporary Construction Matting
● Existing Structure	Stone Work Pad
● Existing Structure to be Removed	Existing Gravel
— Overhead Eversource Line	Eversource Owned Property
— Overhead Distribution Line	Municipal Boundary
— Underground Distribution Line	Sediment Control Barrier
— Existing Right-of-Way (ROW)	2' Contours
— Existing Access	10' Contours
— Proposed Access	Off-ROW Access Pending Rights
— Off-ROW Access Pending Rights	Railroad
● Potential Vernal Pool	FEMA 100-Year Flood Zone
▭ Potential Vernal Pool Extent	FEMA Floodway
▭ Delineated Perennial Stream	NHDES Protected Shoreland
▭ Delineated Intermittent Stream	Approximate Gas Line
▭ Delineated Ephemeral Stream	Stone Wall
▭ Field Delineated Wetland Boundary Outline	Berm
▭ Field Delineated Wetland	Culvert
▭ Priority Resource Area	Rare Species
▭ Open Water	
	↑ Rare Plant Survey Photo Location and Direction
	▭ Approximate Rare Plant Survey Area
	▭ Rare Plant Survey Tracks
	▭ May 2022
	▭ July 2022



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Concord, NH	MAP SHEET
Date: September 26, 2022	
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 Revised: 2022-09-26 By: hturner



WORK PAD DIMENSIONS ARE SHOWN FOR PERMITTING PURPOSES. MINIMIZE WORK PAD AREAS, INCLUDING MATTING, TO THE GREATEST EXTENT POSSIBLE, ESPECIALLY IN WETLANDS AND OTHER SENSITIVE AREAS. RESTORE WORK PADS USING TOPSOIL STOCKPILED DURING INITIAL GRADING TO AN APPROXIMATELY 30-FOOT BY 60-FOOT OR SMALLER AREA AT THE BASE OF THE STRUCTURE TO ALLOW FOR FUTURE MAINTENANCE. STABILIZE EXPOSED SOILS WITH SEED AND MULCH AS NECESSARY. UTILIZE WILDLIFE FRIENDLY EROSION AND SEDIMENT CONTROLS.

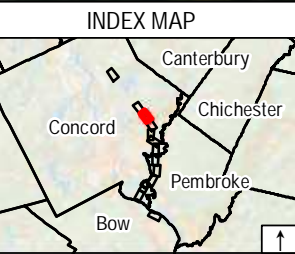
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REFER TO NHDOT ENCUMBRANCE PERMIT CONDITIONS AND SAFETY REQUIREMENTS

15'X50' EMERGENCY PULL-OFF, APPROXIMATE LOCATION

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BMP
 All Work Performed Between October 15 and March 31



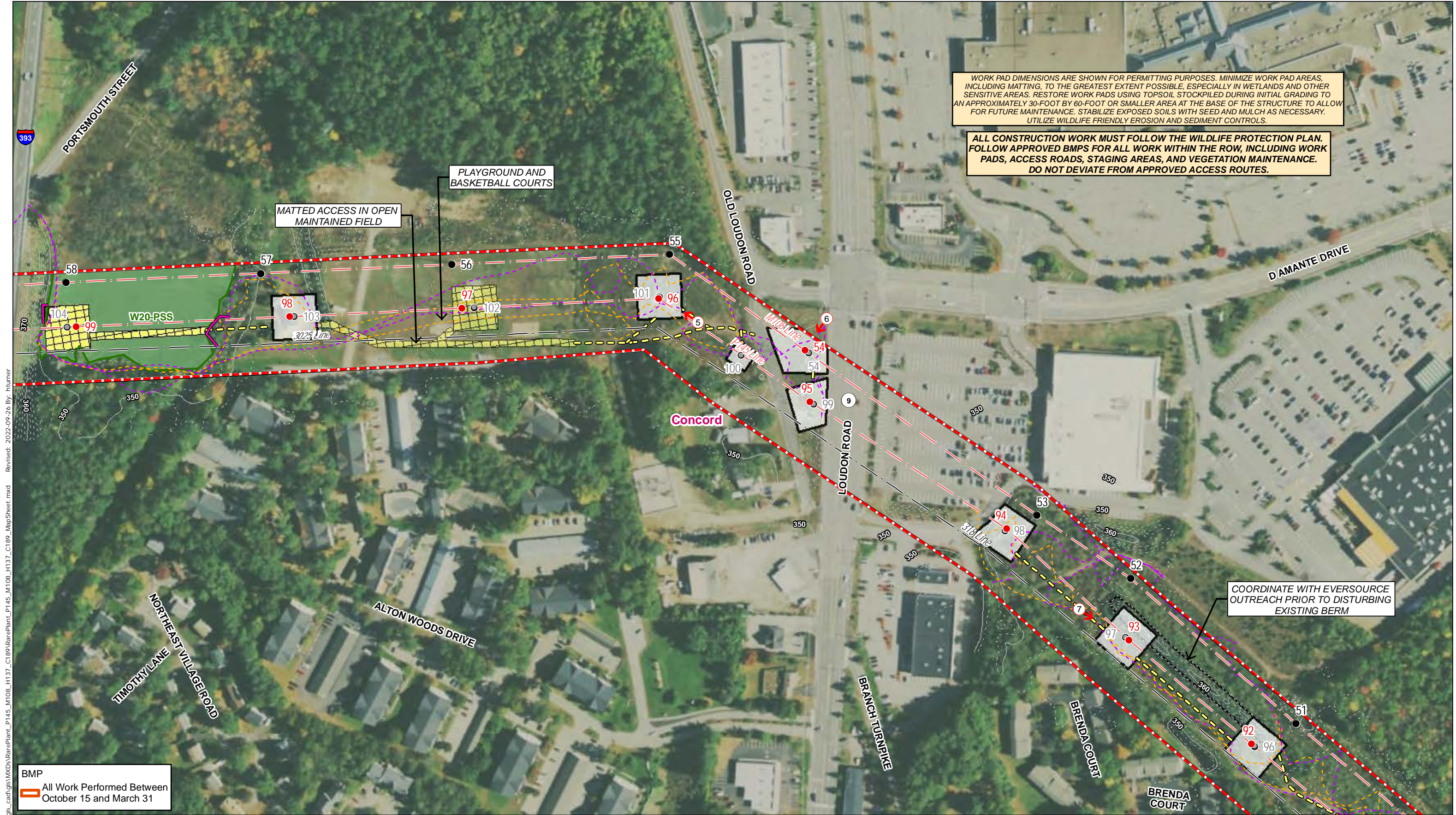
Legend

<ul style="list-style-type: none"> Proposed Structure Existing Structure Existing Structure to be Removed Overhead Eversource Line Overhead Distribution Line Underground Distribution Line Existing Right-of-Way (ROW) Existing Access Proposed Access Off-ROW Access Pending Rights 	<ul style="list-style-type: none"> Temporary Construction Matting Stone Work Pad Existing Gravel Eversource Owned Property Municipal Boundary Sediment Control Barrier 2' Contours 10' Contours Fence Railroad 	<ul style="list-style-type: none"> Potential Vernal Pool Potential Vernal Pool Extent Delineated Perennial Stream Delineated Intermittent Stream Delineated Ephemeral Stream Field Delineated Wetland Boundary Outline Field Delineated Wetland Priority Resource Area Open Water 	<ul style="list-style-type: none"> FEMA 100-Year Flood Zone FEMA Floodway NHDES Protected Shoreland Approximate Gas Line Stone Wall Berm Culvert Rare Species 	<ul style="list-style-type: none"> Rare Plant Survey Photo Location and Direction Approximate Rare Plant Survey Area Rare Plant Survey Tracks May 2022 July 2022
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Map Notes:
 Coordinate System: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
 Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.
 Additional source include: NH Grant
 Basemap: 2018 National Agriculture Imagery Program (NAIP) aerial imagery
 This mapping product has been created to comply with submittal requirements to obtain certain regulatory approvals and, as such, there is no reliance on the information contained herein for any other purpose.



EVERSOURCE ENERGY		Stantec	
P145 Rebuild & H137/M108/C189 Structure Replacement Rare Plant Map Set			
Concord, NH		MAP SHEET	
Date: September 26, 2022		3 of 13	

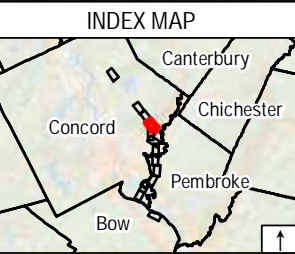


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BMP
 All Work Performed Between
 October 15 and March 31



- Legend**
- Proposed Structure
 - Existing Structure
 - Existing Structure to be Removed
 - Overhead Eversource Line
 - Overhead Distribution Line
 - Underground Distribution Line
 - Existing Right-of-Way (ROW)
 - Existing Access
 - Proposed Access
 - Off-ROW Access Pending Rights

- Temporary Construction Matting
- Stone Work Pad
- Existing Gravel
- Eversource Owned Property
- Municipal Boundary
- Sediment Control Barrier
- 2' Contours
- 10' Contours
- Railroad

- Potential Vernal Pool
- Potential Vernal Pool Extent
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated Ephemeral Stream
- Field Delineated Wetland Boundary Outline
- Field Delineated Wetland
- Priority Resource Area
- Open Water

- FEMA 100-Year Flood Zone
- FEMA Floodway
- NHDES Protected Shoreland
- Approximate Gas Line
- Stone Wall
- Berm
- Culvert
- Rare Species

- Rare Plant Survey Photo Location and Direction
- Approximate Rare Plant Survey Area
- Rare Plant Survey Tracks
- May 2022
- July 2022

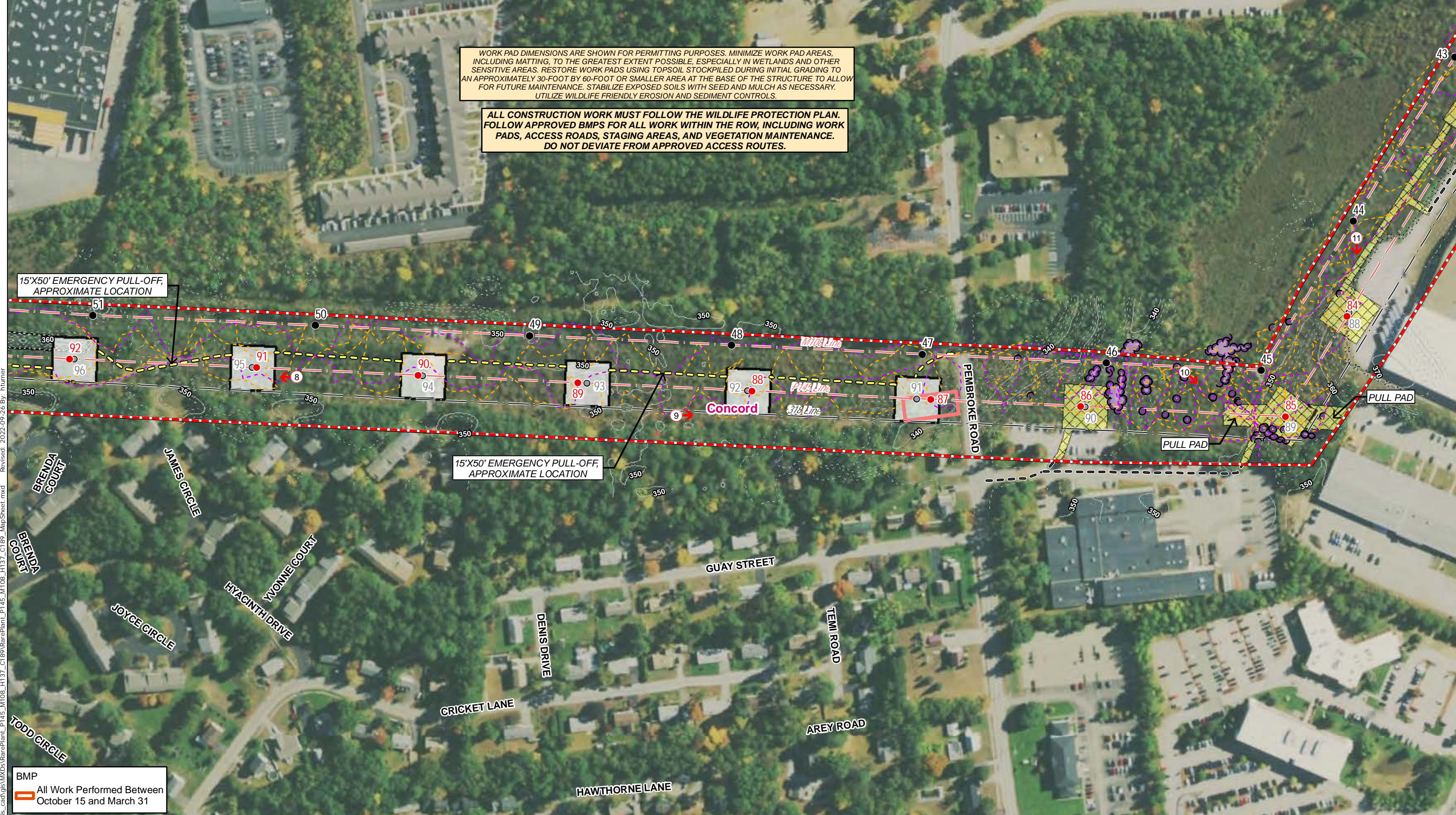
1 inch = 200 feet
 0 50 100 200 Feet
Map Notes:
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EVSOURCE ENERGY		Stantec	
P145 Rebuild & H137/M108/C189 Structure Replacement Rare Plant Map Set			
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WORK PAD DIMENSIONS ARE SHOWN FOR PERMITTING PURPOSES. MINIMIZE WORK PAD AREAS, INCLUDING MATTING, TO THE GREATEST EXTENT POSSIBLE, ESPECIALLY IN WETLANDS AND OTHER SENSITIVE AREAS. RESTORE WORK PADS USING TOPSOIL STOCKPILED DURING INITIAL GRADING TO AN APPROXIMATELY 30-FOOT BY 60-FOOT OR SMALLER AREA AT THE BASE OF THE STRUCTURE TO ALLOW FOR FUTURE MAINTENANCE. STABILIZE EXPOSED SOILS WITH SEED AND MULCH AS NECESSARY. UTILIZE WILDLIFE FRIENDLY EROSION AND SEDIMENT CONTROLS.

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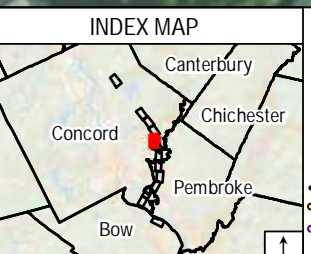


15'X50' EMERGENCY PULL-OFF, APPROXIMATE LOCATION

15'X50' EMERGENCY PULL-OFF, APPROXIMATE LOCATION

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BMP
 All Work Performed Between October 15 and March 31

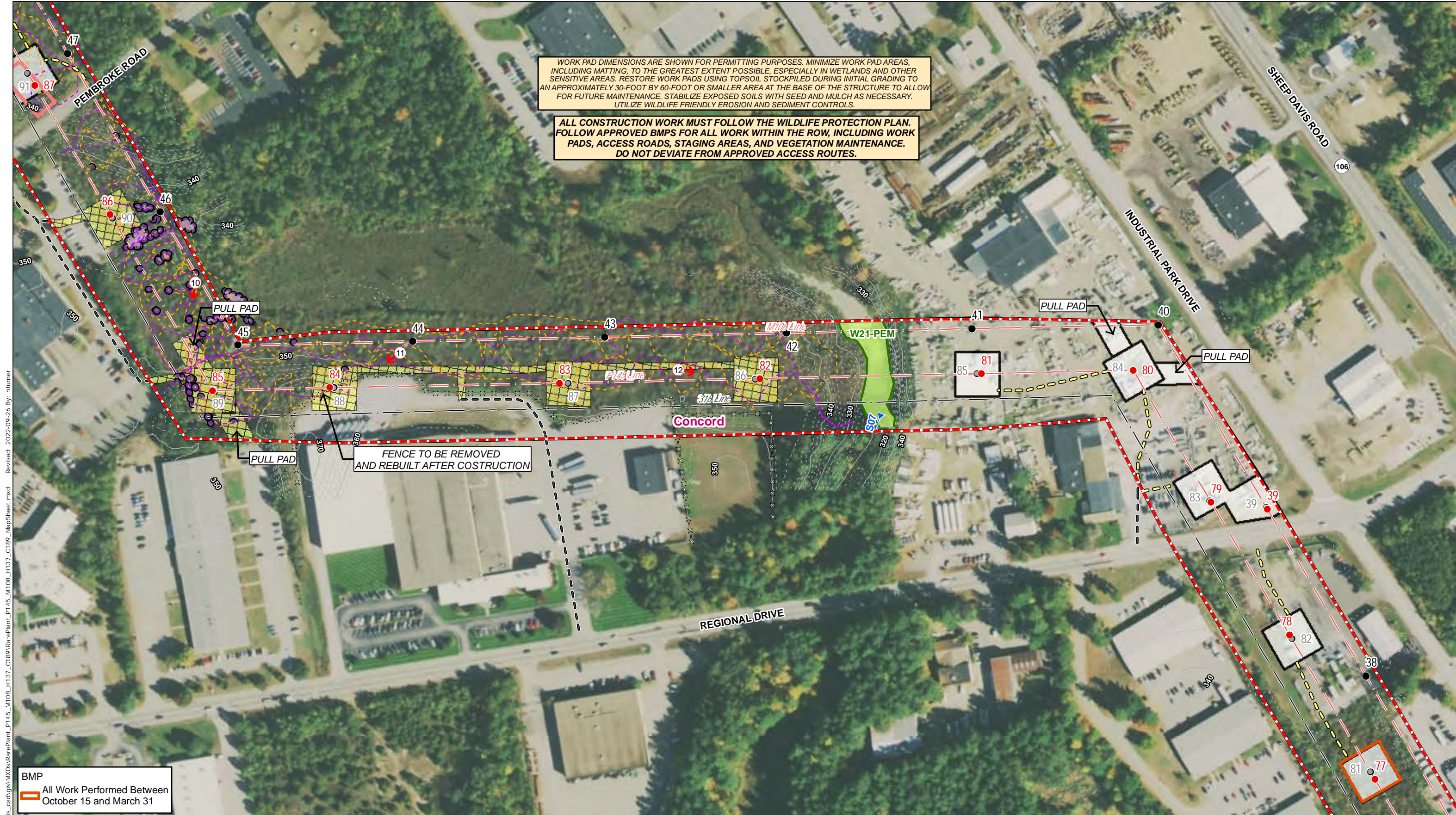


<p>Legend</p> <ul style="list-style-type: none"> ● Proposed Structure ● Existing Structure ● Existing Structure to be Removed — Overhead Eversource Line — Overhead Distribution Line — Underground Distribution Line — Existing Right-of-Way (ROW) — Existing Access — Proposed Access — Off-ROW Access Pending Rights 	<ul style="list-style-type: none"> ■ Temporary Construction Matting ■ Stone Work Pad ■ Existing Gravel ■ Eversource Owned Property ■ Municipal Boundary ■ Sediment Control Barrier — 2' Contours — 10' Contours — Fence — Railroad 	<ul style="list-style-type: none"> ● Potential Vernal Pool ■ Potential Vernal Pool Extent — Delineated Perennial Stream — Delineated Intermittent Stream — Delineated Ephemeral Stream — Field Delineated Wetland Boundary Outline — Field Delineated Wetland — Priority Resource Area — Open Water 	<ul style="list-style-type: none"> ■ FEMA 100-Year Flood Zone — FEMA Floodway — NHDES Protected Shoreland — GAS Approximate Gas Line — Stone Wall — Berm ● Culvert ● Rare Species 	<ul style="list-style-type: none"> ● Rare Plant Survey Photo Location and Direction ■ Approximate Rare Plant Survey Area — Rare Plant Survey Tracks — May 2022 — July 2022 ● Wild Lupine
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1 inch = 200 feet
 0 50 100 200 Feet
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P145 Rebuild & H137/M108/C189 Structure Replacement Rare Plant Map Set		
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Date: September 26, 2022		5 of 13



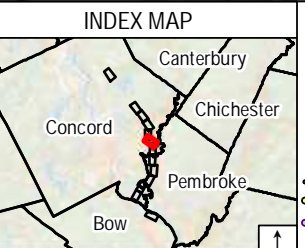
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FENCE TO BE REMOVED AND REBUILT AFTER COSTRUCTION

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BMP
 All Work Performed Between
 October 15 and March 31



- Legend**
- Proposed Structure
 - Existing Structure
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 - Existing Right-of-Way (ROW)
 - Existing Access
 - Proposed Access
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 - Existing Gravel
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 - 2' Contours
 - 10' Contours
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 - Railroad
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 - Potential Vernal Pool Extent
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 - Rare Plant Survey Tracks
 - May 2022
 - July 2022
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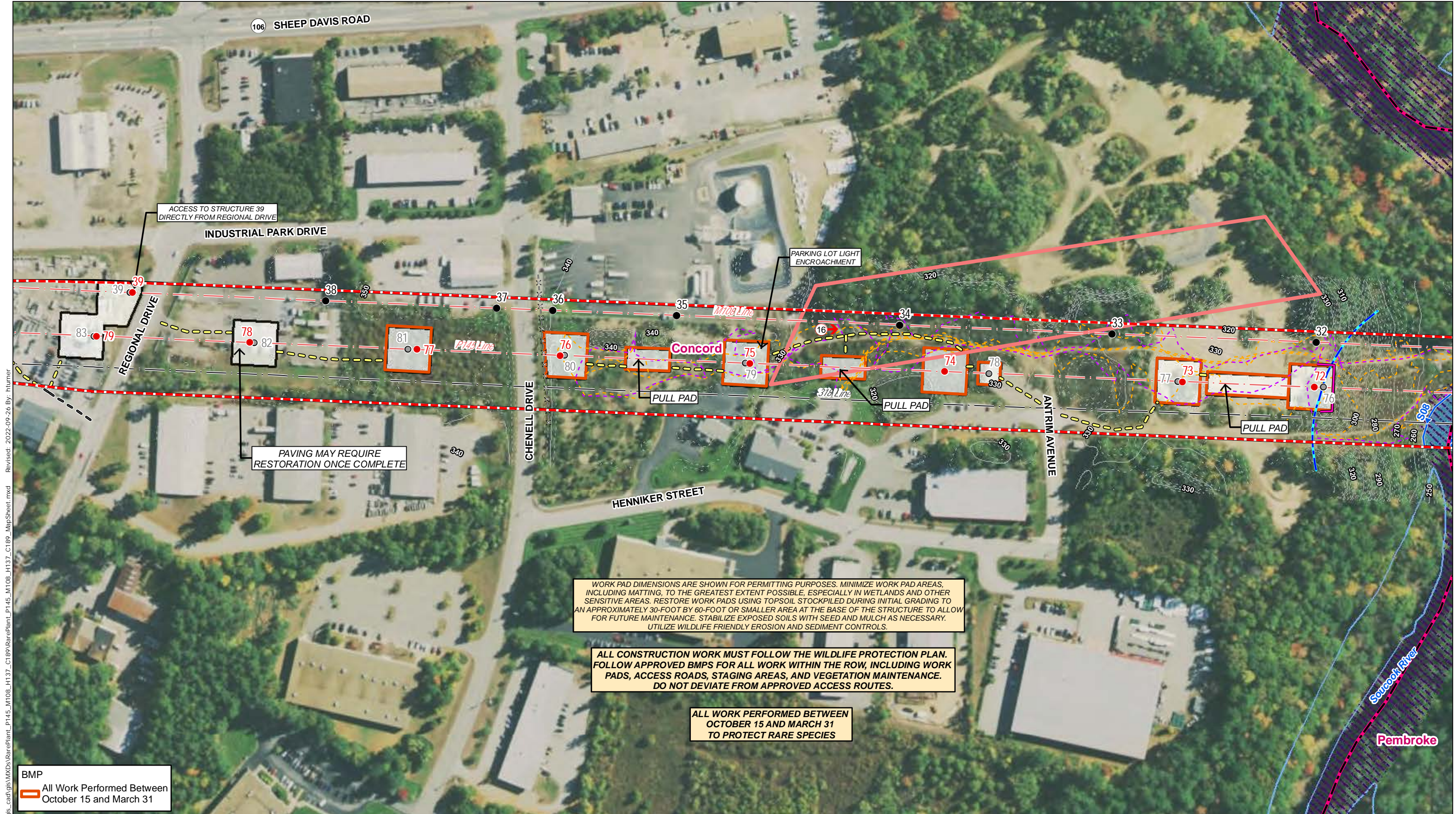
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0 50 100 200 Feet

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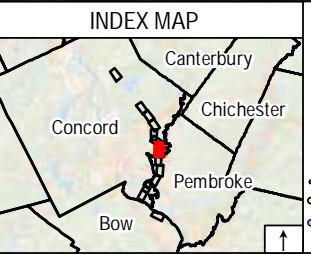


EVERSOURCE ENERGY		Stantec	
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Concord, NH		MAP SHEET	
Date: September 26, 2022		6 of 13	



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Revised: 2022-09-26 By: hturner

BMP
 All Work Performed Between October 15 and March 31



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- Field Delineated Wetland
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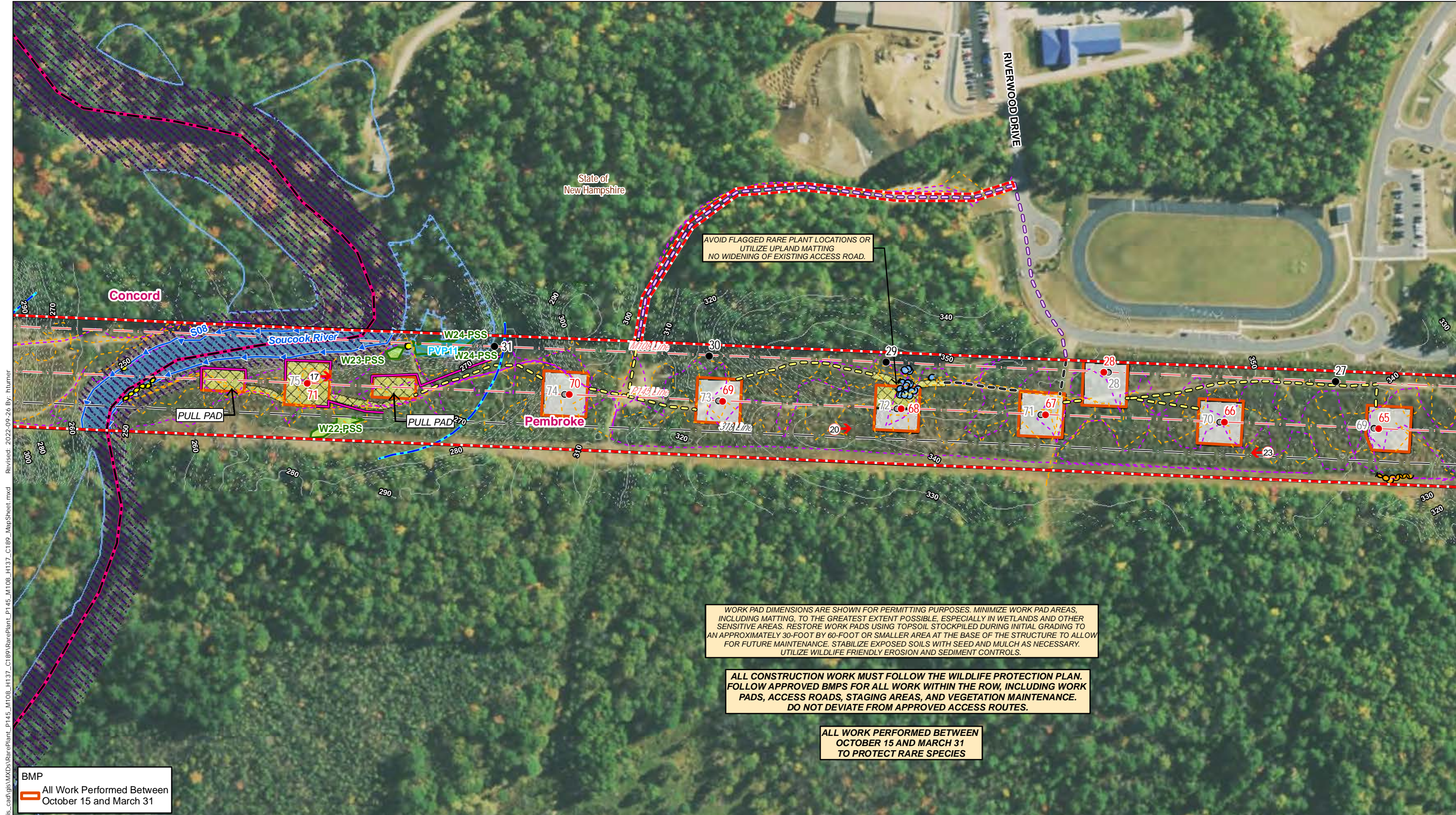
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EVERSOURCE ENERGY		Stantec
P145 Rebuild & H137/M108/C189 Structure Replacement Rare Plant Map Set		
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Date: September 26, 2022	7 of 13	



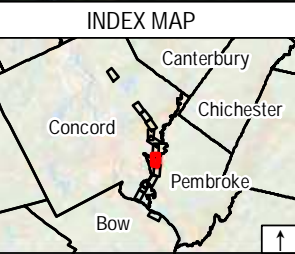
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ALL WORK PERFORMED BETWEEN OCTOBER 15 AND MARCH 31 TO PROTECT RARE SPECIES

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BMP
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 - Dry Land Sedge
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EVERSOURCE ENERGY		Stantec	
P145 Rebuild & H137/M108/C189 Structure Replacement Rare Plant Map Set			
Pembroke & Concord, NH		MAP SHEET	
Date: September 26, 2022		8 of 13	

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ALL WORK PERFORMED BETWEEN OCTOBER 15 AND MARCH 31 TO PROTECT RARE SPECIES

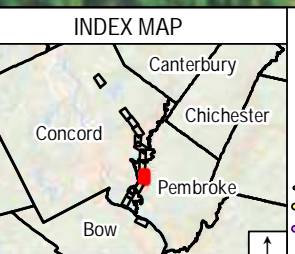
15'X50' EMERGENCY PULL-OFF, APPROXIMATE LOCATION

PLACE UPLAND MATTING FOLLOWING FIRST FROST EVENT AFTER OCTOBER 15 AND REMOVE BY MARCH 31

PLACE UPLAND MATTING ON OR AFTER OCTOBER 1 AND REMOVE BY JULY 1

AVOID FLAGGED RARE PLANT LOCATIONS OR UTILIZE UPLAND MATTING. NO WIDENING OF EXISTING ACCESS ROAD.

BMP
All Work Performed Between October 15 and March 31



- Legend**
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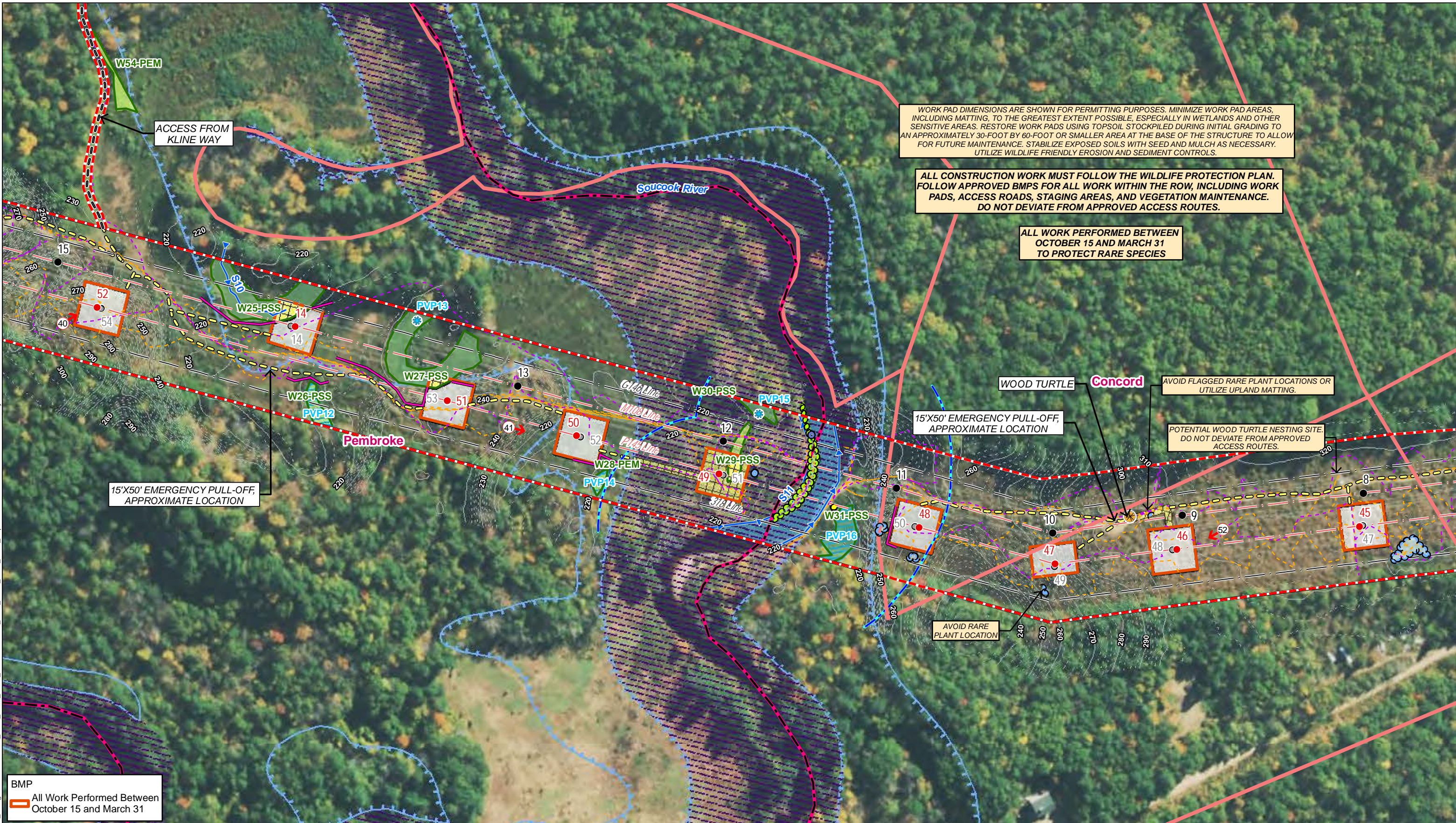
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Map Notes:
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EVERSOURCE ENERGY		Stantec	
P145 Rebuild & H137/M108/C189 Structure Replacement Rare Plant Map Set			
Pembroke, NH		MAP SHEET	
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AVOID FLAGGED RARE PLANT LOCATIONS OR UTILIZE UPLAND MATTING.

POTENTIAL WOOD TURTLE NESTING SITE. DO NOT DEVIATE FROM APPROVED ACCESS ROUTES.

WOOD TURTLE

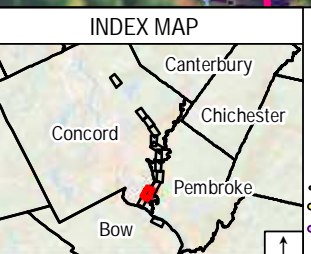
Concord

15'X50' EMERGENCY PULL-OFF, APPROXIMATE LOCATION

15'X50' EMERGENCY PULL-OFF, APPROXIMATE LOCATION

AVOID RARE PLANT LOCATION

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Concord & Pembroke, NH	MAP SHEET	
Date: September 26, 2022	11 of 13	

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ALL WORK PERFORMED BETWEEN OCTOBER 15 AND MARCH 31 TO PROTECT RARE SPECIES

AVOID FLAGGED RARE PLANT LOCATIONS OR UTILIZE UPLAND MATTING.

AVOID FLAGGED RARE PLANT LOCATIONS OR UTILIZE UPLAND MATTING. NO WIDENING OF EXISTING ACCESS ROAD.

15'X50' EMERGENCY PULL-OFF, APPROXIMATE LOCATION

150'X75' MOBILE YARD AND TAPS

20' WIDE UNDERGROUND DISTRIBUTION FEEDER

UTILIZE EXISTING WORK PAD AREAS AS STAGING AREAS ONLY, FOLLOW BMP'S

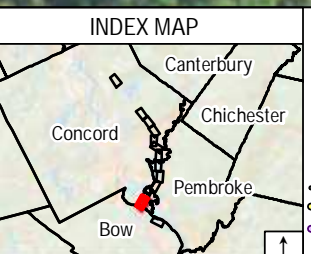
UTILIZE EXISTING WORK PAD AREAS AS STAGING AREAS ONLY, FOLLOW BMP'S

AVOID FLAGGED RARE PLANT LOCATIONS OR UTILIZE UPLAND MATTING.

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BMP
 All Work Performed Between October 15 and March 31

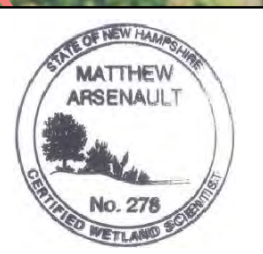


- Legend**
- Proposed Structure
 - Existing Structure
 - Existing Structure to be Removed
 - Overhead Eversource Line
 - Overhead Distribution Line
 - Underground Distribution Line
 - Existing Right-of-Way (ROW)
 - Existing Access
 - Proposed Access
 - Off-ROW Access Pending Rights
 - Temporary Construction Matting
 - Stone Work Pad
 - Existing Gravel
 - Eversource Owned Property
 - Municipal Boundary
 - Sediment Control Barrier
 - 2' Contours
 - 10' Contours
 - Fence
 - Railroad
 - Potential Vernal Pool
 - Potential Vernal Pool Extent
 - Delineated Perennial Stream
 - Delineated Intermittent Stream
 - Delineated Ephemeral Stream
 - Field Delineated Wetland Boundary Outline
 - Field Delineated Wetland
 - Priority Resource Area
 - Open Water
 - FEMA 100-Year Flood Zone
 - FEMA Floodway
 - NHDES Protected Shoreland
 - GAS Approximate Gas Line
 - Stone Wall
 - Berm
 - Culvert
 - Rare Species
 - Rare Plant Survey Photo Location and Direction
 - Approximate Rare Plant Survey Area
 - Rare Plant Survey Tracks
 - May 2022
 - July 2022
 - Dry Land Sedge

- FEMA 100-Year Flood Zone
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1 inch = 200 feet

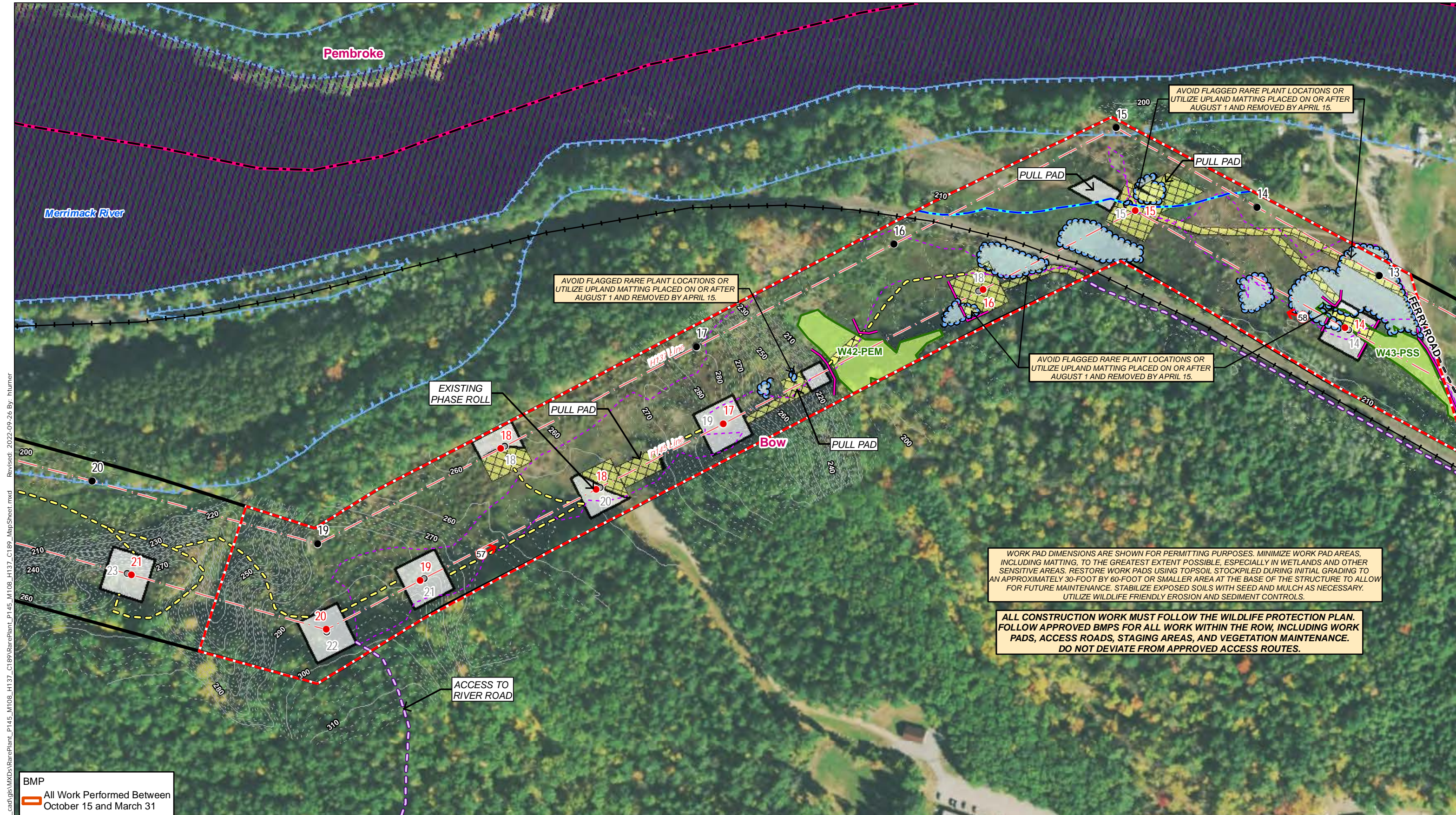
Map Notes:
 Coordinate System: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
 Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.
 Additional source include: NH Grant
 Basemap: 2018 National Agriculture Imagery Program (NAIP) aerial imagery
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EVERSOURCE ENERGY **Stantec**

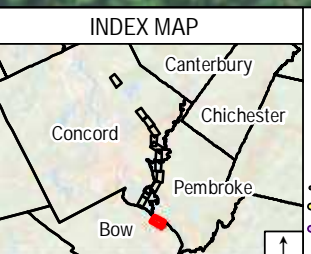
P145 Rebuild & H137/M108/C189 Structure Replacement Rare Plant Map Set

Bow & Concord, NH	MAP SHEET
Date: September 26, 2022	12 of 13



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 Revised: 2022-09-26 By: hturner

BMP
 All Work Performed Between
 October 15 and March 31



- Legend**
- Proposed Structure
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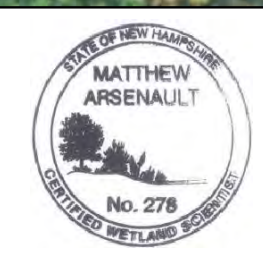
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- Rare Plant Survey Photo Location and Direction
- Approximate Rare Plant Survey Area
- Rare Plant Survey Tracks
- May 2022
- July 2022
- Dry Land Sedge

1 inch = 200 feet
 0 50 100 200 Feet
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EVERSOURCE ENERGY		Stantec	
P145 Rebuild & H137/M108/C189 Structure Replacement Rare Plant Map Set			
Bow, NH		MAP SHEET	
Date: September 26, 2022		13 of 13	

**P145 LINE STRUCTURE REPLACEMENT PROJECT THREATENED AND ENDANGERED PLANT
SURVEY REPORT**

October 4, 2022

APPENDICES



**P145 LINE STRUCTURE REPLACEMENT PROJECT THREATENED AND ENDANGERED PLANT
SURVEY REPORT**

October 4, 2022

Appendix A BOTANIST RESUME



Matt Arsenault

Certified Ecologist, Botanist, Professional Wetland Scientist

Matt is a Certified Ecologist and regionally recognized expert Botanist responsible for performing ecological and botanical assessments and characterizations; natural resource inventories including rare, threatened, and endangered species surveys; wetland delineations and function and value assessments; wildlife population surveys; long-term biological monitoring; and water quality monitoring surveys. For nearly 20 years, Matt has worked on a multitude of ecological projects, including natural community and rare plant and wildlife survey projects throughout the northeastern, northcentral, mid-Atlantic, and southern United States. These projects have ranged from general reconnaissance observations to quantitative, community- and species-specific surveys. These projects have involved detailed natural community mapping and analysis. He has also provided expert witness testimony regarding the findings of various ecological field studies. Matt has taught many workshops, led field trips, and published manuscripts on plant identification and ecology.

EDUCATION

BS, Botany, summa cum laude honors, University of Maine, Orono, Maine, US, 2003

Wetland Delineation Methods, University of New Hampshire, Durham, New Hampshire, 2005

10-Hour Construction Safety & Health Certified, OSHA, Topsham, Maine, 2009

40-hour HAZWOPER Certified, OSHA, Topsham, Maine, 2010

CPR Certified, American Safety & Health Institute, Topsham, Maine, 2022

OSHA 8-Hour HAZWOPER Refresher Certification, Topsham, Maine, 2020

REGISTRATIONS

Certified Wetland Scientist #278, New Hampshire Joint Board

Ecologist, Ecological Society of America, 6-1-2020 through 6-30-2025

Professional Wetland Scientist, #3384, Society of Wetland Scientists, through 6-7-2026

MEMBERSHIPS

Survey-approved Botanist, Massachusetts Natural Heritage and Endangered Species Program

Member, Maine Natural Areas Program Botanical Advisory Group

Member, New England Plant Conservation Program Task Force, Native Plant Trust

Member, New England Botanical Club

Member, Friends of the Maine Herbarium, The University of Maine Herbaria

Member, Josselyn Botanical Society of Maine

Member, Ecological Society of America

Member, Maine Association of Wetland Scientists

PROJECT EXPERIENCE

Rare Plant Surveys | Grafton County, New Hampshire | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys at a project site on the Connecticut River in Grafton County, New Hampshire. Rare plant species located included great St. John's-wort (*Hypericum ascyron*), Kalm's lobelia (*Lobelia kalmii*), fen grass-of-Parnassus (*Parnassia glauca*), sticky false asphodel (*Triantha glutinosa*), and Virginia stickseed (*Hackelia virginiana*). Prepared detailed report for client and state agencies.

Significant Ecological Evaluations | New Hampshire | Coos County | Lead Project Scientist

Lead Project Scientist responsible for performing a broad-spectrum survey and evaluation of significant natural resources within an approximately 60,000-acre project area in northern New Hampshire. Evaluations included rare plant and wildlife surveys, wildlife habitat characterizations, reconnaissance wetland and stream surveys, and natural community characterizations.

Rare Plant Survey | Londonderry, New Hampshire | Lead Project Scientist

Lead Project Scientist responsible for performing a rare plant survey and natural community characterization of a proposed development site.

Rare Species Habitat Assessment, Private Client | Success, New Hampshire | Lead Ecologist

Lead Ecologist responsible for conducting a rare species habitat assessment at a proposed development site. Meander surveys were conducted to characterize the existing habitats in order to evaluate their potential to support rare, threatened, and endangered species of plants and wildlife. Prepared detailed report of findings.

Rare Plant Surveys and Transplanting, Pine Street Boat Launch | Walpole, New Hampshire | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys at a proposed dredge site on the Connecticut River in Walpole, New Hampshire. Field surveys targeted several plant species including Vasey's pondweed (*Potamogeton vaseyi*), grass-leaved mud-plantain (*Heteranthera dubia*), long-leaved pondweed (*Potamogeton nodosus*), pygmy-weed (*Crassula aquatica*), and awned flatsedge (*Cyperus squarrosus*). Participated in consultation with the New Hampshire Natural Heritage Bureau to determine appropriate compensatory mitigation requirements for unavoidable impacts to the rare plant populations. Prepared rare plant transplanting plan. Conducted transplanting to relocate rare aquatic plants outside of project area and conducted long-term monitoring to assess overall viability of rare plant populations.

Wetland Delineation and Rare Species Habitat Assessment, Merrimack Riverfront Trail System | Hooksett, New Hampshire | Lead Project Scientist

Lead Project Scientist responsible for conducting a wetland delineation as well as field surveys and habitat evaluations of several species of rare wildlife and plants at a proposed recreational trail project site in southern New Hampshire. Targeted species included eastern hognose snake (*Heterodon platirhinos*), Blanding's turtle (*Emydoidea blandingii*), bald eagle (*Haliaeetus leucocephalus*), dry-land sedge (*Carex siccata*), licorice goldenrod (*Solidago odora*), blunt-leaved milkweed (*Asclepias amplexicaulis*), and grass-leaved goldenrod (*Euthamia caroliniana*).

Saddleback Maine Ski Area Expansion | Saddleback Maine | Rangeley and Dallas Plantation, Maine | Field Manager and Lead Project Scientist

Field Manager and Lead Project Scientist responsible for conducting landscape analyses and field surveys to identify and characterize the existing natural resources present on Saddleback Mountain in western Maine prior to construction of a proposed development. Provided detailed analyses and expert witness testimony relative to the potential effects of the proposed development on significant natural resources including plants and wildlife and their associated habitats.

Stetson Mountain Wind Power Project | First Wind | Washington and Penobscot Counties, Maine | Project Scientist

Project Scientist responsible for conducting wetland delineations and rare, threatened, and endangered plant surveys of a low elevation ridgeline and over 30 miles of a proposed transmission line associated with a proposed wind power facility.

Long-term Saltmarsh Vegetation Monitoring, Town of Old Orchard Beach | Old Orchard Beach, Maine | Lead Botanist

Lead Botanist responsible for monitoring annual changes in saltmarsh vegetation and evaluating potential effects of downgradient tidal gates installed at a road crossing on the saltmarsh hydrology.

Rare Plant Survey and Herpetofauna Monitoring, Eversource Laminar Structure Replacement Project | Hudson and Londonderry, New Hampshire | Lead Botanist and Herpetologist

Lead Botanist and Project Herpetologist responsible for conducting field surveys for state-listed plants. Observed species included wild lupine (*Lupinus perennis*), red three awn (*Aristida longespica*), licorice goldenrod (*Solidago odora*), and bird's-foot violet (*Viola pedata*). Also responsible for implementing a herpetofauna protection plan during construction activities. Target species include eastern box turtle (*Terrapene carolina*), Blanding's turtle (*Emydoidea blandingii*), spotted turtle (*Clemmys guttata*), northern black racer (*Coluber constrictor*), eastern hognose snake (*Heterodon platirhinos*), and smooth green snake (*Opheodrys vernalis*). Tasks included construction contractor training session, daily monitoring and work site sweeps for herpetofauna relocation of potentially affected individuals, and field staff training and oversight.

Ecological Characterizations | Portland Water District | Windham and Westbrook, Maine | Field Manager and Lead Project Scientist

Field Manager and Lead Project Scientist responsible for leading field surveys including surveys for rare, threatened, and endangered species of plants and wildlife; assessments of existing wildlife habitat values; and mapping of wetland and stream resources. Provided detailed reports of the findings as well as an analysis on the overall landscape value of each parcel and mitigation potential.

Proposed Transmission Line Natural Resource Identification | Central Maine Power Connection | Penobscot and Aroostook Counties, Maine | Project Scientist

Project Scientist responsible for conducting vernal pool surveys, wetland delineations, and rare plant surveys along over 40 miles of a proposed transmission line corridor in northern Maine. Coordinated with the State agencies regarding potential impacts to several species of rare plants that were identified within the project corridor.

Significant Ecological Resource Evaluations | Plum Creek Timber Company | Moosehead Lake Region, Piscataquis and Somerset Counties, Maine | Field Manager and Lead Project Scientist

Field Manager and Lead Project Scientist responsible for coordinating and conducting field efforts on over 300,000 acres of forest land in northern Maine. Efforts included conducting a landscape analysis focused on identifying areas likely to support significant natural resources including large wetland systems, exemplary natural communities, and rare, threatened, and endangered species of plants and wildlife and their associated habitats. Subsequent field surveys targeted areas to identify and characterize the existing natural resources and their overall landscape significance. Species-specific targeted surveys were conducted for several species of sensitive wildlife including rusty blackbird, Bicknell's thrush, and Clayton's copper butterfly. Conducted detailed analyses and provided expert witness testimony relative to the potential effects of a proposed development and conservation easements on the significant natural resources present within the project area.

Rare Plant Surveys, Private Wind Energy Development | Oxford County, Maine | Lead Botanist

Lead Botanist responsible for conducting surveys for rare plants associated with a proposed wind energy development project in western Maine. Conducted a landscape analysis to identify potentially suitable rare plant habitats based on landscape position followed by meander-based field surveys to characterize the existing conditions and locate rare plants. Prepared detailed report of findings.

Rare Plant Surveys, Number Nine Wind Project | Aroostook County, Maine | Lead Botanist

Lead Botanist responsible for conducting de novo rare plant surveys at a proposed wind project site in Aroostook County, Maine. Tasks included the completion of a landscape analysis to identify areas within the project area with potential habitat for rare plants. Follow-up field surveys were completed to identify rare plants and natural communities within the project area. Several new locations of rare plants were located as a result of the field surveys including Goldie's fern (*Dryopteris goldiana*), male fern (*Dryopteris filix-mas*), showy lady's-slipper (*Cypripedium reginae*), northern bog sedge (*Carex gynocrates*), marsh valerian (*Valeriana uliginosa*), lesser yellow water crowfoot (*Ranunculus gmelinii*), and swamp honeysuckle (*Lonicera oblongifolia*). A detailed report of the field results was prepared and included with permit applications.

Rare Plant Surveys and Baseline Water Quality Monitoring, Downeast Wind Project | Washington County, Maine | Field Scientist

Field Scientist responsible for establishing baseline water quality conditions of several streams associated with a proposed wind energy development facility in eastern Maine. Streams were monitored by conducting an inventory and analysis of benthic macroinvertebrate species through systematic sampling and analytical methods. Also completed extensive rare plant surveys throughout the proposed project area. Field efforts identified numerous new locations for a state listed species: Canada mountain-rice grass (*Piptatherum canadense*) as well as a new location for bog Jacob's-ladder (*Polemonium vanburntiae*).

Rare Species Survey and Habitat Characterization, Private Client | Auburn, Maine | Lead Scientist

Field Scientist responsible for conducting a characterization of existing ecological conditions of a proposed development site in central Maine. Efforts consisted of a desktop review of available information followed by field surveys to document existing conditions. Efforts focused on evaluating potential habitats for rare, threatened, and endangered species. Documented several occurrences of swamp white oak (*Quercus bicolor*), a state-listed species. Prepared a detailed report of the findings.

Rare Plant Survey, Private Client | Alfred, Maine | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys associated with a proposed solar facility in southern Maine. Meander surveys were conducted in habitats suitable for rare plants. Species observed included spotted wintergreen (*Chimaphila maculata*), hairy clover (*Lespedeza hirta*), Missouri rock cress (*Boechera missouriensis*), Kalm's brome (*Bromus kalmii*), spicebush (*Lindera benzoin*), Muhlenberg's sedge (*Carex muehlenbergii*), smooth winterberry (*Ilex laevigata*), and blunt-lobed grape fern (*Botrychium oneidense*). Prepared detailed report of findings.

Rare Plant Surveys, Vermont Agency of Transportation | Georgia, Vermont | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys at a proposed culvert replacement project. Surveys identified two state listed species: Fernald's sedge (*Carex merritt-fernaldii*) and short-beaked sedge (*Carex brevior*). Coordinated with client and state heritage program staff regarding avoidance and minimization measures to avoid adverse impacts to rare plant populations.

Rare Species Surveys and Habitat Assessments | Portland to Montreal Pipeline, Northern Vermont | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys and habitat assessments at several ecologically sensitive areas in advance of proposed maintenance activities along an existing pipeline. Documented several rare plant occurrences including lance-leaved violet (*Viola lanceolata*), grass-leaved rush (*Juncus marginatus*), mountain honeysuckle (*Lonicera villosa*), northern sweet-coltfoot (*Petasites frigidus*), yellow lady's-slipper (*Cypripedium parviflorum*), and Lake Huron bog orchid (*Platanthera huronensis*). Also documented occurrences of wood turtle (*Glyptemys insculpta*) and invasive plant species. Coordinated with natural resource agencies and prepared a report of the findings.

Wetland Delineation and Habitat Assessment, Vermont Agency of Transportation | Bennington and Rutland Counties, Vermont | Lead Wetland Scientist and Ecologist

Lead Wetland Scientist and Ecologist responsible for conducting wetland and watercourse delineations and evaluations of potentially suitable habitat for rare, threatened, and endangered species at several railroad bridge replacement locations in southwestern Vermont. Documented several rare plant populations including lesser clearweed (*Pilea fontana*), rough-leaved goldenrod (*Solidago patula*), mudflat spikesedge (*Eleocharis intermedia*), and weak-stalked bulrush (*Schoenoplectus purshianus*). Prepared report of findings.

Wetland Delineation and Habitat Assessment, Vermont Agency of Transportation | Burke, Vermont | Lead Wetland Scientist and Ecologist

Lead Wetland Scientist and Ecologist responsible for conducting wetland and watercourse delineations and evaluations of potentially suitable habitat for rare, threatened, and endangered species at a bridge replacement location. Assessed habitat for wood turtle (*Glyptemys insculpta*), showy lady's-slipper (*Cypripedium reginae*), sheathed sedge (*Carex vaginata*), northern sweet coltsfoot (*Petasites frigidus*), and a moss (*Calligeron obtusiolium*). Prepared report of findings.

Rare Plant Survey and Assessment, Vermont Agency of Transportation | Fairlee, Vermont | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys at a proposed ledge stabilization project on I-91. Surveys identified three state listed species: Fernald's sedge (*Carex merritt-fernaldii*), bronze sedge (*Carex foenea*) and Canada rockcress (*Boechnera stricta*). Coordinated with client and state heritage program staff regarding mitigating efforts to off-set unavoidable impacts to state-listed species. Coordinated seed collection and processing for anticipated transplanting efforts. Assisted with the preparation of a take permit for unavoidable impacts. Conducted transplanting of rare plant specimens that were grown from seed at an off-site location and conducted follow-up monitoring to assess survivorship.

Wetland Delineation and Habitat Assessment, Vermont Agency of Transportation | Statewide, Vermont | Lead Wetland Scientist and Ecologist

Lead Wetland Scientist and Ecologist responsible for conducting wetland and watercourse delineations and evaluations of potentially suitable habitat for rare, threatened, and endangered species at several airports throughout Vermont. Prepared report of findings.

Rare Plant Survey, North Hartland Lake | Hartland, Vermont | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys associated with a large recreational area. Meander surveys were conducted in habitats suitable for rare plants. Species targeted and observed included hyssop-leaved fleabane (*Erigeron hyssopifolius*), ginseng (*Panax quinquefolius*), Wiegand's rye (*Elymus wiegandii*), cursed crowfoot (*Ranunculus sceleratus*), narrow false oat (*Trisetum spicatum*), tall wood-beauty (*Drymocallis arguta*), short-beaked sedge (*Carex brevior*), broad-beech fern (*Phegopteris hexagonoptera*), spotted wintergreen (*Chimaphila maculata*), slender muhly (*Muhlenbergia tenuiflora*), Garber's sedge (*Carex garberi*), and shining lady's-tresses (*Spiranthes lucida*). Prepared detailed report of findings

New England Floristic Quality Assessment Index Development Project | Expert Botanist

Selected as an Expert Botanist to participate in the development of a Floristic Quality Assessment Index (FQAI) for New England. Duties included reviewing comprehensive vascular plant species lists for Maine and assigning a Coefficient of Conservatism value to each species based on direct knowledge of species tolerance for disturbances and affinities for particular habitats.

**ForSAFE-Veg Model Setup and Evaluation Project:
Northern Hardwood Forest Ecosystem | Expert
Botanist**

Selected as an Expert Botanist to participate in the setup of the ForSAFE-Veg model (an integrated forest ecosystem model) to simulate ecosystem biogeochemistry and ground vegetation composition in Northern Hardwood Forest ecosystems in the Northeastern U.S. relative to climate change and air pollution. Duties included participating in meetings with other regional botanists to review vegetation characteristic of northern hardwood forests in order to assign values to each species relative to their colonization ability, rooting depths, shading heights, palatability, temperature ranges, shade tolerance, water requirements, nitrogen needs, and pH tolerance for model calibration.

**Rare Plant Surveys and Mitigation, Hartford-Brainard
Airport | Hartford, Connecticut | Lead Botanist**

Lead Botanist responsible for conducting rare plant surveys associated with a proposed airspace obstruction removal project associated with the Hartford-Brainard Airport in Connecticut. Species targeted and identified within the project area included Davis' sedge (*Carex davisii*), cattail sedge (*Carex typhina*), Wiegand's rye grass (*Elymus wiegandii*), hoary plantain (*Plantago virginica*), and wapato (*Sagittaria cuneata*). Prepared a detailed report of the findings, consulted with state regulatory agencies to reach an agreement on appropriate mitigation, and prepared an incidental take permit application for unavoidable impacts to rare plant species, which was approved by state agencies.

**Rare Plant Monitoring, Groton-New London Airport |
Groton, Connecticut | Lead Botanist**

Lead Botanist responsible for conducting annual monitoring of yellow thistle (*Cirsium horridulum*) at a regional airport in coastal Connecticut. Completed annual counts of flowering and vegetative individuals in order to evaluate population trends over time. Prepared detailed report for state agencies of the field monitoring results.

**Rare Plant Surveys, Pleasure Beach State Park |
Bridgeport, Connecticut | Lead Botanist**

Lead Botanist responsible for conducting rare plant surveys at a coastal project site in southern Connecticut. Rare plant surveys were completed during appropriate periods of the growing season to target seaside threeawn (*Aristida tuberculosa*), eastern prickly-pear (*Opuntia humifusa*), northern blazing-star (*Liatris novae-angliae*), and sickle-leaved silk-grass (*Pityopsis falcata*). Prepared detailed reports of the results of the field surveys.

**Rare Plant Surveys and Mitigation, Old Farms Road |
Avon, Connecticut | Lead Botanist**

Lead Botanist responsible for conducting rare plant surveys associated with a proposed road and bridge replacement project in Avon, Connecticut. Species targeted and identified within the project area included Davis' sedge (*Carex davisii*), Virginia waterleaf (*Hydrophyllum virginianum*), Wiegand's rye grass (*Elymus wiegandii*). Prepared a detailed report of the findings, consulted with state regulatory agencies to reach an agreement on appropriate mitigation, and prepared an incidental take permit application for unavoidable impacts to rare plant species. Conducted transplanting of rare plants within the project footprint to an off-site mitigation area and oversaw herbicide treatment of the mitigation area. Conducted follow-up monitoring to evaluate survivorship of transplanting efforts.

**Rare Plant Survey, Eversource Line 321/1681 | New
Milford, Connecticut | Lead Botanist**

Lead Botanist responsible for conducting rare plant surveys along a transmission line corridor in New Milford, Connecticut. Meander surveys were conducted in habitats suitable for rare plants. Located populations of purple cress (*Cardamine douglassii*). Prepared detailed report and impact assessment.

**Rare Plant Survey, Private Solar Development Site |
Lakeville, Connecticut | Lead Botanist**

Lead Botanist responsible for conducting surveys for rare plants of a proposed solar power development site in northwestern Connecticut. Field surveys targeted handsome sedge (*Carex formosa*) as well as other state-listed species. Documented population of handsome sedge and provided recommendations for avoidance of impacts. Prepared detailed report of findings.

**Rare Plant Survey, Eversource CT02 TRRP Project |
New Milford, Connecticut | Lead Botanist**

Lead Botanist responsible for conducting rare plant surveys along a transmission line corridor in New Milford, Connecticut ahead of vegetation management activities. Field surveys targeted and/or observed hairy angelica (*Angelica venenosa*), purple cress (*Cardamine douglassii*), Bush's sedge (*Carex bushii*), eastern few-seeded sedge (*Carex oligocarpa*), stiff gentian (*Gentianella quinquefolia*), yellow flax (*Linum sulcatum*), hoary plantain (*Plantago virginica*), Hooker's orchid (*Plantago hookeri*), Seneca snakeroot (*Polygala senega*), wild senna (*Senna hebecarpa*), yellow pimpernel (*Taenidtia integerrima*), Indian paintbrush (*Castilleja coccinea*), Devil's-bit (*Chamaelirium luteum*), whitlow-grass (*Draba reptans*), and hairy-fruited sedge (*Carex trichocarpa*).

Rare Plant Survey, Route 7/15 Interchange | Norwalk, Connecticut | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys along a proposed roadway realignment project in Norwalk, Connecticut. Meander surveys were conducted in habitats suitable for rare plants.

Rare Plant Surveys, Shoreline Greenway Trail | East Haven, Connecticut | Field Manager

Field Manager responsible coordinating and overseeing field surveys targeting rare plants at a proposed recreational trail development site in southern Connecticut. Oversaw implementation of field methods and provided quality controls of field data and reporting. Species targeted during the field surveys included bitter panicgrass (*Panicum amarum*), Hervey's aster (*Eurybia xherveyi*), bracted orache (*Atriplex glabriuscula*), and bearded sprangletop (*Leptochloa fusca*).

Rare Plant Surveys, Silver Sands State Park | Milford, Connecticut | Field Manager

Field Manager responsible coordinating and overseeing field surveys targeting rare plants at a proposed state park expansion site in southern Connecticut. Oversaw implementation of field methods and provided quality controls of field data and reporting. Prepared an Incidental Take Permit application for unavoidable impacts which detailed proposed on-site mitigation efforts including transplanting and long-term monitoring.

Rare Plant Surveys, Private Development | Tolland County, Connecticut | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys associated with a proposed development site in Tolland County, Connecticut. A landscape analysis was completed prior to field surveys to identify habitats with potential for rare plant species. Meander surveys were completed throughout the project area to locate rare plants and characterize the natural communities present. A detailed report of the findings was prepared for the client.

Host Plant Assessment, Private Client | Putnam, Connecticut | Lead Botanist

Lead Botanist responsible for conducting a host-plant survey for frosted elfin (*Callophys irus*). Prepared report of findings.

Rare Species Survey, Private Client | Bloomfield, Connecticut | Lead Ecologist

Lead Ecologist responsible for conducting surveys to evaluate the presence of several state-listed species at a proposed development site. Species targeted included meadow horsetail (*Equisetum pratense*), wood turtle (*Glyptemys insculpta*), and box turtle (*Terrapene carolina*). Prepared report of findings.

Rare Plant Surveys, National Grid | Providence County, Rhode Island | Project Manager and Lead Botanist

Lead Botanist responsible for conducting surveys for rare plants along an approximately 14-mile transmission line corridor. Field efforts documented numerous populations of state-listed species including bur-reed sedge (*Carex sparganioides*), floodplain avens (*Geum laciniatum*), orange-fruited horse-gentian (*Triosteum aurantiacum*), slender-leaved agalinis (*Agalinis tenuifolia*), fern-leaved false foxglove (*Aureolaria pedicularia*), pink-corydalis (*Capnoides sempervirens*), woodland sunflower (*Helianthus divaricatus*), and forest lousewort (*Pedicularis canadensis*). Prepared detailed report of findings.

Rare Plant Survey, Massachusetts Department of Transportation, Schell Bridge Replacement Project | Northfield, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys associated with a bridge replacement project in western Massachusetts. Lead Botanist responsible for conducting rare plant surveys along a transmission line corridor in western Massachusetts. Meander surveys were conducted in habitats suitable for rare plants. Species targeted included intermediate spikesedge (*Eleocharis intermedia*), wapato (*Sagittaria cuneata*), Frank's lovegrass (*Eragrostis frankii*), Wright's spikesedge (*Eleocharis diandra*), ovate spikesedge (*Eleocharis ovata*), American waterwort (*Elatine americana*), and many-fruited seedbox (*Ludwigia polycarpa*). Prepared detailed report and impact assessment.

Rare Plant Survey, Eversource Line 1161 | Lenox, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys along a transmission line corridor in western Massachusetts. Meander surveys were conducted in habitats suitable for rare plants. Species targeted included bur oak (*Quercus macrocarpa*), intermediate spikesedge (*Eleocharis intermedia*), wapato (*Sagittaria cuneata*), Frank's lovegrass (*Eragrostis frankii*), and bristly buttercup (*Ranunculus pensylvanicus*). Prepared detailed report and impact assessment.

Rare Species Habitat Assessment, Massachusetts Department of Transportation | Bourne, Massachusetts | Lead Ecologist

Lead Ecologist responsible for conducting habitat assessments for threatened and endangered species associated with a bridge replacement project in eastern Massachusetts. Field surveys were conducted within the project area to characterize the existing habitats and evaluate their potential to support state-listed species of plants and wildlife. Prepared report of the findings.

Rare Plant Surveys, Eversource Line 3419 | Wilbraham and Hampden, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys along a transmission line corridor in Wilbraham and Hampden, Massachusetts. Meander surveys were conducted in habitats suitable for rare plants. Species targeted included climbing fern (*Lygodium palmatum*) and bristly buttercup (*Ranunculus pensylvanicus*). Prepared detailed report and impact assessment. Also prepared a rare plant protection plan designed to avoid take of rare species during construction. Conducted monitoring to assess rare plant populations following construction activities

Rare Plant Surveys, Eversource Line 1113 | Amherst and Granby, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys along a transmission line corridor in Amherst and Granby, Massachusetts. Meander surveys were conducted in habitats suitable for rare plants. Species targeted included green rockcress (*Boechera missouriensis*), large-bracted tick-trefoil (*Desmodium cuspidatum*), and violet wood sorrel (*Oxalis violacea*). Prepared detailed report and impact assessment.

Rare Plant Surveys, Eversource Line 1447/1428 | South Hadley, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys along a transmission line corridor in South Hadley, Massachusetts. Meander surveys were conducted in habitats suitable for rare plants. Species targeted included Gray's sedge (*Carex grayi*), cat-tail sedge (*Carex typhina*), Tuckerman's sedge (*Carex tuckermanii*), winged monkey-flower (*Mimulus alatus*), and swamp dock (*Rumex verticillatus*). Prepared detailed report and impact assessment.

Rare Plant Surveys, Eversource Line 1211 | Pittsfield, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys along a transmission line corridor in Pittsfield, Massachusetts. Meander surveys were conducted in habitats suitable for rare plants. Species targeted included chestnut-colored sedge (*Carex castanea*), barren strawberry (*Geum fragarioides*), hairy honeysuckle (*Lonicera hirsuta*), and crooked-stem aster (*Symphotrichum prenanthoides*). Prepared detailed report and impact assessment.

Rare Plant Surveys, Massachusetts Department of Transportation | Sheffield, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting surveys for rare plants and evaluating after-the-fact impacts to rare plants associated with an emergency slope stabilization project. Prepared study plan for review and approval by the Massachusetts Natural Heritage and Endangered Species Program prior to conducting field surveys. Field surveys targeted Tuckerman's sedge (*Carex tuckermanii*) and small dropseed (*Sporobolus neglectus*) as well as other state-listed species. Documented populations of Tuckerman's sedge. Prepared detailed report of findings.

Rare Plant Surveys, Massachusetts Department of Transportation | Brookfield, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting surveys for and evaluating potential impacts to rare plants associated with a proposed bridge replacement project. Prepared study plan for review and approval by the Massachusetts Natural Heritage and Endangered Species Program prior to conducting field surveys. Field surveys targeted dwarf bulrush (*Lipocarpa micrantha*) and Long's bulrush (*Scirpus longii*). Documented populations of dwarf bulrush. Prepared detailed report and impact assessment.

Invasive Species Assessment, Private Client | Granby, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting an assessment of invasive plant species occurring at an inactive landfill. Efforts included a species inventory and estimation of their overall abundance. Prepared report of findings including recommendations for management.

Rare Plant Survey and Assessment, Massachusetts Department of Transportation | Williamstown, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting a rare plant survey and impact assessment along a proposed roadway rehabilitation project to target crooked-stem aster (*Symphotrichum prenanthoides*). Prepared study plan for review and approval by the Massachusetts Natural Heritage and Endangered Species Program. Surveys resulted in documentation of numerous new populations. Prepared a report of the survey results.

Rare Plant Surveys | Worcester, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys along a transmission line corridor in Worcester, Massachusetts. Meander surveys were conducted in habitats suitable for rare plants. Species targeted included smooth rockcress (*Boechera laevigata*) and downy wild rye (*Elymus villosus*).

Hoosac Wind Project | Iberdrola Renewables Inc. | Florida, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting annual monitoring of large-leaved goldenrod (*Solidago macrophylla*) at the Hoosac Wind Project in western Massachusetts. Data were collected on transplant success and establishment as well as seed germination success. Prepared detailed reports for client and state agencies.

Rare Plant Surveys, Mount Wachusett | Princeton, Massachusetts | Lead Botanist

Lead Botanist responsible for conducting rare plant surveys associated with a road rehabilitation project by the Massachusetts Department of Conservation and Recreation on Mt. Wachusett. Targeted plant species included narrow false oat (*Trisetum spicatum*), Back's sedge (*Carex backii*), Bartram's shadbush (*Amelanchier bartramiana*), millet grass (*Milium effusum*), and adder's-tongue fern (*Ophioglossum pusillum*).

Rare Plant Survey | Lower Chichester, Pennsylvania | Lead Project Scientist

Lead Project Scientist responsible for performing a rare plant survey and natural community characterization of a proposed development site.

Moresville Wind Power Project | Delaware County, New York | Lead Project Scientist

Lead Project Scientist responsible for conducting a broad-spectrum survey and characterization of the existing natural resources including natural communities, rare plants, and rare wildlife along an approximately 5-mile ridgeline in south central New York. Provided a detailed report of the results of the field surveys.

PUBLICATIONS AND PRESENTATIONS

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Belyazip, S., J. Phelan, B. Nihlgård, H. Sverdrup, C. Driscoll, I. Fernandez, J. Aherne, L.M. Teeling-Adams, S. Bailey, **M. Arsenault**, N. Cleavitt, B. Engstrom, R. Dennis, D. Sperduto, D. Werier, and C. Clark. 2019. Assessing the effects of climate change and air pollution on soil properties and plant diversity in northeastern U.S. hardwood forests: model setup and evaluation. *Water, Air, & Soil Pollution*, 230: 106

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Campbell, C.S., W.A. Wright, M. Cox, T.F. Vining, C.S. Major, **M.P. Arsenault**. Nuclear ribosomal DNA internal transcribed spacer 1 (ITS1) in *Picea* (Pinaceae): Sequence divergence and structure. *Molecular Phylogenetics and Evolution*, 35: 165-185, 2005.

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Presentation: Winter Twigs of Maine. *Maine Association of Wetland Scientists*, 2016.

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Presentation: The Sedges of Maine - A Field Guide to the Cyperaceae Project Overview. *Northeast Natural History Conference*, 2013.

Presentation: *Carex* Identification. *Maine Association of Wetland Scientists*, 2009.

Presentation: Winter Twig Identification. *Stantec Consulting*, 2008.

Presentation: Natural Resource Inventories. Maine Land Trust Conference. *Maine Coast Heritage Trust*, 2007.

Presentation: The Genus *Galium*. *Plant Identification Workshop for Josselyn Botanical Society Annual Meeting*, 2006.

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Appendix B REPRESENTATIVE PHOTOGRAPHS



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Photo 1. Structure 114 to Portsmouth Street Segment: shrub-dominated ROW, view to the southeast to structure 114. Stantec. July 19, 2022.



Photo 2. Structure 114 to Portsmouth Street Segment: shrub-dominated ROW, view to the southeast to structure 111. Stantec. July 19, 2022.



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Photo 3. Structure 114 to Portsmouth Street Segment: shrub-dominated ROW, view to the southeast to structure 109. Stantec. May 16, 2022.



Photo 4. Structure 114 to Portsmouth Street Segment: view to the north to structure 108. Stantec. May 16, 2022.



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Photo 5. I-393 to Louden Road Segment: shrub-dominated ROW, view to the north to structure 101. Stantec. July 19, 2022.



Photo 6. I-393 to Louden Road Segment: previously documented location for red threeawn near structure 99, view to the west. Stantec. July 19, 2022.



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Photo 7. Louden Road to Soucook River Segment: shrub-dominated ROW, view to the south at structure 97. Stantec. May 16, 2022.



Photo 8. Louden Road to Soucook River Segment: shrub-dominated ROW, view to the north at structure 95. Stantec. July 19, 2022.



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Photo 9. Louden Road to Soucook River Segment: shrub-dominated ROW, view to the south at structure 92. Stantec. May 16, 2022.



Photo 10. Louden Road to Soucook River Segment: shrub-dominated ROW, view to the south to structure 89. Stantec. July 18, 2022.



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Photo 11. Louden Road to Soucook River Segment: shrub-dominated ROW, view to the west to structure 88. Stantec. July 19, 2022.



Photo 12. Louden Road to Soucook River Segment: dense shrub-dominated ROW, view to the west to structure 86. Stantec. July 19, 2022.



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Photo 13. Louden Road to Soucook River Segment: wild lupine near structure 90. Stantec. May 6, 2022.



Photo 14. Louden Road to Soucook River Segment: wild lupine near structure 90. Stantec. June 2, 2022.



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Photo 15. Louden Road to Soucook River Segment: wild lupine. Stantec. May 16, 2022.



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Photo 16. Louden Road to Soucook River Segment: ROW south of Chenell Drive, view to the south to structure 78. Stantec. May 16, 2022.



Photo 17. Soucook River to Pembroke Street Segment: scrub oak-dominated ROW near structure 75, view to the south. Stantec. July 22, 2022.



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Photo 18. Soucook River to Pembroke Street Segment: hollow Joe-Pye weed along Soucook River north of structure 75. Stantec. July 22, 2022.



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Photo 19. Soucook River to Pembroke Street Segment: glaucous stem of hollow Joe-Pye weed along Soucook River north of structure 75. Stantec. July 22, 2022.



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Photo 20. Soucook River to Pembroke Street Segment: scrub oak-dominated ROW near structure 72, view to the south. Stantec. May 17, 2022.



Photo 21. Soucook River to Pembroke Street Segment: dry land sedge habitat at structure 72. Stantec. May 17, 2022.



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Photo 22. Soucook River to Pembroke Street Segment: dry land sedge at structure 72. Stantec.
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Photo 23. Soucook River to Pembroke Street Segment: scrub oak-dominated ROW near structure 70, view to the north. Stantec. July 22, 2022.



Photo 24. Soucook River to Pembroke Street Segment: wild lupine habitat near structure 68. Stantec. May 17, 2022.



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Photo 25. Soucook River to Pembroke Street Segment: wild lupine near structure 68. Stantec.
May 17, 2022.



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Photo 26. Soucook River to Pembroke Street Segment: licorice goldenrod habitat near structure 67, view to the north. Stantec. July 22, 2022.



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Photo 27. Soucook River to Pembroke Street Segment: licorice goldenrod. Stantec. July 22, 2022.



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Photo 28. Soucook River to Pembroke Street Segment: licorice goldenrod along edge of existing trail. Stantec. July 22, 2022.



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Photo 29. Soucook River to Pembroke Street Segment: licorice goldenrod. Stantec. July 22, 2022.



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Photo 30. Soucook River to Pembroke Street Segment: red threeawn population near structure 66. Stantec. July 22, 2022.



Photo 31. Soucook River to Pembroke Street Segment: vegetative red threeawn plants near structure 66. Stantec. July 22, 2022.



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Photo 32. Soucook River to Pembroke Street Segment: sparsely pilose flat leaves of red threeawn near structure 66. Stantec. July 22, 2022.



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Photo 33. Soucook River to Pembroke Street Segment: dry land sedge habitat near structure 62. Stantec.
May 17, 2022.



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Photo 34. Soucook River to Pembroke Street Segment: dry land sedge near structure 62. Stantec.
May 17, 2022.



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Photo 35. Soucook River to Pembroke Street Segment: dry land sedge near structure 62. Stantec.
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Photo 36. Soucook River to Pembroke Street Segment: scrub oak-dominated ROW near structure 60, view to the northeast. Stantec. July 21, 2022.



Photo 37. Pembroke Street to Merrimack River Segment: scrub oak-dominated ROW near structure 58, view to the northeast. Stantec. July 21, 2022.



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Photo 38. Pembroke Street to Merrimack River Segment: dry land sedge habitat near structure 56. Stantec. May 17, 2022.



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Photo 39. Pembroke Street to Merrimack River Segment: dry land sedge near structure 56. Stantec.
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Photo 40. Pembroke Street to Merrimack River Segment: ROW uplands near structure 54, view to the south. Stantec. May 17, 2022.



Photo 41. Pembroke Street to Merrimack River Segment: shrub-dominated near structure 52, view to the southwest. Stantec. July 21, 2022.



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Photo 42. Pembroke Street to Merrimack River Segment: incurved umbrella sedge habitat along Soucook River. Stantec. July 21, 2022.



Photo 43. Pembroke Street to Merrimack River Segment: incurved umbrella sedge habitat along Soucook River. Stantec. July 21, 2022.



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Photo 44. Pembroke Street to Merrimack River Segment: incurved umbrella sedge along Soucook River. Stantec. July 21, 2022.



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Photo 45. Pembroke Street to Merrimack River Segment: red-root umbrella sedge habitat along Soucook River. Stantec. July 21, 2022.



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Photo 46. Pembroke Street to Merrimack River Segment: red-root umbrella sedge along Soucook River. Stantec. July 21, 2022.



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Photo 47. Pembroke Street to Merrimack River Segment: hollow Joe-Pye weed along Soucook River. Stantec. July 21, 2022.



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Photo 48. Pembroke Street to Merrimack River Segment: dry land sedge habitat near structure 50. Stantec. May 17, 2022.



Photo 49. Pembroke Street to Merrimack River Segment: dry land sedge habitat near structure 50. Stantec. May 17, 2022.



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Photo 50. Pembroke Street to Merrimack River Segment: dry land sedge habitat near structure 47. Stantec. May 17, 2022.



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Photo 51. Pembroke Street to Merrimack River Segment: dry land sedge near structure 47. Stantec.
May 17, 2022.



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Photo 52. Pembroke Street to Merrimack River Segment: scrub oak-dominated ROW near structure 48, view to the north. Stantec. July 21, 2022.



Photo 53. Pembroke Street to Merrimack River Segment: scrub oak-dominated ROW near structure 46 view to the south. Stantec. May 17, 2022.



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Photo 54. Pembroke Street to Merrimack River Segment: dry land sedge habitat near structure 41.
Stantec. May 17, 2022.



Photo 55. Pembroke Street to Merrimack River Segment: dry land sedge habitat near structure 41.
Stantec. May 17, 2022.



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Photo 56. Pembroke Street to Merrimack River Segment: dry land sedge near structure 41. Stantec.
May 17, 2022.



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Photo 57. Structure 23 to Ferry Road Segment: sandy grassland area near structure 21, view to the east. Stantec. July 21, 2022.



Photo 58. Structure 23 to Ferry Road Segment: sandy grassland area near structure 14, view to the northwest. Stantec. July 21, 2022.



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Photo 59. Structure 23 to Ferry Road Segment: dry land sedge habitat near structure 18. Stantec.
May 17, 2022.



Photo 60. Structure 23 to Ferry Road Segment: dry land sedge habitat near structure 15. Stantec.
May 17, 2022.



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Photo 61. Structure 23 to Ferry Road Segment: dry land sedge habitat near structure 14. Stantec.
May 17, 2022.



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Photo 62. Structure 23 to Ferry Road Segment: dry land sedge near structure 14. Stantec. May 17, 2022.



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Appendix C SPECIAL PLANT DATA FORMS



Special Plant Survey Form

Sourcecode (office use only)

Survey Site: Eversource ROW – Dirt Doctors Date: 7/22/22 Phone: 207-798-2135
 Surveyors: Matt Arsenault Town: Pembroke Email: Matt.arsenault@stantec.com
 GPS Waypoint #s: _____
 GPS coordinates: 43.189369/-71.487850 Datum (e.g., NAD 83): NAD83 GPS Unit / model: EOS Arrow

Directions: (Map must be attached)
 Access via Dirt Doctors landscape material facility west of Sheep Davis Road. Plants occur in middle of open transmission line at north end of the open material storage and stockpiling yard

Species Aristida longespica EONum: _____

IMPORTANT: What diagnostic features were observed that would separate it from similar species?
 Plants were vegetative – identification is tentative and based on the following: late season annual grass with white, fibrous roots, flat and sparsely pilose leaves, dense vegetative growth in dry, open, disturbed sandy soil

Specimen taken? No X Photograph taken? Yes X Photograph attached? Yes X
 For specimens: Collector, collection #, repository: _____

Office Use Only ID reviewed by: _____ Date: _____ Based on: Description Photograph Specimen
 Conclusion: Verified Possible - needs follow-up Mis-identified

Phenology (%)		Population Size		Age Structure (%)		Vigor (%)	
100	In leaf	Ramets	Genets**	100	seedlings		Very feeble
	In bud		actual #		immature		Feeble
	In flower		estim. #		vegetative sprouts		Normal
	Immature fruit		1-10		1 st year	100	Vigorous
	Mature fruit		11-50		mature (established)		Exceptionally vigorous
	Seed dispersing		51-100		senescent		vigorous
			101-1000		age unknown		
	Vegetative reproduction*		> 1,000				
			X				

*Describe vegetative reproduction: Annual grass
 **Genets: How defined? Average size?: Individual stems emerging from ground

% of plants with 0 Evidence of disease
0 Injury / herbivory

Population Polygon (PP): If you drew a line around all the plants you found, how large an area would be within it?
Total Cover (TC): What is the total area covered by all the plants (as if they were growing next to one another)?

PP	TC	What % of the Population Polygon is covered by this species?	<u>55%</u> = (TC / PP)*100
< 1 sq. meter	_____	Within the population polygon, how are the stems distributed?	Clumped <u>Scattered</u> Other <u>X</u>
1-5 sq. m.	_____		If "other", describe:
5-10 sq. m.	_____		<u>lawn-like</u>
10-100 sq. m.	_____	How much time was spent searching in this area?	<u>1</u> people searched for <u>150</u> minutes
100-1000 sq. m. (.1 ha)	200 sm 110 sm	How thoroughly was the Population Polygon searched?	Very well <u>X</u> Fairly well <u>Not well</u>
> 0.1 ha	_____	Is there suitable habitat nearby that was not searched?	Yes <u>No</u> Unknown <u>X</u>
actual area (if known)	_____		

Comments on population size / distribution / etc.: Numerous vegetative stems occurring in a small area of open, disturbed soil ; forming a lawn of annual grasses

Aspect		Slope		Light		Topo position		Moisture regime		Comments	
N	NE	X	0-3%	X	Open		Crest		Inundated (hydric)		
E	NW		3-8%		Partial	X	Upper slope		Saturated (wet-mesic)		
S	SE		8-15%		Filtered		Mid-slope		Moist (mesic)		
W	SW		15-35%		Shade		Lower slope		Dry-mesic		
X	Flat		35%-vert.				Bottom	X	Dry (xeric)		
	Degrees		degrees								

Elevation range: 330' to 330' feet Soil name (SCS) / Substrate: Windsor loamy sand

Bedrock type: _____

Associated natural community: Developed lot	Releve completed? Yes__ No x_
Dominant / characteristic species: Agrostis gigantea, Trifolium arvense, Erigeron canadense, Juncus tenuis, Rudbeckia hirta, Schizachyrium scoparium	
Associated plant species (immediate vicinity): Same as above	
Invasive species: None observed	
Sketch (habitat and/or overhead view). Include scale, north arrow, and where the plants are. See attached mapping	

Owner aware of the plant? Yes X	Owner comments:
Owner protecting the plant? Yes X	

Evidence of disturbance: Site is heavily disturbed from moving / storage of landscape material and equipment

Management needs: Routine soil scarification is needed to maintain open disturbed soil and remove competing vegetation

<p>The SIZE of the population: Summarize first page, provide additional details (e.g. on the distribution of the plants, how confident you are that most of the habitat was searched, thus most plants were located). Large vigorous population albeit limited in spatial extent to discrete area of exposed sandy soils. Suitable habitat is available in many areas beyond limits of survey. Habitat is likely ephemeral and may fluctuate depending on operations at the landscape material facility.</p> <p>The current CONDITION of the population and its immediate habitat. Include reproductive activity and health of the plants, and dispersal, establishment, and maintenance of the population. Also evidence of disturbance in the immediate vicinity including known presence of invasive species. Habitat is heavily disturbed as a result of storage and movement of landscaping materials and supplies. Disturbed habitat is consistent with the needs of the species. However, habitat resembles more a vacant/abandoned lot than a natural community</p> <p>The condition of the LANDSCAPE in the area SURROUNDING the population (e.g. is the area an undisturbed, functioning natural ecosystem: current and past land use? fragmentation?). Immediate landscape is heavily developed with an active landscape material operation</p>

Letter ranks summarizing the comments made above: A = Excellent, B = Good, C = Fair, D = Poor			
Size Rank: A	Condition Rank: C	Landscape Context Rank: D	Overall Rank (A-D): C
Your experience with this species (ranks are relative to): <input type="checkbox"/> Local <input type="checkbox"/> Statewide <input checked="" type="checkbox"/> Regional <input type="checkbox"/> Global			

Special Plant Survey Form

Sourcecode (office use only)

Survey Site: Eversource ROW – Ferry Road Date: 5/18/22 Phone: 207-798-2135
 Surveyors: Matt Arsenault Town: Bow Email: Matt.arsenault@stantec.com
 GPS Waypoint #s: _____
 GPS coordinates: 43.152685/-71.484606 Datum (e.g., NAD 83): NAD83 GPS Unit / model: EOS Arrow

Directions: (Map must be attached)
 Open transmission line right-of-way north of Ferry Road. Park at railroad crossing at Ferry Road plants begin along the western shoulder of Ferry Road and continue for approximately 0.3 miles north and then west, ending approximately mid-way up a steep east-facing slope west of the railroad tracks.

Species **Carex siccata** EONum: _____

IMPORTANT: What diagnostic features were observed that would separate it from similar species?
 Strongly rhizomatous habit; erect culm with basally disposed leaves and all spikes similar and sessile, perigynia with winged margin; terminal spike androgynous

Specimen taken? **No X** Photograph taken? **Yes X** Photograph attached? **Yes X**
 For specimens: Collector, collection #, repository: _____

Office Use Only ID reviewed by: _____ Date: _____ Based on: Description Photograph Specimen
 Conclusion: Verified Possible - needs follow-up Mis-identified

Phenology (%)		Population Size		Age Structure (%)	Vigor (%)
		Ramets	Genets**		
<input type="checkbox"/>	In leaf		actual #	<input type="checkbox"/>	Very feeble
<input type="checkbox"/>	In bud			<input type="checkbox"/>	Feeble
<input type="checkbox"/>	In flower	14000+	estim. #	<input type="checkbox"/>	Normal
<input type="checkbox"/>	Immature fruit		1-10	<input type="checkbox"/>	Vigorous
100	Mature fruit		11-50	<input type="checkbox"/>	Exceptionally vigorous
<input type="checkbox"/>	Seed dispersing		51-100	100	Exceptionally vigorous
<input type="checkbox"/>			101-1000	<input type="checkbox"/>	
X	Vegetative reproduction*	X	> 1,000	<input type="checkbox"/>	
				<input type="checkbox"/>	age unknown

*Describe vegetative reproduction: Plants spreading colonially by rhizomes
 **Genets: How defined? Average size?: Ramets were estimated and based on emergent culms

% of plants with 0 Evidence of disease
0 Injury / herbivory

Population Polygon (PP): If you drew a line around all the plants you found, how large an area would be within it?
Total Cover (TC): What is the total area covered by all the plants (as if they were growing next to one another)?

<u>0</u> < 1 sq. meter	<u>0</u> PP	<u>0</u> TC	What % of the Population Polygon is covered by this species? <u>32%</u> = (TC / PP)*100
<u>0</u> 1-5 sq. m.			Within the population polygon, how are the stems distributed? Clumped <u>Scattered</u> Other X
<u>0</u> 5-10 sq. m.			If "other", describe: <u>lawn-like</u>
<u>0</u> 10-100 sq. m.			How much time was spent searching in this area? <u>1</u> people searched for <u>120</u> minutes
<u>0</u> 100-1000 sq. m. (.1 ha)			How thoroughly was the Population Polygon searched? Very well X <u>Fairly well</u> Not well
<u>0</u> > 0.1 ha	2.2	-0.7	Is there suitable habitat nearby that was not searched? Yes X No <u>Unknown</u>
<u>0</u> actual area (if known)			

Comments on population size / distribution / etc.: Forming large colonies in dry sandy soil in open ROW. Population near Merrimack River is particularly vigorous.

Aspect	Slope	Light	Topo position	Moisture regime	Comments
<input type="checkbox"/> N	<input checked="" type="checkbox"/> 0-3%	<input checked="" type="checkbox"/> Open	<input checked="" type="checkbox"/> Crest	<input type="checkbox"/> Inundated (hydric)	
<input checked="" type="checkbox"/> E	<input type="checkbox"/> 3-8%	<input type="checkbox"/> Partial	<input type="checkbox"/> Upper slope	<input type="checkbox"/> Saturated (wet-mesic)	
<input type="checkbox"/> S	<input type="checkbox"/> 8-15%	<input type="checkbox"/> Filtered	<input checked="" type="checkbox"/> Mid-slope	<input type="checkbox"/> Moist (mesic)	
<input type="checkbox"/> W	<input checked="" type="checkbox"/> 15-35%	<input type="checkbox"/> Shade	<input type="checkbox"/> Lower slope	<input type="checkbox"/> Dry-mesic	
<input checked="" type="checkbox"/> Flat	<input type="checkbox"/> 35%-vert.		<input type="checkbox"/> Bottom	<input checked="" type="checkbox"/> Dry (xeric)	
<input type="checkbox"/> Degrees	<input type="checkbox"/> degrees				

Elevation range: 200' to 250' feet Soil name (SCS) / Substrate: Occum very fine sandy loam

Bedrock type: _____

Associated natural community:	Sandplain grassland	Releve completed?	Yes__ No x _
Dominant / characteristic species:	Schizachyrium scoparium, Carex pensylvanica, Solidago rugosa, Pteridium aquilinum, Ionactis linearifolia		
Associated plant species (immediate vicinity):	Same as above		
Invasive species:	None observed		
Sketch (habitat and/or overhead view). Include scale, north arrow, and where the plants are. See attached mapping			
Owner aware of the plant?	Yes X	Owner comments:	
Owner protecting the plant?	Yes X		
Evidence of disturbance:	Periodic vegetation management, including vegetation removal and access		
Management needs:	Thinning of shrub and sapling vegetation would promote open habitat necessary for this species.		
The SIZE of the population: Summarize first page, provide additional details (e.g. on the distribution of the plants, how confident you are that most of the habitat was searched, thus most plants were located). Large meta population with plants occurring regularly in open ROW, thousands of ramets observed; many areas forming dense colonies, particularly closer to railroad tracks and Ferry Road			
The current CONDITION of the population and its immediate habitat. Include reproductive activity and health of the plants, and dispersal, establishment, and maintenance of the population. Also evidence of disturbance in the immediate vicinity including known presence of invasive species. The open, disturbed habitat is favorable for establishment of Carex siccata. Dense shrub vegetation may over time reduce habitat suitability through succession. Periodic vegetation maintenance is necessary to maintain early successional conditions.			
The condition of the LANDSCAPE in the area SURROUNDING the population (e.g. is the area an undisturbed, functioning natural ecosystem: current and past land use? fragmentation?). Surrounding landscape in immediate vicinity is low-intensity development. Granite Shore Power plant located to south			
Letter ranks summarizing the comments made above: A = Excellent, B = Good, C = Fair, D = Poor			
Size Rank:	A	Condition Rank:	A
Landscape Context Rank:	A/B	Overall Rank (A-D):	A
Your experience with this species (ranks are relative to): <input type="checkbox"/> Local <input type="checkbox"/> Statewide <input checked="" type="checkbox"/> Regional <input type="checkbox"/> Global			

Special Plant Survey Form

Sourcecode (office use only)

Survey Site: Eversource ROW – South of Soucook River Date: 5/17/22 Phone: 207-798-2135
 Surveyors: Matt Arsenault and Derek Benedix Town: Concord Email: Matt.arsenault@stantec.com
 GPS Waypoint #s: _____
 GPS coordinates: 43.179298/-71.493284 43.175194/-71.499327 Datum (e.g., NAD 83): NAD83 GPS Unit / model: EOS Arrow

Directions: (Map must be attached)
 Plants are located in numerous locations within open transmission line from sandy terrace south of Soucook River to sandy floodplain terrace of the Merrimack River near Garvins Falls Road. See provided mapping

Species **Carex siccata** EONum: _____

IMPORTANT: What diagnostic features were observed that would separate it from similar species?
 Strongly rhizomatous habit; erect culm with basally disposed leaves and all spikes similar and sessile, perigynia with winged margin; terminal spike androgynous

Specimen taken? **Yes X** Photograph taken? **Yes X** Photograph attached? **Yes X**
 For specimens: Collector, collection #, repository: TBD

Office Use Only ID reviewed by: _____ Date: _____ Based on: Description Photograph Specimen
 Conclusion: Verified Possible - needs follow-up Mis-identified

Phenology (%)		Population Size		Age Structure (%)		Vigor (%)	
		Ramets	Genets**				
In leaf			actual #		seedlings		Very feeble
In bud					immature		Feeble
In flower		7600+	estim. #		vegetative sprouts	50	Normal
Immature fruit			1-10		1 st year	25	Vigorous
100 Mature fruit			11-50		100 mature (established)	25	Exceptionally vigorous
Seed dispersing			51-100		senescent		vigorous
			101-1000		age unknown		
X Vegetative reproduction*		X	> 1,000				

*Describe vegetative reproduction: Plants spreading colonially by rhizomes
 **Genets: How defined? Average size?: Ramets were estimated and based on emergent culms

% of plants with 0 Evidence of disease
0 Injury / herbivory

Population Polygon (PP): If you drew a line around all the plants you found, how large an area would be within it?
Total Cover (TC): What is the total area covered by all the plants (as if they were growing next to one another)?

PP	TC	What % of the Population Polygon is covered by this species?	<u>2.5%</u> = (TC / PP)*100
< 1 sq. meter	_____	Within the population polygon, how are the stems distributed?	Clumped <u>Scattered</u> Other <u>X</u>
1-5 sq. m.	_____		If "other", describe: <u>lawn-like</u>
5-10 sq. m.	_____	How much time was spent searching in this area?	<u>2</u> people searched for <u>180</u> minutes
10-100 sq. m.	_____	How thoroughly was the Population Polygon searched?	Very well <u>X</u> Fairly well <u>Not well</u>
100-1000 sq. m. (.1 ha)	_____	Is there suitable habitat nearby that was not searched?	Yes <u>X</u> No <u>Unknown</u>
> 0.1 ha	<u>-6 ha</u> <u>-0.15</u>		
actual area (if known)	_____		

Comments on population size / distribution / etc.: Forming large colonies in dry sandy soil in open ROW. Population near Merrimack River is particularly vigorous.

Aspect		Slope		Light		Topo position		Moisture regime		Comments
N	NE	X	0-3%	X	Open	X	Crest		Inundated (hydric)	
E	NW		3-8%		Partial		Upper slope		Saturated (wet-mesic)	
S	SE		8-15%		Filtered	X	Mid-slope		Moist (mesic)	
W	SW		15-35%		Shade		Lower slope		Dry-mesic	
X	Flat		35%-vert.				Bottom	X	Dry (xeric)	
	Degrees		degrees							

Elevation range: 200' to 250' feet Soil name (SCS) / Substrate: Windsor loamy sand

Bedrock type: _____

Associated natural community:	Scrub oak barren (location 1) / early successional floodplain terrace (location 2)	Releve completed?	Yes__ No x_
Dominant / characteristic species:	Quercus ilicifolia, Betula populifolia, Comptonia peregrina, Carex lucorum, Solidago rugosa, Schizachyrium scoparium, Spiraea alba, Betula populifolia, Corylus americana		
Associated plant species (immediate vicinity):	Same as above		
Invasive species:	None observed		
Sketch (habitat and/or overhead view). Include scale, north arrow, and where the plants are. See attached mapping			
Owner aware of the plant?	Yes X	Owner comments:	
Owner protecting the plant?	Yes X		
Evidence of disturbance:	Periodic vegetation management, including vegetation removal and access		
Management needs:	Thinning of shrub and sapling vegetation would promote open habitat necessary for this species.		
The SIZE of the population: Summarize first page, provide additional details (e.g. on the distribution of the plants, how confident you are that most of the habitat was searched, thus most plants were located). Large meta population with plants occurring regularly in open ROW, thousands of ramets observed; many areas forming dense colonies, particularly closer to Merrimack River			
The current CONDITION of the population and its immediate habitat. Include reproductive activity and health of the plants, and dispersal, establishment, and maintenance of the population. Also evidence of disturbance in the immediate vicinity including known presence of invasive species. The open, disturbed habitat is favorable for establishment of Carex siccata. Dense shrub vegetation may over time reduce habitat suitability through succession. Periodic vegetation maintenance is necessary to maintain early successional conditions.			
The condition of the LANDSCAPE in the area SURROUNDING the population (e.g. is the area an undisturbed, functioning natural ecosystem: current and past land use? fragmentation?). Surrounding landscape south of Route 3 to Merrimack River is largely undeveloped and intact			
Letter ranks summarizing the comments made above: A = Excellent, B = Good, C = Fair, D = Poor			
Size Rank:	A	Condition Rank:	B
Landscape Context Rank:	A/B	Overall Rank (A-D):	A/B
Your experience with this species (ranks are relative to): <input type="checkbox"/> Local <input type="checkbox"/> Statewide <input checked="" type="checkbox"/> Regional <input type="checkbox"/> Global			

Special Plant Survey Form

Sourcecode (office use only)

Survey Site: Eversource ROW – North of Route 3 Date: 5/17/22 Phone: 207-798-2135
 Surveyors: Matt Arsenault and Derek Benedix Town: Pembroke Email: Matt.arsenault@stantec.com
 GPS Waypoint #s: _____
 GPS coordinates: 43.195400 / -71.487063 43.183986/-71.488398 Datum (e.g., NAD 83): NAD83 GPS Unit / model: EOS Arrow

Directions: (Map must be attached)
 Location 1: Eversource ROW across NH Army National Guard Training Facility west of Sheep David Rd. Plants are located at 2nd structure north of Riverwood Drive / running track along both edges of an existing gravel road in open ROW
 Location 2: Located at the top of a north facing slope on flat, sandy terrace south of the Dirt Doctors facility west of Sheep Davis Road. Plants are located approximately 35-40 feet south of existing transmission line structure on west edge of existing gravel road.

Species **Carex siccata** EONum: _____

IMPORTANT: What diagnostic features were observed that would separate it from similar species?
 Strongly rhizomatous habit; erect culm with basally disposed leaves and all spikes similar and sessile, perigynia with winged margin; terminal spike androgynous

Specimen taken? **Yes X** Photograph taken? **Yes X** Photograph attached? **Yes X**
 For specimens: Collector, collection #, repository: TBD

Office Use Only ID reviewed by: _____ Date: _____ Based on: Description Photograph Specimen
 Conclusion: Verified Possible - needs follow-up Mis-identified

Phenology (%)		Population Size		Age Structure (%)		Vigor (%)	
		Ramets	Genets**				
<input type="checkbox"/>	In leaf			<input type="checkbox"/>	seedlings	<input type="checkbox"/>	Very feeble
<input type="checkbox"/>	In bud		actual #	<input type="checkbox"/>	immature	<input type="checkbox"/>	Feeble
<input type="checkbox"/>	In flower	1200	estim. #	<input type="checkbox"/>	vegetative sprouts	100	Normal
<input type="checkbox"/>	Immature fruit		1-10	<input type="checkbox"/>	1 st year	<input type="checkbox"/>	Vigorous
100	Mature fruit		11-50	100	mature (established)	<input type="checkbox"/>	Exceptionally vigorous
<input type="checkbox"/>	Seed dispersing		51-100	<input type="checkbox"/>	senescent	<input type="checkbox"/>	vigorous
<input type="checkbox"/>			101-1000	<input type="checkbox"/>	age unknown		
X	Vegetative reproduction*	X	> 1,000				

*Describe vegetative reproduction: Plants spreading colonially by rhizomes
 **Genets: How defined? Average size?: Ramets were counted and based on emergent culms

% of plants with _____ Description _____
0 Evidence of disease _____
0 Injury / herbivory _____

Population Polygon (PP): If you drew a line around **all** the plants you found, how large an area would be within it?
Total Cover (TC): What is the total area covered by all the plants (as if they were growing next to one another)?

	PP	TC	
< 1 sq. meter	_____	_____	What % of the Population Polygon is covered by this species? <u>65%</u> = (TC / PP)*100 Within the population polygon, how are the stems distributed? Clumped <u>Scattered</u> Other X If "other", describe: <u>lawn-like</u>
1-5 sq. m.	_____	_____	
5-10 sq. m.	_____	_____	
10-100 sq. m.	_____	_____	
100-1000 sq. m. (.1 ha)	230	150	
> 0.1 ha	_____	_____	How much time was spent searching in this area? <u>2</u> people searched for <u>60</u> minutes
actual area (if known)	_____	_____	How thoroughly was the Population Polygon searched? Very well X <u>Fairly well</u> Not well
			Is there suitable habitat nearby that was not searched? Yes X No Unknown

Comments on population size / distribution / etc.: Forming large colonies in dry sandy soil in open ROW

Aspect		Slope		Light		Topo position		Moisture regime		Comments
<input type="checkbox"/>	N	X	0-3%	X	Open	X	Crest	<input type="checkbox"/>	Inundated (hydric)	
<input type="checkbox"/>	NE				Partial		Upper slope	<input type="checkbox"/>	Saturated (wet-mesic)	
<input type="checkbox"/>	E		3-8%		Filtered		Mid-slope	<input type="checkbox"/>	Moist (mesic)	
<input type="checkbox"/>	S		8-15%		Shade		Lower slope	<input type="checkbox"/>	Dry-mesic	
<input type="checkbox"/>	W		15-35%				Bottom	X	Dry (xeric)	
X	Flat		35%-vert.							
	Degrees		degrees							

Elevation range: 320' to 350' feet

Soil name (SCS) / Substrate: Windsor loamy sand

Bedrock type: _____

Associated natural community: Scrub oak barren	Releve completed? Yes__ No x_
Dominant / characteristic species: <i>Quercus ilicifolia</i> , <i>Betula populifolia</i> , <i>Comptonia peregrina</i> , <i>Carex lucorum</i> , <i>Solidago rugosa</i> , <i>Schizachyrium scoparium</i>	
Associated plant species (immediate vicinity): Same as above	
Invasive species: None observed	

Sketch (habitat and/or overhead view). Include scale, north arrow, and where the plants are.
See attached mapping

Owner aware of the plant? **Yes X**
Owner protecting the plant? **Yes X**

Owner comments:

Evidence of disturbance: **Periodic vegetation management, including vegetation removal and access**

Management needs: **Thinning of shrub and sapling vegetation would promote open habitat necessary for this species.**

The SIZE of the population: Summarize first page, provide additional details (e.g. on the distribution of the plants, how confident you are that most of the habitat was searched, thus most plants were located).

Population area is generally small and discrete but with numerous ramets per colony. *Carex siccata* can routinely form large colonies consisting of tens of thousands of plants under the right habitat conditions. This population is relatively small.

The current CONDITION of the population and its immediate habitat. Include reproductive activity and health of the plants, and dispersal, establishment, and maintenance of the population. Also evidence of disturbance in the immediate vicinity (including known) presence of invasive species.

The open, disturbed habitat is favorable for establishment of *Carex siccata*. Dense shrub vegetation may over time reduce habitat suitability through succession. Periodic vegetation maintenance is necessary to maintain early successional conditions.

The condition of the LANDSCAPE in the area SURROUNDING the population (e.g. is the area an undisturbed, functioning natural ecosystem: current and past land use? fragmentation?).

Population is situated in a highly developed urban landscape; periodic anthropogenic disturbances that result in vegetation removal and soil scarification are beneficial for plants

Letter ranks summarizing the comments made above: A = Excellent, B = Good, C = Fair, D = Poor

Size Rank: **B** Condition Rank: **B** Landscape Context Rank: **C** Overall Rank (A-D): **B**

Your experience with this species (ranks are relative to): Local Statewide Regional Global

Special Plant Survey Form

Sourcecode (office use only)

Survey Site: Eversource ROW – South of Route 3 Date: 5/17/22 Phone: 207-798-2135
 Surveyors: Matt Arsenault and Derek Benedix Town: Pembroke Email: Matt.arsenault@stantec.com
 GPS Waypoint #s: _____
 GPS coordinates: 43.179298/-71.493284 43.175194/-71.499327 Datum (e.g., NAD 83): NAD83 GPS Unit / model: EOS Arrow

Directions: (Map must be attached)
 Plants are located in open transmission line south of Route 3 and north of Soucook River. Location 1: from Route 3, walk southwesterly on existing access road passing 3 structure> Plants are located on east edge of existing access road, approximately 100 feet south of 3rd structure passed. Location 2 – small population (~75 plants) located in middle of open ROW midway between Soucook River and 1st transmission line structure to the north of the river

Species **Carex siccata** EONum: _____

IMPORTANT: What diagnostic features were observed that would separate it from similar species?
 Strongly rhizomatous habit; erect culm with basally disposed leaves and all spikes similar and sessile, perigynia with winged margin; terminal spike androgynous

Specimen taken? **Yes X** Photograph taken? **Yes X** Photograph attached? **Yes X**
 For specimens: Collector, collection #, repository: TBD

Office Use Only ID reviewed by: _____ Date: _____ Based on: Description Photograph Specimen
 Conclusion: Verified Possible - needs follow-up Mis-identified

Phenology (%)		Population Size		Age Structure (%)		Vigor (%)	
		Ramets	Genets**				
<input type="checkbox"/>	In leaf			<input type="checkbox"/>	seedlings	<input type="checkbox"/>	Very feeble
<input type="checkbox"/>	In bud	actual #		<input type="checkbox"/>	immature	<input type="checkbox"/>	Feeble
<input type="checkbox"/>	In flower	2000+	estim. #	<input type="checkbox"/>	vegetative sprouts	100	Normal
<input type="checkbox"/>	Immature fruit		1-10	<input type="checkbox"/>	1 st year	<input type="checkbox"/>	Vigorous
100	Mature fruit		11-50	100	mature (established)	<input type="checkbox"/>	Exceptionally vigorous
<input type="checkbox"/>	Seed dispersing		51-100	<input type="checkbox"/>	senescent	<input type="checkbox"/>	vigorous
<input type="checkbox"/>			101-1000	<input type="checkbox"/>	age unknown		
X	Vegetative reproduction*	X	> 1,000				

*Describe vegetative reproduction: Plants spreading colonially by rhizomes
 **Genets: How defined? Average size?: Ramets were counted and based on emergent culms

% of plants with 0 Evidence of disease Description _____
0 Injury / herbivory _____

Population Polygon (PP): If you drew a line around all the plants you found, how large an area would be within it?
Total Cover (TC): What is the total area covered by all the plants (as if they were growing next to one another)?

	PP	TC	What % of the Population Polygon is covered by this species?	_____ 68% _____ = (TC / PP)*100
< 1 sq. meter	_____	_____	Within the population polygon, how are the stems distributed?	Clumped <input type="checkbox"/> Scattered <input type="checkbox"/> Other X
1-5 sq. m.	_____	_____		If "other", describe: _____
5-10 sq. m.	_____	_____		_____ lawn-like _____
10-100 sq. m.	_____	_____	How much time was spent searching in this area?	_____ 2 _____ people searched for _____ 120 _____ minutes
100-1000 sq. m. (.1 ha)	175	120	How thoroughly was the Population Polygon searched?	Very well X Fairly well <input type="checkbox"/> Not well <input type="checkbox"/>
> 0.1 ha	_____	_____	Is there suitable habitat nearby that was not searched?	Yes X No <input type="checkbox"/> Unknown <input type="checkbox"/>
actual area (if known)	_____	_____		

Comments on population size / distribution / etc.: Forming large colonies in dry sandy soil in open ROW

Aspect		Slope		Light		Topo position		Moisture regime		Comments
<input type="checkbox"/>	N	<input checked="" type="checkbox"/>	NE	<input checked="" type="checkbox"/>	Open	<input checked="" type="checkbox"/>	Crest	<input type="checkbox"/>	Inundated (hydric)	
<input type="checkbox"/>	E	<input type="checkbox"/>	NW	<input type="checkbox"/>	Partial	<input type="checkbox"/>	Upper slope	<input type="checkbox"/>	Saturated (wet-mesic)	
<input type="checkbox"/>	S	<input type="checkbox"/>	SE	<input type="checkbox"/>	Filtered	<input type="checkbox"/>	Mid-slope	<input type="checkbox"/>	Moist (mesic)	
<input type="checkbox"/>	W	<input type="checkbox"/>	SW	<input type="checkbox"/>	Shade	<input type="checkbox"/>	Lower slope	<input type="checkbox"/>	Dry-mesic	
X	Flat	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>	Bottom	X	Dry (xeric)	
<input type="checkbox"/>	Degrees	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		

Elevation range: 220' to 320' feet Soil name (SCS) / Substrate: Windsor loamy sand / Suncook loamy fine sand

Bedrock type: _____

Associated natural community:	Scrub oak barren (location 1) / early successional floodplain terrace (location 2)	Releve completed?	Yes__ No x_
Dominant / characteristic species:	Quercus ilicifolia, Betula populifolia, Comptonia peregrina, Carex lucorum, Solidago rugosa, Schizachyrium scoparium, Spiraea alba		
Associated plant species (immediate vicinity):	Same as above		
Invasive species:	None observed		
Sketch (habitat and/or overhead view). Include scale, north arrow, and where the plants are. See attached mapping			
Owner aware of the plant?	Yes X	Owner comments:	
Owner protecting the plant?	Yes X		
Evidence of disturbance:	Periodic vegetation management, including vegetation removal and access		
Management needs:	Thinning of shrub and sapling vegetation would promote open habitat necessary for this species.		
The SIZE of the population: Summarize first page, provide additional details (e.g. on the distribution of the plants, how confident you are that most of the habitat was searched, thus most plants were located). Population area is generally small and discrete but with numerous ramets per colony. Carex siccata can routinely form large colonies consisting of tens of thousands of plants under the right habitat conditions. This population is relatively small.			
The current CONDITION of the population and its immediate habitat. Include reproductive activity and health of the plants, and dispersal, establishment, and maintenance of the population. Also evidence of disturbance in the immediate vicinity including known presence of invasive species. The open, disturbed habitat is favorable for establishment of Carex siccata. Dense shrub vegetation may over time reduce habitat suitability through succession. Periodic vegetation maintenance is necessary to maintain early successional conditions.			
The condition of the LANDSCAPE in the area SURROUNDING the population (e.g. is the area an undisturbed, functioning natural ecosystem: current and past land use? fragmentation?). Surrounding landscape south of Route 3 to Merrimack River is largely undeveloped and intact			
Letter ranks summarizing the comments made above: A = Excellent, B = Good, C = Fair, D = Poor			
Size Rank:	B	Condition Rank:	B
Landscape Context Rank:	B	Overall Rank (A-D):	B
Your experience with this species (ranks are relative to): <input type="checkbox"/> Local <input type="checkbox"/> Statewide <input checked="" type="checkbox"/> Regional <input type="checkbox"/> Global			

Special Plant Survey Form

Sourcecode **(office use only)**

Survey Site: Eversource ROW – Soucook River Date: 7/21/22 Phone: 207-798-2135
 Surveyors: Matt Arsenault Town: Pembroke Email: Matt.arsenault@stantec.com
 GPS Waypoint #s: _____
 GPS coordinates: 43.174774/-71.499290 Datum (e.g., NAD 83): NAD83 GPS Unit / model: EOS Arrow

Directions: (Map must be attached)
 Best access is to walk southwesterly in open transmission line corridor from Route 3 to Soucook River. Plants are located on a seasonally exposed sandbar on the north shore of the river on an inside bend between the waterline and mid-bank.

Species **Cyperus erythrorhizos** EONum: _____

IMPORTANT: What diagnostic features were observed that would separate it from similar species?
 Tufted annual with bottlebrush-like spikes, small floral scales, and anthocyanic fibrous roots.

Specimen taken? **Yes X** Photograph taken? **Yes X** Photograph attached? **Yes X**
 For specimens: Collector, collection #, repository: TBD

Office Use Only ID reviewed by: _____ Date: _____ Based on: Description Photograph Specimen
 Conclusion: Verified Possible - needs follow-up Mis-identified

Phenology (%)	Population Size		Age Structure (%)	Vigor (%)
	Ramets	Genets**		
In leaf		actual #	seedlings	Very feeble
In bud		estim. #	immature	Feeble
In flower			vegetative sprouts	100 Normal
100 Immature fruit		1-10	1 st year	Vigorous
Mature fruit		11-50	100 mature (established)	Exceptionally vigorous
Seed dispersing		51-100	senescent	vigorous
		101-1000	age unknown	
Vegetative reproduction*		> 1,000		

*Describe vegetative reproduction: Annuals reliant on yearly seed production and germination
 **Genets: How defined? Average size?: Individual plants

% of plants with 0 Evidence of disease
0 Injury / herbivory

Population Polygon (PP): If you drew a line around **all** the plants you found, how large an area would be within it?
Total Cover (TC): What is the total area covered by all the plants (as if they were growing next to one another)?

	PP	TC	What % of the Population Polygon is covered by this species?	_____ % = (TC / PP)*100
< 1 sq. meter	_____	_____	Within the population polygon, how are the stems distributed?	Clumped ___ Scattered X ___ Other ___
1-5 sq. m.	2	0.1		If "other", describe: _____
5-10 sq. m.	_____	_____	How much time was spent searching in this area?	_____1_____ people searched for _____30_____ minutes
10-100 sq. m.	_____	_____	How thoroughly was the Population Polygon searched?	Very well X Fairly well ___ Not well ___
100-1000 sq. m. (.1 ha)	_____	_____	Is there suitable habitat nearby that was not searched?	Yes X ___ No ___ Unknown ___
> 0.1 ha	_____	_____		
actual area (if known)	_____	_____		

Comments on population size / distribution / etc.: Few plants in population. Plants are restricted to exposed wet and mesic sands below the top of the bank ; area receives seasonal scour during runoff / flood events which reduces competing vegetation.

Aspect	Slope	Light	Topo position	Moisture regime	Comments
N _____ NE X	0-3%	X Open	Crest	Inundated (hydic)	
E _____ NW _____	3-8%	Partial	Upper slope	X Saturated (wet-mesic)	
S _____ SE _____	8-15%	Filtered	Mid-slope	Moist (mesic)	
W _____ SW _____	15-35%	Shade	Lower slope	Dry-mesic	
X Flat	35%-vert.		X Bottom	Dry (xeric)	
Degrees _____	degrees _____				

Elevation range: 200' to 200' feet Soil name (SCS) / Substrate: Suncook loamy fine sand
 Bedrock type: _____

Associated natural community:	Emergent shoreline	Releve completed?	Yes ___ No x _
Dominant / characteristic species: Lindernia dubia, Agrostis stolonifera, Mollugo verticillata, Xanthium strumarium, Scirpus cyperinus, Dichantheium clandenstinum, Hypericum mutilum, Sparganium americanum, Eleocharis obtusa, Cyperus squarrosus			
Associated plant species (immediate vicinity): Cyperus squarrosus, Cyperus strigosus, Leersia oryzoides, Lythrum salicaria			
Invasive species: Lythrum salicaria (low abundance)			
Sketch (habitat and/or overhead view). Include scale, north arrow, and where the plants are. See attached mapping			
Owner aware of the plant?	Yes X	Owner comments:	
Owner protecting the plant?	Yes X		
Evidence of disturbance:	Occasional foot traffic from swimming / fishing		
Management needs:	Plants rely on seasonal flood / scour events that remove competing vegetation; maintaining normal hydrological processes is key		
The SIZE of the population: Summarize first page, provide additional details (e.g. on the distribution of the plants, how confident you are that most of the habitat was searched, thus most plants were located). Small population, additional habitat upstream / downstream may provide additional locations			
The current CONDITION of the population and its immediate habitat. Include reproductive activity and health of the plants, and dispersal, establishment, and maintenance of the population. Also evidence of disturbance in the immediate vicinity including known presence of invasive species. Habitat is in good condition albeit rather limited in spatial extent to a discrete inner bend in the river. Plants are in good condition, with normal vigor.			
The condition of the LANDSCAPE in the area SURROUNDING the population (e.g. is the area an undisturbed, functioning natural ecosystem: current and past land use? fragmentation?). Population surrounded by largely intact landscape with limited development apart from existing transmission line			
Letter ranks summarizing the comments made above: A = Excellent, B = Good, C = Fair, D = Poor			
Size Rank:	C	Condition Rank:	B
		Landscape Context Rank:	A
		Overall Rank (A-D):	B/C
Your experience with this species (ranks are relative to):			
	<input type="checkbox"/> Local	<input type="checkbox"/> Statewide	<input checked="" type="checkbox"/> Regional <input type="checkbox"/> Global

Special Plant Survey Form

Sourcecode (office use only)

Survey Site: Eversource ROW – Soucook River Date: 7/21/22 Phone: 207-798-2135
 Surveyors: Matt Arsenault Town: Pembroke Email: Matt.arsenault@stantec.com
 GPS Waypoint #s: _____
 GPS coordinates: 43.174931/-71.499619 Datum (e.g., NAD 83): NAD83 GPS Unit / model: EOS Arrow

Directions: (Map must be attached)
 Best access is to walk southwesterly in open transmission line corridor from Route 3 to Soucook River. Plants are located on a seasonally exposed sandbar on the north shore of the river on an inside bend between the waterline and mid-bank.

Species **Cyperus squarrosus** EONum: _____

IMPORTANT: What diagnostic features were observed that would separate it from similar species?
 Small tufted annual with flattened spikes and evidently recurving floral scale

Specimen taken? **No X** Photograph taken? **Yes X** Photograph attached? **Yes X**
 For specimens: Collector, collection #, repository: _____

Office Use Only ID reviewed by: _____ Date: _____ Based on: Description Photograph Specimen
 Conclusion: Verified Possible - needs follow-up Mis-identified

Phenology (%)		Population Size		Age Structure (%)		Vigor (%)	
		Ramets	Genets**				
<input type="checkbox"/>	In leaf		actual #	<input type="checkbox"/>	seedlings	<input type="checkbox"/>	Very feeble
<input type="checkbox"/>	In bud		estim. #	<input type="checkbox"/>	immature	<input type="checkbox"/>	Feeble
<input type="checkbox"/>	In flower			<input type="checkbox"/>	vegetative sprouts	100	Normal
100	Immature fruit		1-10	<input type="checkbox"/>	1 st year	<input type="checkbox"/>	Vigorous
<input type="checkbox"/>	Mature fruit		11-50	100	mature (established)	<input type="checkbox"/>	Exceptionally vigorous
<input type="checkbox"/>	Seed dispersing		51-100	<input type="checkbox"/>	senescent	<input type="checkbox"/>	vigorous
<input type="checkbox"/>	Vegetative reproduction*		101-1000	<input type="checkbox"/>	age unknown	<input type="checkbox"/>	
			> 1,000				

*Describe vegetative reproduction: Annuals reliant on yearly seed production and germination _____

Genets: How defined? Average size?: **Individual plants

% of plants with 0 Evidence of disease 0 Injury / herbivory

Population Polygon (PP): If you drew a line around all the plants you found, how large an area would be within it?
Total Cover (TC): What is the total area covered by all the plants (as if they were growing next to one another)?

PP	TC	What % of the Population Polygon is covered by this species? <u>1</u> % = (TC / PP)*100
< 1 sq. meter _____	3	Within the population polygon, how are the stems distributed? Clumped <u>Scattered</u> X <u>Other</u> _____
1-5 sq. m. _____		If "other", describe: _____
5-10 sq. m. _____		How much time was spent searching in this area? <u>1</u> people searched for <u>30</u> minutes
10-100 sq. m. _____		How thoroughly was the Population Polygon searched? Very well X <u>Fairly well</u> <u>Not well</u>
100-1000 sq. m. (.1 ha) 350		Is there suitable habitat nearby that was not searched? Yes X <u>No</u> <u>Unknown</u>
> 0.1 ha _____		
actual area (if known) _____		

Comments on population size / distribution / etc.: Plants are restricted to exposed wet and mesic sands below the top of the bank ; area receives seasonal scour during runoff / flood events which reduces competing vegetation. Many plants present in area

Aspect		Slope		Light		Topo position		Moisture regime		Comments
<input type="checkbox"/>	N	<input checked="" type="checkbox"/>	0-3%	<input checked="" type="checkbox"/>	Open	<input type="checkbox"/>	Crest	<input type="checkbox"/>	Inundated (hydic)	
<input type="checkbox"/>	NE				Partial	<input type="checkbox"/>	Upper slope	<input checked="" type="checkbox"/>	Saturated (wet-mesic)	
<input type="checkbox"/>	E		3-8%		Filtered	<input type="checkbox"/>	Mid-slope	<input type="checkbox"/>	Moist (mesic)	
<input type="checkbox"/>	SE		8-15%		Shade	<input type="checkbox"/>	Lower slope	<input type="checkbox"/>	Dry-mesic	
<input checked="" type="checkbox"/>	W		15-35%			<input checked="" type="checkbox"/>	Bottom	<input type="checkbox"/>	Dry (xeric)	
<input type="checkbox"/>	SW		35%-vert. degrees							

Elevation range: 200' to 200' feet Soil name (SCS) / Substrate: Suncook loamy fine sand
 Bedrock type: _____

Associated natural community:	Emergent shoreline	Releve completed?	Yes__ No x_
Dominant / characteristic species: Lindernia dubia, Agrostis stolonifera, Mollugo verticillata, Xanthium strumarium, Scirpus cyperinus, Dichantherium clandenstinum, Hypericum mutilum, Sparganium americanum, Eleocharis obtusa. Cyperus erythrorhizos present near plants.			
Associated plant species (immediate vicinity): Same as above			
Invasive species: Lythrum salicaria (low abundance)			
Sketch (habitat and/or overhead view). Include scale, north arrow, and where the plants are. See attached mapping			
Owner aware of the plant?	Yes X	Owner comments:	
Owner protecting the plant?	Yes X		
Evidence of disturbance:	Occasional foot traffic from swimming / fishing		
Management needs:	Plants rely on seasonal flood / scour events that remove competing vegetation; maintaining normal hydrological processes is key		
The SIZE of the population: Summarize first page, provide additional details (e.g. on the distribution of the plants, how confident you are that most of the habitat was searched, thus most plants were located). Moderately sized population; areas of exposed sandy shorelines likely occur elsewhere beyond ROW and may provide additional habitat.			
The current CONDITION of the population and its immediate habitat. Include reproductive activity and health of the plants, and dispersal, establishment, and maintenance of the population. Also evidence of disturbance in the immediate vicinity including known presence of invasive species. Habitat is in good condition albeit rather limited in spatial extent to a discrete inner bend in the river. Plants are in good condition, with normal vigor. Plants occur from the water line to middle bank region that is more densely vegetated			
The condition of the LANDSCAPE in the area SURROUNDING the population (e.g. is the area an undisturbed, functioning natural ecosystem: current and past land use? fragmentation?). Population surrounded by largely intact landscape with limited development apart from existing transmission line			
Letter ranks summarizing the comments made above: A = Excellent, B = Good, C = Fair, D = Poor			
Size Rank:	A	Condition Rank:	A
Landscape Context Rank:	A	Overall Rank (A-D):	A
Your experience with this species (ranks are relative to):	<input type="checkbox"/> Local	<input type="checkbox"/> Statewide	<input checked="" type="checkbox"/> Regional <input type="checkbox"/> Global

Special Plant Survey Form

Sourcecode (office use only)

Survey Site: Eversource ROW – Soucook River Date: 7/19/22, 7/22/22 Phone: 207-798-2135
 Surveyors: Matt Arsenault Town: Pembroke / Concord Email: Matt.arsenault@stantec.com
 GPS Waypoint #s: _____
 GPS coordinates: 43.200236/-71.486677 Datum (e.g., NAD 83): NAD83 GPS Unit / model: EOS Arrow

Directions: (Map must be attached)
 Plants occur on both shorelines of the Soucook River where an existing transmission line crosses the river. Access is via Antrim Avenue or the NH Army National Guard training facility west of Sheep Davis Road

Species Eutrochium fistulosum EONum: _____

IMPORTANT: What diagnostic features were observed that would separate it from similar species?
 Tall (~6-8' tall) plants, whorled leaves, purplish glaucous stem, inflorescence convex in outline

Specimen taken? No X Photograph taken? Yes X Photograph attached? Yes X
 For specimens: Collector, collection #, repository: _____

Office Use Only ID reviewed by: _____ Date: _____ Based on: Description Photograph Specimen
 Conclusion: Verified Possible - needs follow-up Mis-identified

Phenology (%)	Population Size		Age Structure (%)	Vigor (%)
	Ramets	Genets**		
In leaf	<u>43</u>	actual # <u>6</u>	seedlings	Very feeble
In bud		estim. #	immature	Feeble
<u>100</u> In flower		1-10	vegetative sprouts	<u>100</u> Normal
Immature fruit		11-50	1 st year	Vigorous
Mature fruit		51-100	<u>100</u> mature (established)	Exceptionally vigorous
Seed dispersing		101-1000	senescent	vigorous
Vegetative reproduction*		> 1,000	age unknown	

*Describe vegetative reproduction: Single clump with several ramets
 **Genets: How defined? Average size?: Individual stems arising from ground

% of plants with 0 Evidence of disease 0 Injury / herbivory

Population Polygon (PP): If you drew a line around all the plants you found, how large an area would be within it?
Total Cover (TC): What is the total area covered by all the plants (as if they were growing next to one another)?

<u>5</u> <u>1</u>	What % of the Population Polygon is covered by this species? <u>20%</u> = (TC / PP)*100
Within the population polygon, how are the stems distributed? <u>Clumped X Scattered Other</u>	If "other", describe: _____
How much time was spent searching in this area? <u>1</u> people searched for <u>30</u> minutes	How thoroughly was the Population Polygon searched? <u>Very well X Fairly well Not well</u>
Is there suitable habitat nearby that was not searched? <u>Yes X No Unknown</u>	

Comments on population size / distribution / etc.: Plants occur in a small clump on the floodplain terrace of the Soucook River in the middle of an open transmission line

Aspect	Slope	Light	Topo position	Moisture regime	Comments
<u>X</u> N	<u>X</u> 0-3%	<u>X</u> Open	Crest	Inundated (hydic)	
E	3-8%	Partial	Upper slope	<u>X</u> Saturated (wet-mesic)	
S	8-15%	Filtered	Mid-slope	Moist (mesic)	
W	15-35%	Shade	Lower slope	Dry-mesic	
<u>X</u> Flat	35%-vert.		<u>X</u> Bottom	Dry (xeric)	
Degrees	degrees				

Elevation range: 250' to 250' feet Soil name (SCS) / Substrate: Windsor sand
 Bedrock type: _____

Associated natural community:	River shoreline	Releve completed?	Yes ___ No x_
Dominant / characteristic species:	Corylus americana, Carex crinita, Carex stricta, Acer rubrum, Thalictrum pubescens, Eutrochium maculatum		
Associated plant species (immediate vicinity):	Same as above		
Invasive species:	None observed		
<p>Sketch (habitat and/or overhead view). Include scale, north arrow, and where the plants are. See attached mapping</p>			
Owner aware of the plant?	Yes X	Owner comments:	
Owner protecting the plant?	Yes X		
Evidence of disturbance:	No disturbance in immediate vicinity although nearby vegetation is maintained through periodic transmission line maintenance.		
Management needs:	None		
<p>The SIZE of the population: Summarize first page, provide additional details (e.g. on the distribution of the plants, how confident you are that most of the habitat was searched, thus most plants were located). Population is moderate in size, limited in spatial extent to banks of Soucook River. Additional habitat likely occurs upstream / downstream of ROW survey area</p> <p>The current CONDITION of the population and its immediate habitat. Include reproductive activity and health of the plants, and dispersal, establishment, and maintenance of the population. Also evidence of disturbance in the immediate vicinity including known presence of invasive species. Habitat is in good condition along the immediate banks. Limited wetland habitat away from banks within survey area</p> <p>The condition of the LANDSCAPE in the area SURROUNDING the population (e.g. is the area an undisturbed, functioning natural ecosystem: current and past land use? fragmentation?). Immediate area is largely intact although degradation of neighboring floodplain from refuse dumping is occurring to the north of the river.</p>			
Letter ranks summarizing the comments made above: A = Excellent, B = Good, C = Fair, D = Poor			
Size Rank:	B	Condition Rank:	B
		Landscape Context Rank:	B
		Overall Rank (A-D):	B
Your experience with this species (ranks are relative to):			
	<input type="checkbox"/> Local	<input type="checkbox"/> Statewide	<input checked="" type="checkbox"/> Regional <input type="checkbox"/> Global

Special Plant Survey Form

Sourcecode (office use only)

Survey Site: Eversource ROW – Soucook River Date: 7/21/22 Phone: 207-798-2135
 Surveyors: Matt Arsenault Town: Concord Email: Matt.arsenault@stantec.com
 GPS Waypoint #s: _____
 GPS coordinates: 43.174882/-71.499908 Datum (e.g., NAD 83): NAD83 GPS Unit / model: EOS Arrow

Directions: (Map must be attached)
 From Garvins Falls Road. Park at open transmission line and follow existing access road north to Soucook River. Turn left at bottom of hill at river. Plants occur to the south of the access path between the river and a small basin wetland.

Species Eutrochium fistulosum EONum: _____

IMPORTANT: What diagnostic features were observed that would separate it from similar species?
 Tall (~8' tall) plant, whorled leaves, purplish glaucous stem, inflorescence convex in outline

Specimen taken? No X Photograph taken? Yes X Photograph attached? Yes X
 For specimens: Collector, collection #, repository: _____

Office Use Only ID reviewed by: _____ Date: _____ Based on: Description Photograph Specimen
 Conclusion: Verified Possible - needs follow-up Mis-identified

Phenology (%)	Population Size		Age Structure (%)	Vigor (%)
	Ramets	Genets**		
In leaf	<u>17</u>	actual # <u>1</u>	seedlings	Very feeble
In bud		estim. #	immature	Feeble
<u>100</u> In flower		1-10	vegetative sprouts	<u>100</u> Normal
Immature fruit		11-50	1 st year	Vigorous
Mature fruit		51-100	<u>100</u> mature (established)	Exceptionally vigorous
Seed dispersing		101-1000	senescent	vigorous
Vegetative reproduction*		> 1,000	age unknown	

*Describe vegetative reproduction: Single clump with several ramets
 **Genets: How defined? Average size?: Individual stems arising from ground

% of plants with 0 Evidence of disease
0 Injury / herbivory

Population Polygon (PP): If you drew a line around all the plants you found, how large an area would be within it?
Total Cover (TC): What is the total area covered by all the plants (as if they were growing next to one another)?

<u>1</u> < 1 sq. meter	<u>1</u> 1-5 sq. m.	<u>1</u> 5-10 sq. m.	<u>1</u> 10-100 sq. m.	<u>1</u> 100-1000 sq. m. (.1 ha)	<u>1</u> > 0.1 ha	actual area (if known)
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What % of the Population Polygon is covered by this species? 100% = (TC / PP)*100
 Within the population polygon, how are the stems distributed? Clumped X Scattered Other _____
 If "other", describe: _____
 How much time was spent searching in this area? 1 people searched for 15 minutes
 How thoroughly was the Population Polygon searched? Very well X Fairly well Not well _____
 Is there suitable habitat nearby that was not searched? Yes X No Unknown _____

Comments on population size / distribution / etc.: Plants occur in a small clump on the floodplain terrace of the Soucook River in the middle of an open transmission line

Aspect	Slope	Light	Topo position	Moisture regime	Comments
<u>X</u> N	<u>X</u> 0-3%	<u>X</u> Open	Crest	Inundated (hydic)	
E	3-8%	Partial	Upper slope	<u>X</u> Saturated (wet-mesic)	
S	8-15%	Filtered	Mid-slope	Moist (mesic)	
W	15-35%	Shade	Lower slope	Dry-mesic	
<u>X</u> Flat	35%-vert.		<u>X</u> Bottom	Dry (xeric)	
Degrees	degrees				

Elevation range: 210' to 210' feet Soil name (SCS) / Substrate: Suncook loamy fine sand
 Bedrock type: _____

Associated natural community: Scrub-shrub wetland	Releve completed? Yes__ No x_
Dominant / characteristic species: Loniera morrowii, Rubus alleghaniensis, Clematis virginiana	
Associated plant species (immediate vicinity): Same as above	
Invasive species: Lonicera morrowii (moderate abundance)	
<p>Sketch (habitat and/or overhead view). Include scale, north arrow, and where the plants are. See attached mapping</p>	

Owner aware of the plant? Yes X	Owner comments:
Owner protecting the plant? Yes X	
Evidence of disturbance:	Invasive plants, existing ATV trail adjacent to the plants, periodic transmission line maintenance
Management needs:	Maintain open habitat conditions through periodic vegetation management; monitor encroachment of invasive species.
<p>The SIZE of the population: Summarize first page, provide additional details (e.g. on the distribution of the plants, how confident you are that most of the habitat was searched, thus most plants were located). Small population, limited in spatial extent; although additional habitat may occur upstream / downstream outside of ROW survey limits.</p>	
<p>The current CONDITION of the population and its immediate habitat. Include reproductive activity and health of the plants, and dispersal, establishment, and maintenance of the population. Also evidence of disturbance in the immediate vicinity including known presence of invasive species. Habitat is somewhat degraded by invasive species presence and ATV traffic.</p>	
<p>The condition of the LANDSCAPE in the area SURROUNDING the population (e.g. is the area an undisturbed, functioning natural ecosystem: current and past land use? fragmentation?). Population surrounded by largely intact landscape with limited development apart from existing transmission line</p>	
Letter ranks summarizing the comments made above: A = Excellent, B = Good, C = Fair, D = Poor	
Size Rank: C	Condition Rank: C
Landscape Context Rank: A	Overall Rank (A-D): C
Your experience with this species (ranks are relative to):	
<input type="checkbox"/> Local	<input type="checkbox"/> Statewide
<input checked="" type="checkbox"/> Regional	<input type="checkbox"/> Global

Special Plant Survey Form

Sourcecode (office use only)

Survey Site: Eversource ROW Pembroke Road Date: 5/6/22, 5/16/22, 6/2/22 Phone: 207-798-2135
 Surveyors: Matt Arsenault Town: Concord Email: Matt.arsenault@stantec.com
 GPS Waypoint #s: _____
 GPS coordinates: 43.213096 -71.492063 Datum (e.g., NAD 83): NAD83 GPS Unit / model: EOS Arrow

Directions: (Map must be attached)

Park at transmission line crossing at Pembroke Road adjacent to Praxair Surface Technologies. Plants begin on south facing slope to the south of Pembroke Road and continue south in shrub-dominated ROW for approximately 1,000 feet. Highest concentration of plants occur between the first and second transmission line structures encountered.

Species **Lupinus perennis** EONum:

IMPORTANT: What diagnostic features were observed that would separate it from similar species?

Palmate leaves with mostly 5-7 leaflets; sprawling and low-growing habit; bilabiate purple to pink flowers in a terminal raceme to 20 cm tall

Specimen taken? **Yes** NoX Photograph taken? **YesX** Photograph attached? **Yes X**

For specimens: Collector, collection #, repository: _____

Office Use Only ID reviewed by: _____ Date: _____ Based on: Description Photograph Specimen
 Conclusion: Verified Possible - needs follow-up Mis-identified

Phenology (%)		Population Size		Age Structure (%)		Vigor (%)	
50	In leaf	Ramets			seedlings		Very feeble
	In bud		actual #		immature		Feeble
50	In flower	750	estim. #	30	vegetative sprouts	50	Normal
	Immature fruit		1-10		1 st year	50	Vigorous
	Mature fruit		11-50		mature (established)		Exceptionally vigorous
	Seed dispersing		51-100	70	senescent		vigorous
			101-1000		age unknown		
X	Vegetative reproduction*		> 1,000				

*Describe vegetative reproduction: Plants spreading +/- colonially by underground caudex

**Genets: How defined? Average size?: Ramets were counted and based on discrete leaf clusters emerging from a single point or flowering stalks

% of plants with	Description
<u>0</u>	Evidence of disease
<u>0</u>	Injury / herbivory

Population Polygon (PP): If you drew a line around **all** the plants you found, how large an area would be within it?
Total Cover (TC): What is the total area covered by all the plants (as if they were growing next to one another)?

<table border="0"> <tr> <td></td> <td>PP</td> <td>TC</td> <td></td> </tr> <tr> <td>< 1 sq. meter</td> <td>_____</td> <td>_____</td> <td></td> </tr> <tr> <td>1-5 sq. m.</td> <td>_____</td> <td>_____</td> <td></td> </tr> <tr> <td>5-10 sq. m.</td> <td>_____</td> <td>_____</td> <td></td> </tr> <tr> <td>10-100 sq. m.</td> <td>_____</td> <td>_____</td> <td></td> </tr> <tr> <td>100-1000 sq. m. (.1 ha)</td> <td>_____</td> <td>_____</td> <td></td> </tr> <tr> <td>> 0.1 ha</td> <td>1.4 ha</td> <td>0.15 ha</td> <td></td> </tr> <tr> <td>actual area (if known)</td> <td>_____</td> <td>_____</td> <td></td> </tr> </table>		PP	TC		< 1 sq. meter	_____	_____		1-5 sq. m.	_____	_____		5-10 sq. m.	_____	_____		10-100 sq. m.	_____	_____		100-1000 sq. m. (.1 ha)	_____	_____		> 0.1 ha	1.4 ha	0.15 ha		actual area (if known)	_____	_____		What % of the Population Polygon is covered by this species? <u> 10 </u> = (TC / PP)*100 Within the population polygon, how are the stems distributed? Clumped <u> Scattered X </u> Other <u> </u> If "other", describe: _____ How much time was spent searching in this area? <u> 1 </u> people searched for <u> 200 </u> minutes How thoroughly was the Population Polygon searched? Very well <u> X </u> Fairly well <u> </u> Not well <u> </u> Is there suitable habitat nearby that was not searched? Yes <u> X </u> No <u> </u> Unknown <u> </u>
	PP	TC																															
< 1 sq. meter	_____	_____																															
1-5 sq. m.	_____	_____																															
5-10 sq. m.	_____	_____																															
10-100 sq. m.	_____	_____																															
100-1000 sq. m. (.1 ha)	_____	_____																															
> 0.1 ha	1.4 ha	0.15 ha																															
actual area (if known)	_____	_____																															

Comments on population size / distribution / etc.: Occurring in scattered patches where shrub cover is generally less

Aspect		Slope		Light		Topo position		Moisture regime		Comments
<u> </u>	N	X	0-3%	X	Open	X	Crest	<u> </u>	Inundated (hydric)	
<u> </u>	NE				Partial	<u> </u>	Upper slope	<u> </u>	Saturated (wet-mesic)	
<u> </u>	E		3-8%		Filtered	<u> </u>	Mid-slope	<u> </u>	Moist (mesic)	
<u> </u>	NW				Shade	<u> </u>	Lower slope	<u> </u>	Dry-mesic	
<u> </u>	S		8-15%			<u> </u>	Bottom	X	Dry (xeric)	
<u> </u>	SE		15-35%							
X	SW		35%-vert.							
<u> </u>	Flat		degrees							
<u> </u>	Degrees									

Elevation range: 340' to 350' feet

Soil name (SCS) / Substrate: Windsor loamy sand

Bedrock type: _____

Associated natural community: Scrub oak barren	Releve completed? Yes__ No x_
Dominant / characteristic species: <i>Quercus ilicifolia</i> , <i>Betula populifolia</i> , <i>Comptonia peregrina</i> , <i>Vaccinium angustifolium</i> , <i>Pinus rigida</i> , <i>Populus tremuloides</i> , <i>Solidago juncea</i> , <i>Carex lucorum</i> , <i>Schizachyrium scoparium</i>	
Associated plant species (immediate vicinity): Same as above	
Invasive species: <i>Lonicera morrowii</i> (low abundance nearby)	

Sketch (habitat and/or overhead view). Include scale, north arrow, and where the plants are.
See attached mapping

Owner aware of the plant? Yes X	Owner comments:
Owner protecting the plant? Yes X	
Evidence of disturbance: Periodic vegetation management, including vegetation removal and access	
Management needs: Thinning of shrub and sapling vegetation would promote open habitat necessary for this species.	

The SIZE of the population: Summarize first page, provide additional details (e.g. on the distribution of the plants, how confident you are that most of the habitat was searched, thus most plants were located).
Plants continue easterly beyond the limits of the survey area within the open transmission line ROW. This is a large population and area is actively managed for lupine

The current CONDITION of the population and its immediate habitat. Include reproductive activity and health of the plants, and dispersal, establishment, and maintenance of the population. Also evidence of disturbance in the immediate vicinity including known presence of invasive species.
Plants are for the most part growing vigorous in areas with favorable habitat. Encroachment of early successional species (e.g. *Betula populifolia* and *Populus tremuloides*) have the potential to reduce available open habitat for lupine. Ongoing vegetation management is critical to maintaining habitat and lupine population. Presently ROW, is overgrown in many areas around the plants but it is understood that vegetation management is planned to reduce shrub and sapling cover in 2022/2023; this will likely enhance the habitat

The condition of the LANDSCAPE in the area SURROUNDING the population (e.g. is the area an undisturbed, functioning natural ecosystem: current and past land use? fragmentation?).
Population is situated in a highly developed urban landscape and this population is present in a small remaining block of habitat

Letter ranks summarizing the comments made above: A = Excellent, B = Good, C = Fair, D = Poor			
Size Rank: A	Condition Rank: B	Landscape Context Rank: D	Overall Rank (A-D): B
Your experience with this species (ranks are relative to): <input type="checkbox"/> Local <input checked="" type="checkbox"/> Statewide <input type="checkbox"/> Regional <input type="checkbox"/> Global			

Special Plant Survey Form

Sourcecode (office use only)

Survey Site: Eversource ROW NHANG Training Facility Date: 5/17/22 Phone: 207-798-2135
 Surveyors: Matt Arsenault and Derek Benedix Town: Pembroke Email: Matt.arsenault@stantec.com
 GPS Waypoint #s: _____
 GPS coordinates: 43.191827 -71.487505 Datum (e.g., NAD 83): NAD83 GPS Unit / model: EOS Arrow

Directions: (Map must be attached)
 Plants are located within fenced "wild lupine" enclosure within an Eversource transmission line on the NH Army National Guard training facility west of Sheep Davis Road.

Species Lupinus perennis EONum: _____

IMPORTANT: What diagnostic features were observed that would separate it from similar species?
 Palmate leaves with mostly 5-7 leaflets; sprawling and low-growing habit; bilabiate purple to pink flowers in a terminal raceme to 20 cm tall

Specimen taken? Yes NoX____ Photograph taken? YesX____ Photograph attached? Yes X

For specimens: Collector, collection #, repository: _____

Office Use Only ID reviewed by: _____ Date: _____ Based on: Description Photograph Specimen
 Conclusion: Verified Possible - needs follow-up Mis-identified

Phenology (%)		Population Size		Age Structure (%)		Vigor (%)	
<u>50</u>	In leaf	Ramets					
	In bud	<u>59</u>	actual #		seedlings		Very feeble
<u>50</u>	In flower		estim. #	<u>40</u>	immature	<u>25</u>	Feeble
	Immature fruit		1-10		vegetative sprouts	<u>75</u>	Normal
	Mature fruit		11-50		1 st year		Vigorous
	Seed dispersing		51-100	<u>60</u>	mature (established)		Exceptionally vigorous
	Vegetative reproduction*		101-1000		senescent		vigorous
			> 1,000		age unknown		

*Describe vegetative reproduction: Plants spreading +/- colonially by underground caudex
 **Genets: How defined? Average size?: Ramets were counted and based on discrete leaf clusters emerging from a single point or flowering stalks

% of plants with	Description
<u>0</u>	Evidence of disease
<u>0</u>	Injury / herbivory

Population Polygon (PP): If you drew a line around all the plants you found, how large an area would be within it?
Total Cover (TC): What is the total area covered by all the plants (as if they were growing next to one another)?

	PP	TC	What % of the Population Polygon is covered by this species?	<u>10%</u> = (TC / PP)*100
< 1 sq. meter	_____	_____	Within the population polygon, how are the stems distributed?	<u>Clumped</u> <u>Scattered</u> <u>X</u> <u>Other</u> _____
1-5 sq. m.	_____	_____	How much time was spent searching in this area?	<u>2</u> people searched for <u>60</u> minutes
5-10 sq. m.	_____	_____	How thoroughly was the Population Polygon searched?	<u>Very well</u> <u>X</u> <u>Fairly well</u> <u>Not well</u> _____
10-100 sq. m.	_____	<u>50</u>	Is there suitable habitat nearby that was not searched?	<u>Yes</u> <u>No</u> <u>X</u> <u>Unknown</u> _____
100-1000 sq. m. (.1 ha)	<u>550</u>	_____		
> 0.1 ha	_____	_____		
actual area (if known)	_____	_____		

Comments on population size / distribution / etc.: Occurring in small scattered patches

Aspect	Slope	Light	Topo position	Moisture regime	Comments
N _____ NE	0-3%	<u>X</u> Open	<u>X</u> Crest	Inundated (hydric)	
E _____ NW	<u>X</u> 3-8%	Partial	<u>X</u> Upper slope	Saturated (wet-mesic)	
<u>X</u> S _____ SE	8-15%	Filtered	<u>X</u> Mid-slope	Moist (mesic)	
W _____ SW	15-35%	Shade	<u>X</u> Lower slope	Dry-mesic	
Flat	35%-vert.		Bottom	<u>X</u> Dry (xeric)	
Degrees	degrees				

Elevation range: 310' to 340' feet Soil name (SCS) / Substrate: Windsor loamy sand

Bedrock type: _____

Associated natural community: Scrub oak barren	Releve completed? Yes__ No x_		
Dominant / characteristic species: Quercus ilicifolia, Comptonia peregrina, Carex lucorum, Schizachyrium scoparium			
Associated plant species (immediate vicinity): Same as above			
Invasive species: None observed			
Sketch (habitat and/or overhead view). Include scale, north arrow, and where the plants are. See attached mapping			
Owner aware of the plant? Yes X	Owner comments:		
Owner protecting the plant? Yes X			
Evidence of disturbance: Periodic vegetation management, including vegetation removal and access			
Management needs: Thinning of shrub and sapling vegetation would promote open habitat necessary for this species.			
The SIZE of the population: Summarize first page, provide additional details (e.g. on the distribution of the plants, how confident you are that most of the habitat was searched, thus most plants were located). Rather small size and restricted to small, discrete area despite widespread potential habitat availability in open ROW			
The current CONDITION of the population and its immediate habitat. Include reproductive activity and health of the plants, and dispersal, establishment, and maintenance of the population. Also evidence of disturbance in the immediate vicinity including known presence of invasive species. Habitat associated with the plants is in good condition with low shrub growth and open sandy soils. The habitat is actively maintained to promote lupine			
The condition of the LANDSCAPE in the area SURROUNDING the population (e.g. is the area an undisturbed, functioning natural ecosystem: current and past land use? fragmentation?). Population is situated in a developed landscape although sizeable blocks of habitat exist on the NHANG property			
Letter ranks summarizing the comments made above: A = Excellent, B = Good, C = Fair, D = Poor			
Size Rank: C	Condition Rank: B	Landscape Context Rank: C	Overall Rank (A-D): C
Your experience with this species (ranks are relative to): <input type="checkbox"/> Local <input checked="" type="checkbox"/> Statewide <input type="checkbox"/> Regional <input type="checkbox"/> Global			

Special Plant Survey Form

Sourcecode (office use only)

Survey Site: Eversource ROW – NH Army National Guard Date: 7/22/22 Phone: 207-798-2135
 Surveyors: Matt Arsenault Town: Pembroke Email: Matt.arsenault@stantec.com
 GPS Waypoint #s: _____
 GPS coordinates: 43.190744/-71.487577 Datum (e.g., NAD 83): NAD83 GPS Unit / model: EOS Arrow

Directions: (Map must be attached)
 Access via New Hampshire Army National Guard training facility west of Sheep Davis Road. Plants occur in open transmission line south of where an existing paved roadway crosses the ROW to the west of the track and continue 0.2 miles south to the Dirt Doctors facility. Plants are scattered in ROW and associated with openings with proportionately less shrub coverage. Highest concentration of plants occur on the western edge of the open corridor

Species **Solidago odora** EONum: _____

IMPORTANT: What diagnostic features were observed that would separate it from similar species?
 Leaves entire, all similar in shape, glossy green with evident licorice fragrance

Specimen taken? **No X** Photograph taken? **Yes X** Photograph attached? **Yes X**
 For specimens: Collector, collection #, repository: _____

Office Use Only ID reviewed by: _____ Date: _____ Based on: Description Photograph Specimen
 Conclusion: Verified Possible - needs follow-up Mis-identified

Phenology (%)		Population Size		Age Structure (%)		Vigor (%)	
40	In leaf	Ramets	Genets**		seedlings		Very feeble
	In bud		actual #		immature		Feeble
60	In flower	1157	estim. #		vegetative sprouts	100	Normal
	Immature fruit		1-10		1 st year		Vigorous
	Mature fruit		11-50		100 mature (established)		Exceptionally
	Seed dispersing		51-100		senescent		vigorous
			101-1000		age unknown		
	Vegetative reproduction*		> 1,000				

*Describe vegetative reproduction: Short rhizomatous species forming small clumps of flowering stems
 Genets: How defined? Average size?: **Individual flowering stems emerging from ground

% of plants with	Description
0 Evidence of disease	_____
0 Injury / herbivory	_____

Population Polygon (PP): If you drew a line around **all** the plants you found, how large an area would be within it?
Total Cover (TC): What is the total area covered by all the plants (as if they were growing next to one another)?

PP	TC	What % of the Population Polygon is covered by this species?	_____10%_____ = (TC / PP)*100
< 1 sq. meter _____	_____	Within the population polygon, how are the stems distributed?	Clumped _____ Scattered X _____ Other _____
1-5 sq. m. _____	_____	How much time was spent searching in this area?	_____1_____ people searched for _____150_____ minutes
5-10 sq. m. _____	_____	How thoroughly was the Population Polygon searched?	Very well X _____ Fairly well _____ Not well _____
10-100 sq. m. _____	_____	Is there suitable habitat nearby that was not searched?	Yes _____ No _____ Unknown X _____
100-1000 sq. m. (.1 ha) _____	0.1 ha _____		
> 0.1 ha 1 ha _____	_____		
actual area (if known) _____	_____		

Comments on population size / distribution / etc.: Numerous plants scattered in dry open habitat in ROW ; plants most abundant in areas with sparse shrub cover

Aspect		Slope		Light		Topo position		Moisture regime		Comments
N	NE	X	0-3%	X	Open		Crest		Inundated (hydric)	
E	NW		3-8%		Partial	X	Upper slope		Saturated (wet-mesic)	
S	SE		8-15%		Filtered		Mid-slope		Moist (mesic)	
W	SW		15-35%		Shade		Lower slope		Dry-mesic	
X	Flat		35%-vert.				Bottom	X	Dry (xeric)	
	Degrees		degrees							

Elevation range: 290' to 320'' feet Soil name (SCS) / Substrate: Windsor loamy sand
 Bedrock type: _____

Associated natural community:	Scrub oak barren	Releve completed?	Yes__ No x_
Dominant / characteristic species: Schizachyrium scoparium, Agrostis gigantea, Solidago puberula, Comptonia peregrina, Panicum virgatum, Solidago juncea, Betula populifolia, Danthonia compressa, Quercus ilicifolia, Carex lucorum			
Associated plant species (immediate vicinity): Same as above			
Invasive species: None observed			
<p>Sketch (habitat and/or overhead view). Include scale, north arrow, and where the plants are. See attached mapping</p>			
Owner aware of the plant?	Yes X	Owner comments:	
Owner protecting the plant?	Yes X		
Evidence of disturbance:	Periodic transmission line vegetation maintenance including vegetation removal and access		
Management needs:	Routine vegetation management to remove successional vegetation and maintain open dry sandplain / scrub habitat		
<p>The SIZE of the population: Summarize first page, provide additional details (e.g. on the distribution of the plants, how confident you are that most of the habitat was searched, thus most plants were located). Large population with normal vigor. Plants are more abundant in areas with sparse shrub coverage on the western edge of the ROW</p>			
<p>The current CONDITION of the population and its immediate habitat. Include reproductive activity and health of the plants, and dispersal, establishment, and maintenance of the population. Also evidence of disturbance in the immediate vicinity including known presence of invasive species. Habitat is in moderate condition for the species; encroachment of successional vegetation in ROW reduces overall habitat availability / suitability for Solidago odora. Periodic vegetation mowing is needed to maintain open habitat conditions.</p>			
<p>The condition of the LANDSCAPE in the area SURROUNDING the population (e.g. is the area an undisturbed, functioning natural ecosystem: current and past land use? fragmentation?). Population is associated with existing development from Dirt Doctors and NH Army National Guard as well as existing transmission line but otherwise is part of a moderate size block of habitat between Sheep Davis Rd and the Concord airport.</p>			
Letter ranks summarizing the comments made above: A = Excellent, B = Good, C = Fair, D = Poor			
Size Rank:	A	Condition Rank:	B
		Landscape Context Rank:	B
		Overall Rank (A-D):	A/B
Your experience with this species (ranks are relative to):			
<input type="checkbox"/> Local <input type="checkbox"/> Statewide <input checked="" type="checkbox"/> Regional <input type="checkbox"/> Global			

NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

January 27, 2023

Appendix D EXISTING ECOLOGICAL CONDITIONS



To: Kim Tuttle
New Hampshire Fish and Game
Department

From: Matt Arsenault
Topsham, Maine Office

File: 195602232

Date: February 4, 2022

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

Public Service Company of New Hampshire d/b/a Eversource Energy (Eversource) owns and maintains the P145 electrical transmission line (P145 line; Project) in Concord, Pembroke, and Bow, New Hampshire. The P145 line was constructed in the 1960s and runs within an existing right-of-way (ROW) between the Farmwood Substation off Farmwood Road in Concord and the Merrimack Substation off River Road in Bow. Eversource has identified that all wooden structures will need to be replaced within the 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. Once the structures are replaced, Eversource also plans on replacing the overhead static wires with optical ground wire. Natural resource impacts have been minimized and avoided to the greatest extent practicable through careful siting of access roads and work pads. Temporary work pads will be utilized in wetland areas that are unavoidable.

The following provides a characterization of the existing habitat conditions observed within the ROW during field work conducted by Stantec Consulting Services Inc. (Stantec) in fall 2021.

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:** Existing structures 166–144 (Farmwood Substation to Shaker Road in Concord; approximately 1.7 miles)
- **Area B:** Existing structures 143–134 (Shaker Road to Oak Hill Road in Concord; approximately 0.7 miles)
- **Area C:** Existing structures 133–129 (Oak Hill Road to Appleton Street in Concord; approximately 0.6 miles)
- **Area D:** Existing structures 128–120 (Appleton Street to Curtisville Road in Concord; approximately 0.7 miles)
- **Area E:** existing structures 119–105 (Curtisville Road to Portsmouth Street in Concord; approximately 1 mile)
- **Area F:** existing structure 104–99 (Interstate (I)-393 to Loudon Road in Concord; approximately 0.4 miles)
- **Area G:** Existing structures 98–78 (Loudon Road in Concord to Antrim Avenue in Pembroke; approximately 1.6 miles)
- **Area H:** Existing structures 77–59 (Antrim Avenue to Pembroke Street in Pembroke; approximately 1.6 miles)

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

- **Area I:** Existing structures 58–41 (Pembroke Street in Pembroke to Merrimack River in Concord; approximately 1.3 miles)
- **Area J:** Existing structures 40–14 (Merrimack River to Ferry Road in Bow; approximately 1.8 miles)
- **Area K:** Existing structures 13–1 (Ferry Road to Merrimack Substation in Bow; approximately 1.1 miles)

The preliminary Project plans are provided as Attachment 1 and representative photographs are provided as Attachment 2.

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

February 4, 2022

Kim Tuttle

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Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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).

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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.

February 4, 2022

Kim Tuttle

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Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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 is present between Structures 130 and 133 and 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) near existing structure 140. 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.

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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>Spiraea 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

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Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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.

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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

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Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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 existing structure 122. 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 structure 122 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 structure 122 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.

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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.

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, uptight 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. A small intermittent stream (stream S06) flows southeasterly into the wetland and soon dissipates near existing structure 107. It has banks up to approximately 3 feet wide and a sandy substrate.

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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

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Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

AREA F: I-393 TO LOUDEN ROAD

Area F is a short section of ROW between I-393 and Louden Road. It traverses a landscaped 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. A small area of dry shrubland is present between existing structure 101 and Old Louden Road.

Wetland and Aquatic Habitats

There is one wetland area in Area F (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.

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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, steeplebush, maleberry, broad-leaf meadowsweet, highbush blueberry, setose blackberry (<i>Rubus setosus</i>) Herbs: uptight sedge	Permanently saturated	Yes—peatland	

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Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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.

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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

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Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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 Suncook 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 near existing structures 68 and 69. 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.

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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, steeplebush, 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, steeplebush, 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

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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.

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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: silky 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

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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 existing structures 24 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 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.

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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	

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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 existing structure 10 to approximately structure 7, 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.

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

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

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Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke, New Hampshire

Please let me know if you have any questions on the information provided in this report.

Regards,

Stantec Consulting Services Inc.

A handwritten signature in dark ink, appearing to read "Matt Arsenault", with a long horizontal flourish extending to the right.

Matt Arsenault Ecologist, PWS, NHCWS
Ecologist / Botanist

Phone: 207 798 2135

matt.arsenault@stantec.com

Attachment: Attachment 1. Map Set
Attachment 2. Representative Photographs

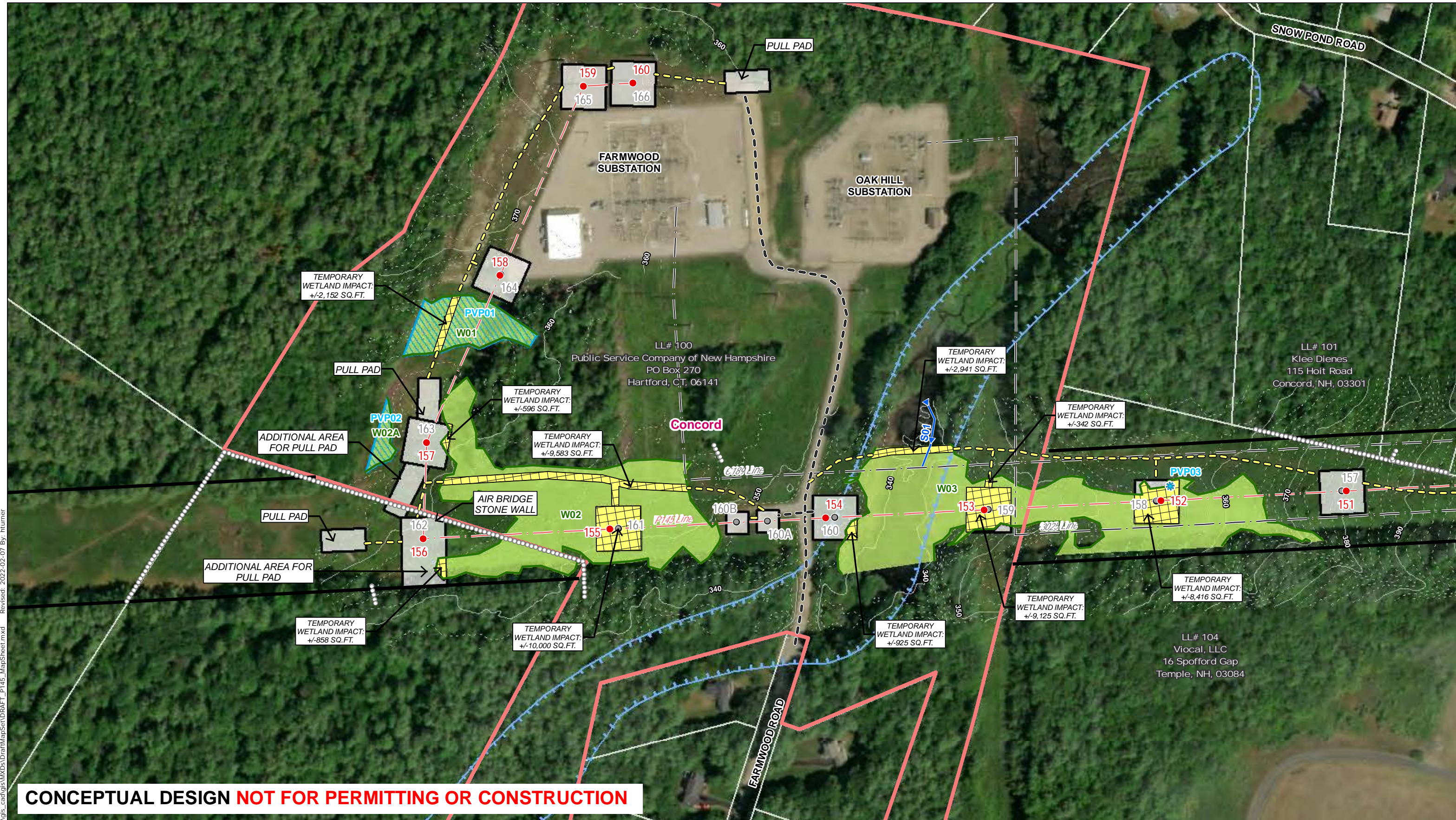
c. Tom Tetreau (Stantec)
Ashley Ruprecht (Eversource)

February 4, 2022

Kim Tuttle
Attachment

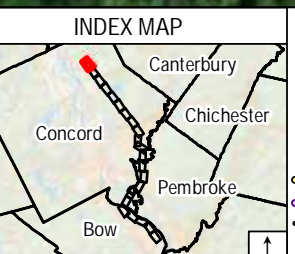
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ATTACHMENT 1. MAP SET



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CONCEPTUAL DESIGN NOT FOR PERMITTING OR CONSTRUCTION



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● Existing Structure	⊠ Stone Work Pad
● Existing Structure to be Removed	⊠ Eversource Owned Property
○ Overhead Eversource Line	⊠ State Owned Land
○ Overhead Distribution Line	⊠ LL# 100 LLN/Property Owner
⊠ Existing Right-of-Way (ROW)	⊠ Parcel Boundary
⊠ Proposed Access	⊠ Municipal Boundary
⊠ Off-ROW Access Pending Rights	⊠ 2' Contours
⊠ Existing Access	⊠ 10' Contours
⊠ Potential Vernal Pool	⊠ FEMA 100-Year Flood Zone
⊠ Potential Vernal Pool Extent	⊠ Floodway
⊠ Delineated Perennial Stream	⊠ NHDES Protected Shoreland
⊠ Delineated Intermittent Stream	⊠ Rail Road
⊠ Delineated Ephemeral Stream	⊠ GAS Approximate Gas Line
⊠ Delineated Wetland Boundary	⊠ Fence
⊠ Delineated Wetland	⊠ Stone Wall
⊠ Open Water	⊠ Gate
	⊠ Culvert
	⊠ Rare Species

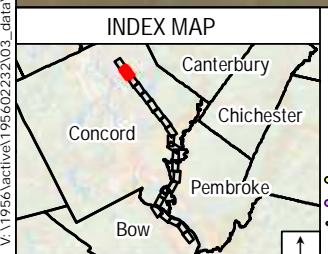
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 Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec, October 2021.
 Additional source include: NH Grant
 Basemap: National Agriculture Imagery Program (NAIP) aerial

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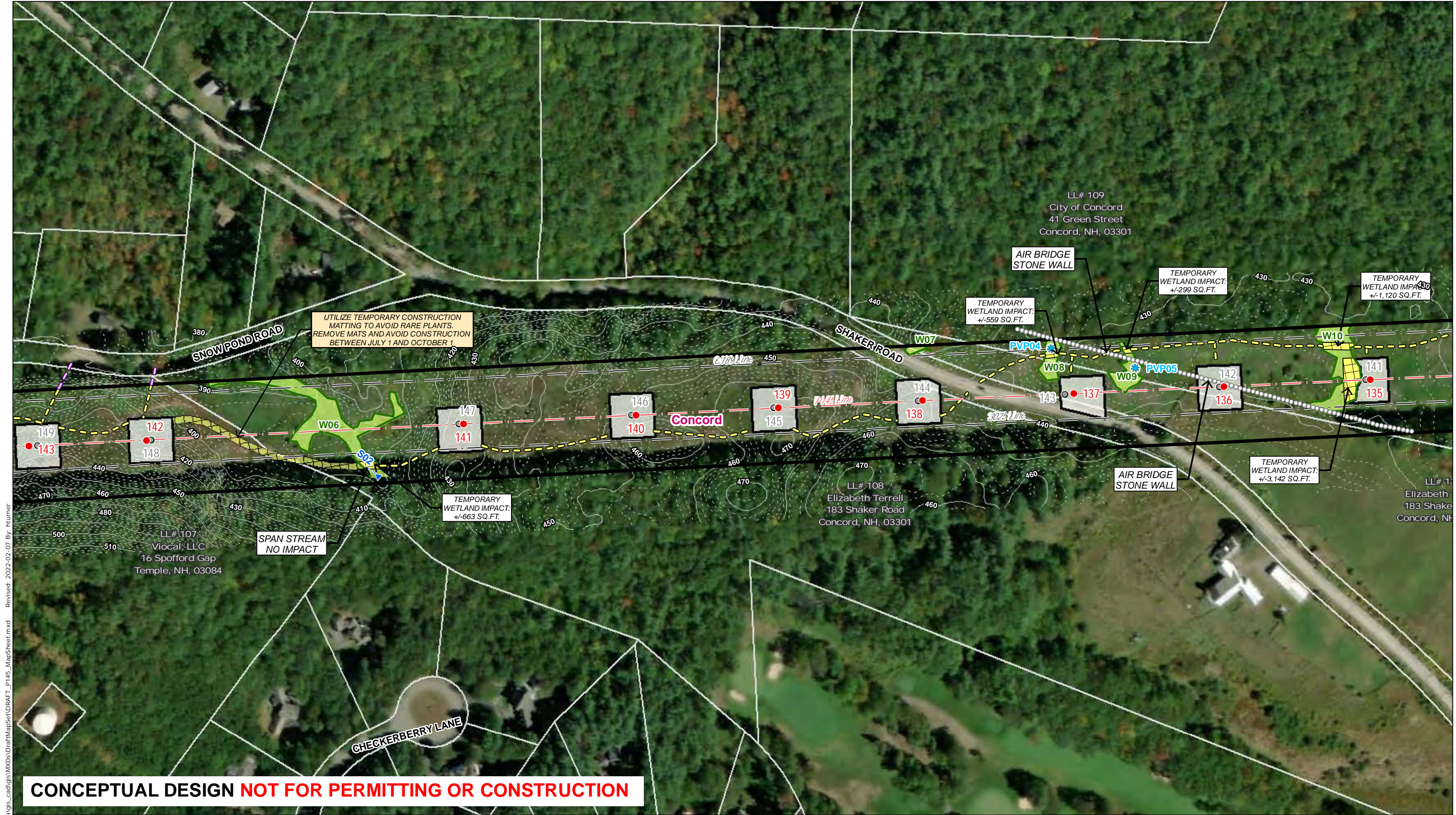
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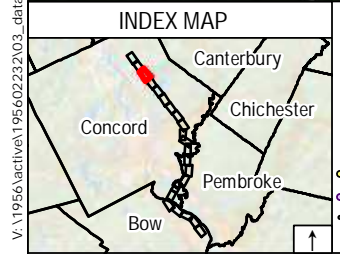
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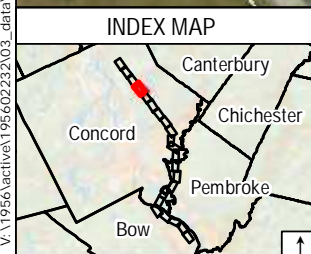
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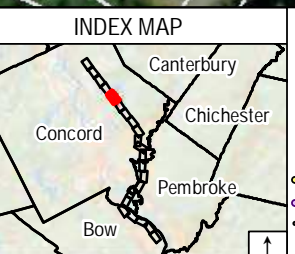
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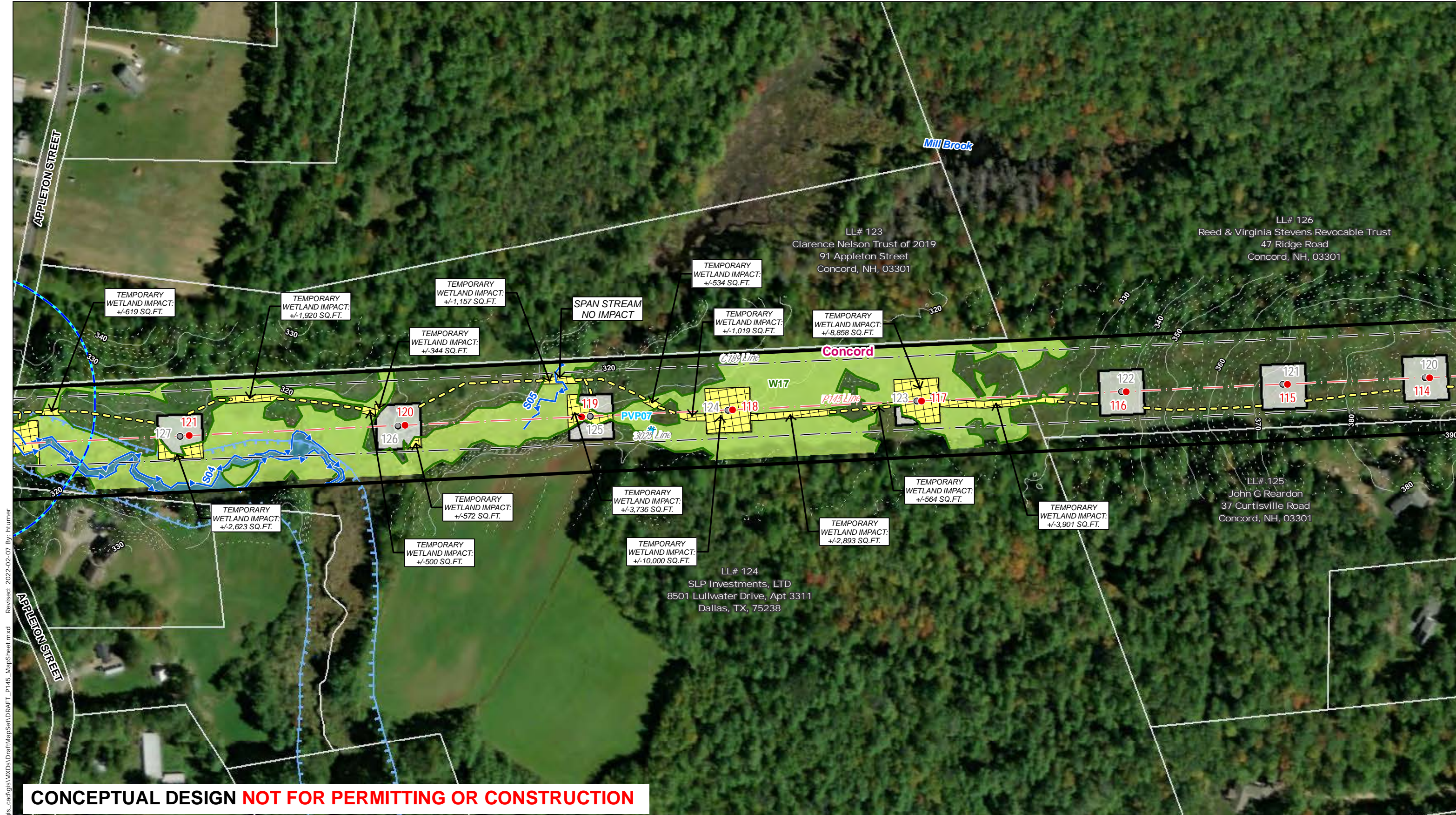
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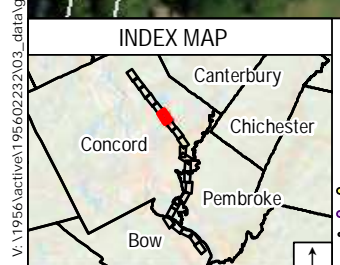
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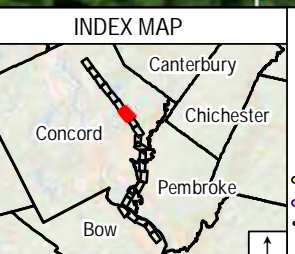
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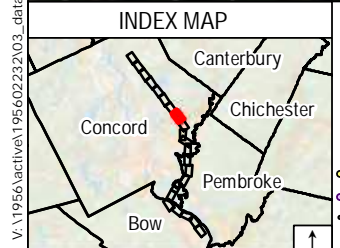
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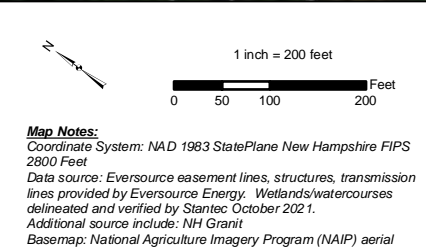


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● Existing Structure	■ Potential Vernal Pool Extent
● Existing Structure to be Removed	■ Delineated Perennial Stream
○ Overhead Eversource Line	■ Delineated Intermittent Stream
○ Overhead Distribution Line	■ Delineated Ephemeral Stream
○ Existing Right-of-Way (ROW)	■ Delineated Wetland Boundary
○ Proposed Access	■ Delineated Wetland
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○ Existing Access	
■ Temporary Construction Matting	■ FEMA 100-Year Flood Zone
■ Stone Work Pad	■ Floodway
■ Eversource Owned Property	■ NHDES Protected Shoreland
■ State Owned Land	■ Rail Road
■ LLN/Property Owner	■ GAS Approximate Gas Line
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■ 10' Contours	○ Culvert
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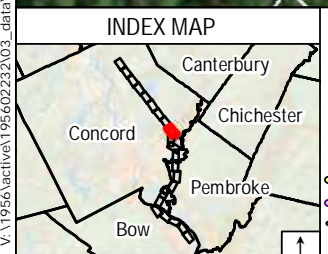
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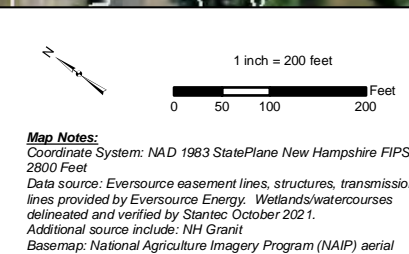


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Legend	
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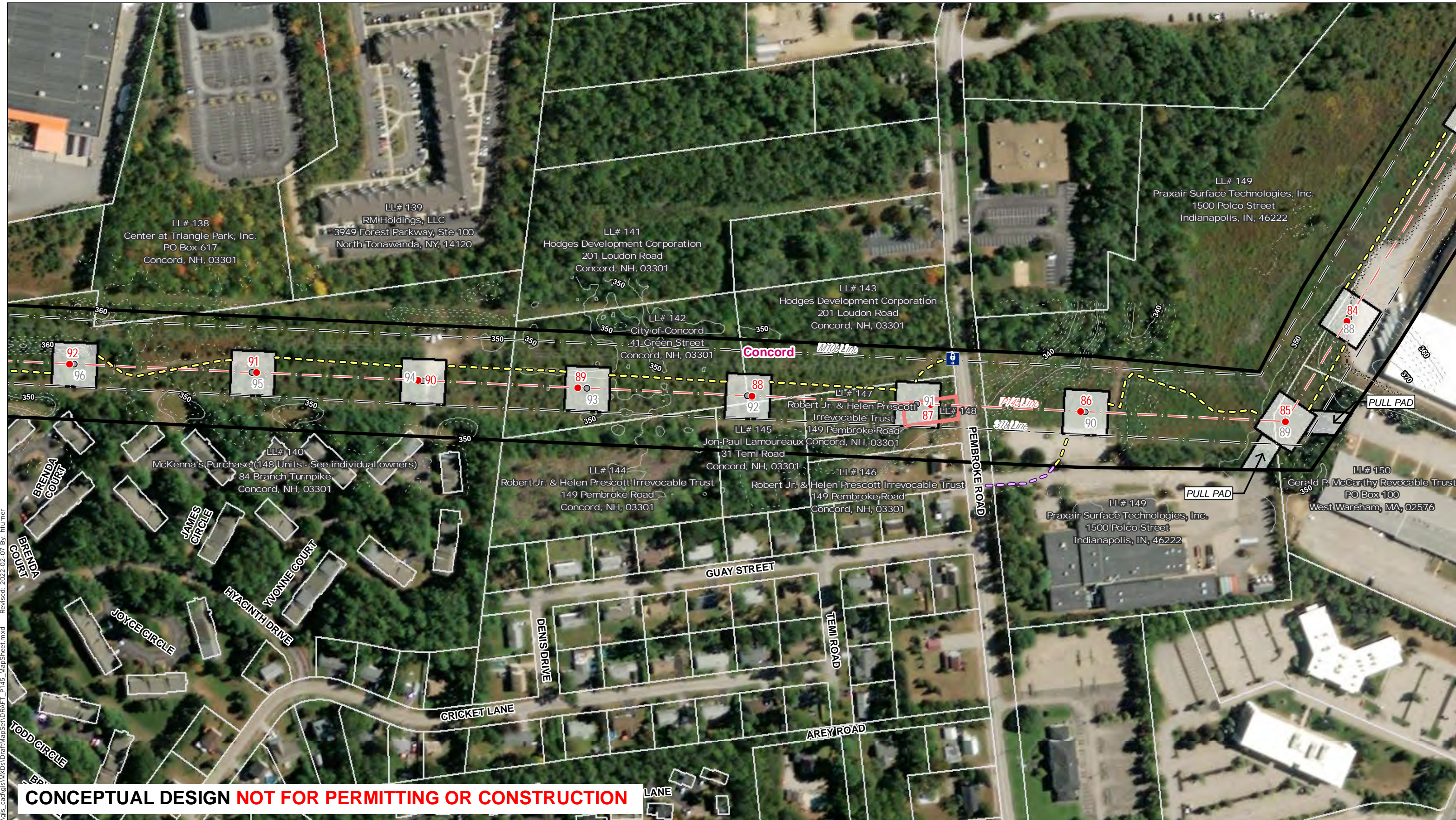


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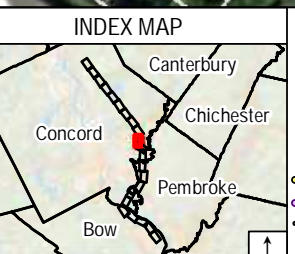
P145 - Structure Replacement Project Draft Map set

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CONCEPTUAL DESIGN NOT FOR PERMITTING OR CONSTRUCTION



Legend

- Proposed Structure
- Existing Structure
- Existing Structure to be Removed
- Overhead Eversource Line
- Overhead Distribution Line
- Existing Right-of-Way (ROW)
- Proposed Access
- Off-ROW Access Pending Rights
- Existing Access
- Temporary Construction Matting
- Stone Work Pad
- Eversource Owned Property
- State Owned Land
- LLN/Property Owner
- Parcel Boundary
- Municipal Boundary
- 2' Contours
- 10' Contours
- Potential Vernal Pool
- Potential Vernal Pool Extent
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated Ephemeral Stream
- Delineated Wetland Boundary
- Delineated Wetland
- Open Water
- FEMA 100-Year Flood Zone
- Floodway
- NHDES Protected Shoreland
- Rail Road
- GAS Approximate Gas Line
- Fence
- Stone Wall
- Gate
- Culvert
- Rare Species

Map Notes:
 Coordinate System: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
 Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.
 Additional source include: NH Grant
 Basemap: National Agriculture Imagery Program (NAIP) aerial

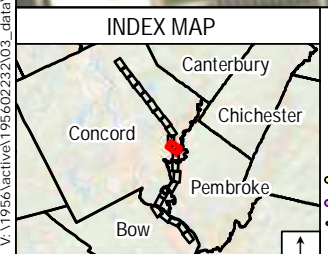
1 inch = 200 feet

0 50 100 200 Feet

EVERSOURCE ENERGY		Stantec	
P145 - Structure Replacement Project			
Draft Map set			
Concord, NH		MAP SHEET	
Date: February 07, 2022		10 of 22	
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CONCEPTUAL DESIGN NOT FOR PERMITTING OR CONSTRUCTION



Legend

- Proposed Structure
- Existing Structure
- Existing Structure to be Removed
- Overhead Eversource Line
- Overhead Distribution Line
- Proposed Access
- Off-ROW Access Pending Rights
- Existing Access
- Temporary Construction Matting
- Stone Work Pad
- Eversource Owned Property
- State Owned Land
- LLN/Property Owner
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NO.	DATE	REVISIONS

EVERSOURCE ENERGY **Stantec**

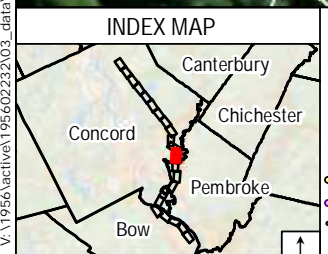
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Concord, NH	MAP SHEET
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CONCEPTUAL DESIGN NOT FOR PERMITTING OR CONSTRUCTION



Legend	
● Proposed Structure	Temporary Construction Matting
● Existing Structure	Stone Work Pad
● Existing Structure to be Removed	Eversource Owned Property
● Overhead Eversource Line	State Owned Land
● Overhead Distribution Line	LLN/Property Owner
● Proposed Access	Parcel Boundary
● Off-ROW Access Pending Rights	Municipal Boundary
● Existing Access	2' Contours
	10' Contours
● Potential Vernal Pool	Potential Vernal Pool Extent
● Delineated Perennial Stream	Delineated Intermittent Stream
● Delineated Ephemeral Stream	Delineated Wetland Boundary
● Delineated Wetland	Delineated Wetland
● Open Water	
● FEMA 100-Year Flood Zone	Stone Wall
● Floodway	Gate
● NHDES Protected Shoreland	Culvert
● Rail Road	Rare Species
● GAS Approximate Gas Line	
● Fence	

Map Notes:
 Coordinate System: NAD 1983 StatePlane New Hampshire FIPS 2800 Feet
 Data source: Eversource easement lines, structures, transmission lines provided by Eversource Energy. Wetlands/watercourses delineated and verified by Stantec October 2021.
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NO.	DATE	REVISIONS

EVERSOURCE ENERGY **Stantec**

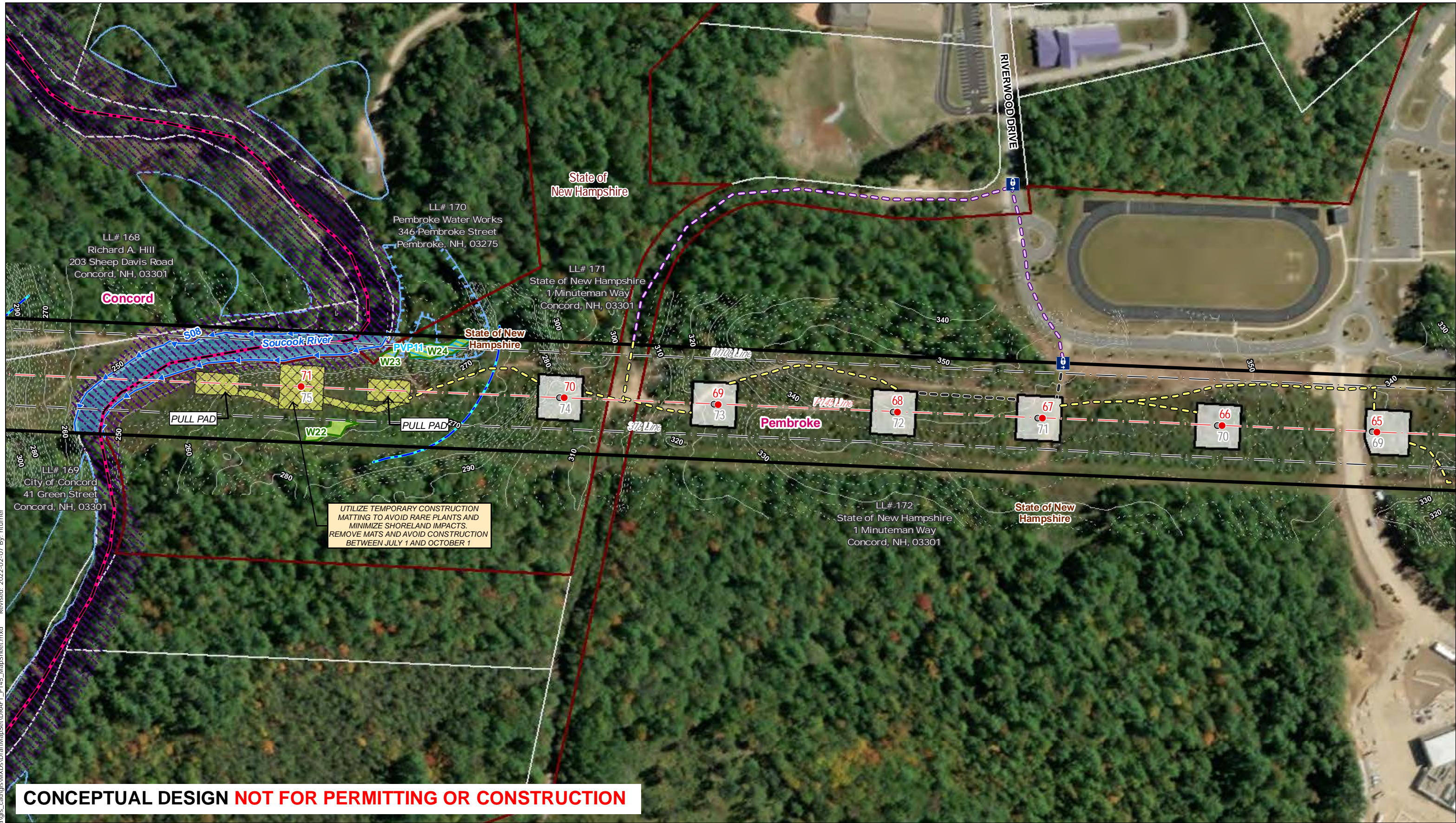
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Concord, NH MAP SHEET

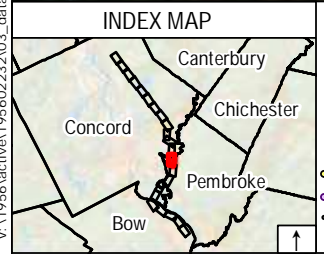
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CONCEPTUAL DESIGN NOT FOR PERMITTING OR CONSTRUCTION



Legend	
● Proposed Structure	Temporary Construction Matting
● Existing Structure	Stone Work Pad
● Existing Structure to be Removed	Eversource Owned Property
— Overhead Eversource Line	State Owned Land
— Overhead Distribution Line	LLN/Property Owner
— Existing Right-of-Way (ROW)	Parcel Boundary
— Proposed Access	Municipal Boundary
— Off-ROW Access Pending Rights	2' Contours
— Existing Access	10' Contours
● Potential Vernal Pool	Potential Vernal Pool Extent
— Delineated Perennial Stream	Delineated Intermittent Stream
— Delineated Ephemeral Stream	Delineated Wetland Boundary
— Delineated Wetland	Delineated Wetland
— Open Water	
— FEMA 100-Year Flood Zone	— Floodway
— NHDES Protected Shoreland	— Rail Road
— GAS Approximate Gas Line	— Fence
— Stone Wall	— Gate
— Culvert	— Rare Species

Map Notes:
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1 inch = 200 feet

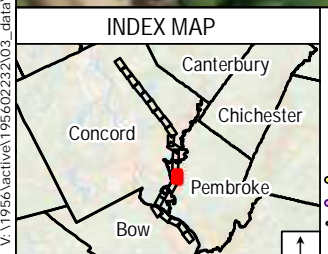
0 50 100 200 Feet

		EVERSOURCE ENERGY		Stantec	
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CONCEPTUAL DESIGN NOT FOR PERMITTING OR CONSTRUCTION



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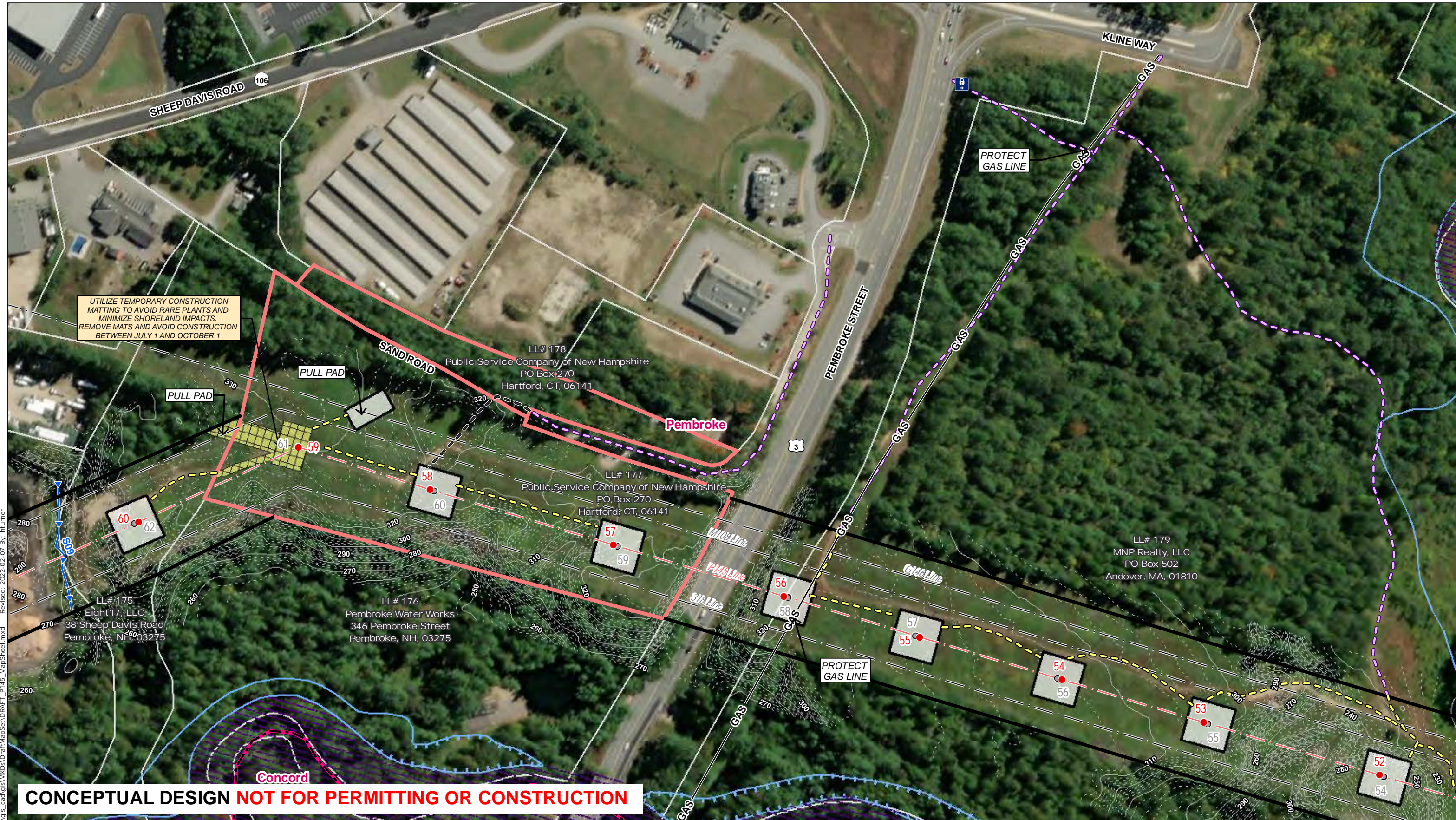
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- Existing Structure to be Removed
- Overhead Eversource Line
- Overhead Distribution Line
- Existing Right-of-Way (ROW)
- Proposed Access
- Off-ROW Access Pending Rights
- Existing Access
- Temporary Construction Matting
- Stone Work Pad
- Eversource Owned Property
- State Owned Land
- LL# 100 LLN/Property Owner
- Parcel Boundary
- Municipal Boundary
- 2' Contours
- 10' Contours
- Potential Vernal Pool
- Potential Vernal Pool Extent
- Delineated Perennial Stream
- Delineated Intermittent Stream
- Delineated Ephemeral Stream
- Delineated Wetland Boundary
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- Open Water
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- NHDES Protected Shoreland
- Rail Road
- GAS Approximate Gas Line
- X—X Fence
- Stone Wall
- Gate
- Culvert
- Rare Species

Map Notes:
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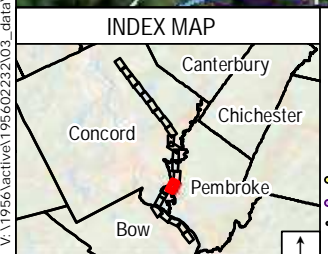
1 inch = 200 feet
 0 50 100 200 Feet

		EVERSOURCE ENERGY		Stantec	
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CONCEPTUAL DESIGN NOT FOR PERMITTING OR CONSTRUCTION



- Legend**
- Proposed Structure
 - Existing Structure
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This mapping product has been created to comply with submittal requirements to obtain certain regulatory approvals and, as such, there is no reliance on the information contained herein for any other purpose.

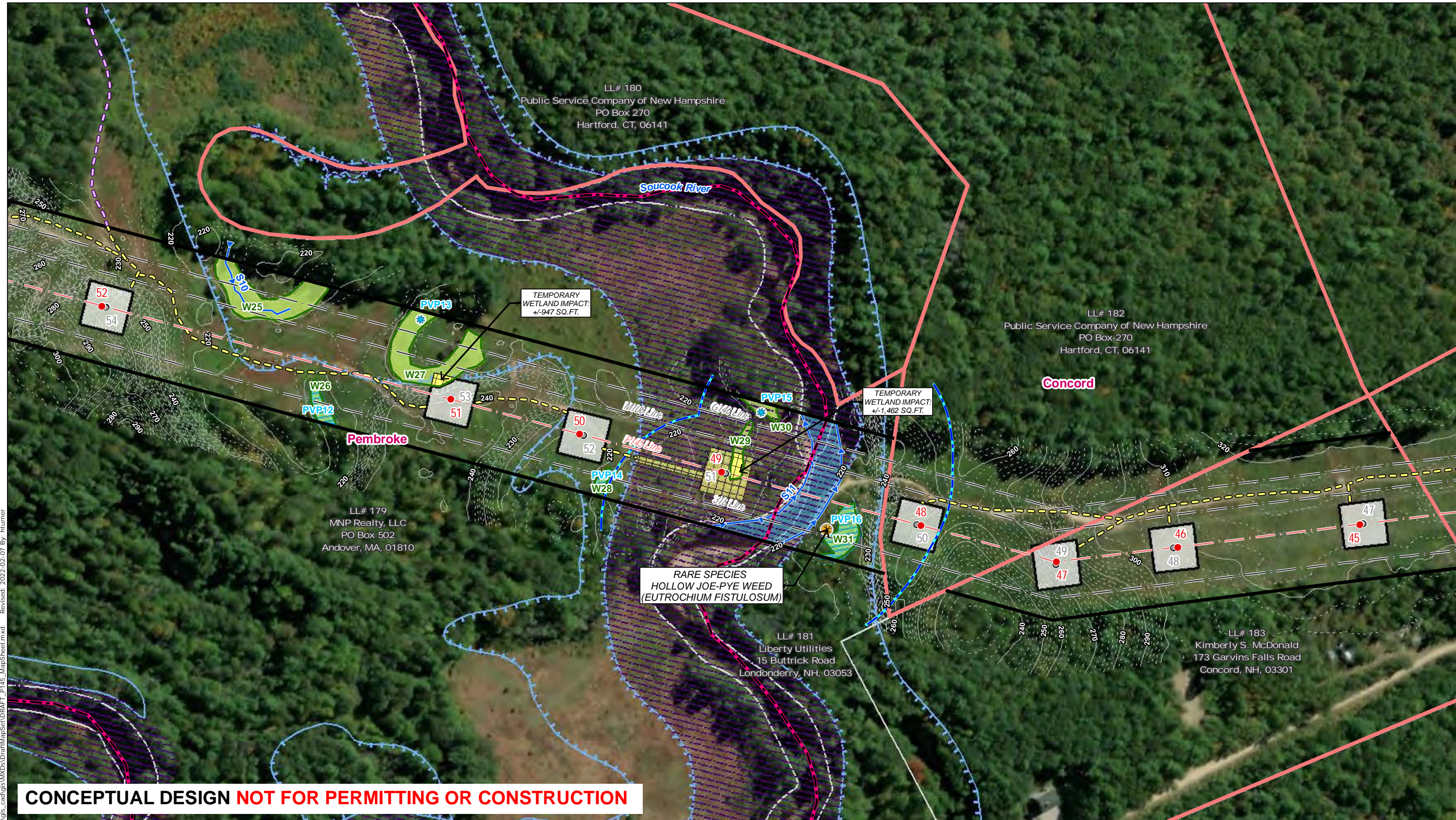
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LL# 180
Public Service Company of New Hampshire
PO Box 270
Hartford, CT, 06141

LL# 182
Public Service Company of New Hampshire
PO Box 270
Hartford, CT, 06141

LL# 179
MNP Realty, LLC
PO Box 502
Andover, MA, 01810

LL# 181
Liberty Utilities
15 Buttrick Road
Londonderry, NH, 03053

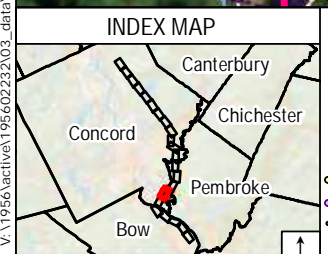
LL# 183
Kimberly S. McDonald
173 Garvins Falls Road
Concord, NH, 03301

TEMPORARY WETLAND IMPACT:
+/-947 SQ.FT.

TEMPORARY WETLAND IMPACT:
+/-1,462 SQ.FT.

RARE SPECIES
HOLLOW JOE-PYE WEED
(EUTROCHUM FISTULOSUM)

CONCEPTUAL DESIGN NOT FOR PERMITTING OR CONSTRUCTION



Legend	
● Proposed Structure	Temporary Construction Matting
● Existing Structure	Stone Work Pad
● Existing Structure to be Removed	Eversource Owned Property
● Overhead Eversource Line	State Owned Land
● Overhead Distribution Line	LLN/Property Owner
● Existing Right-of-Way (ROW)	Parcel Boundary
● Proposed Access	Municipal Boundary
● Off-ROW Access Pending Rights	2' Contours
● Existing Access	10' Contours
● Potential Vernal Pool	Potential Vernal Pool Extent
● Delineated Perennial Stream	Delineated Intermittent Stream
● Delineated Ephemeral Stream	Delineated Wetland Boundary
● Delineated Wetland	Delineated Wetland
● Open Water	
● FEMA 100-Year Flood Zone	Floodway
● NHDES Protected Shoreland	Rail Road
● GAS Approximate Gas Line	Fence
● Stone Wall	Gate
● Culvert	Rare Species

Map Notes:
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NO.	DATE	REVISIONS

EVERSOURCE ENERGY **Stantec**

P145 - Structure Replacement Project
Draft Map set

Concord & Pembroke, NH MAP SHEET

Date: February 07, 2022

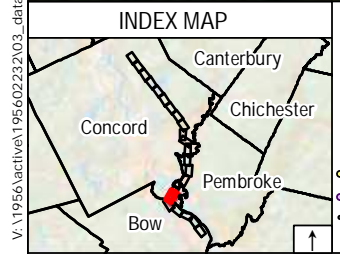
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CONCEPTUAL DESIGN NOT FOR PERMITTING OR CONSTRUCTION

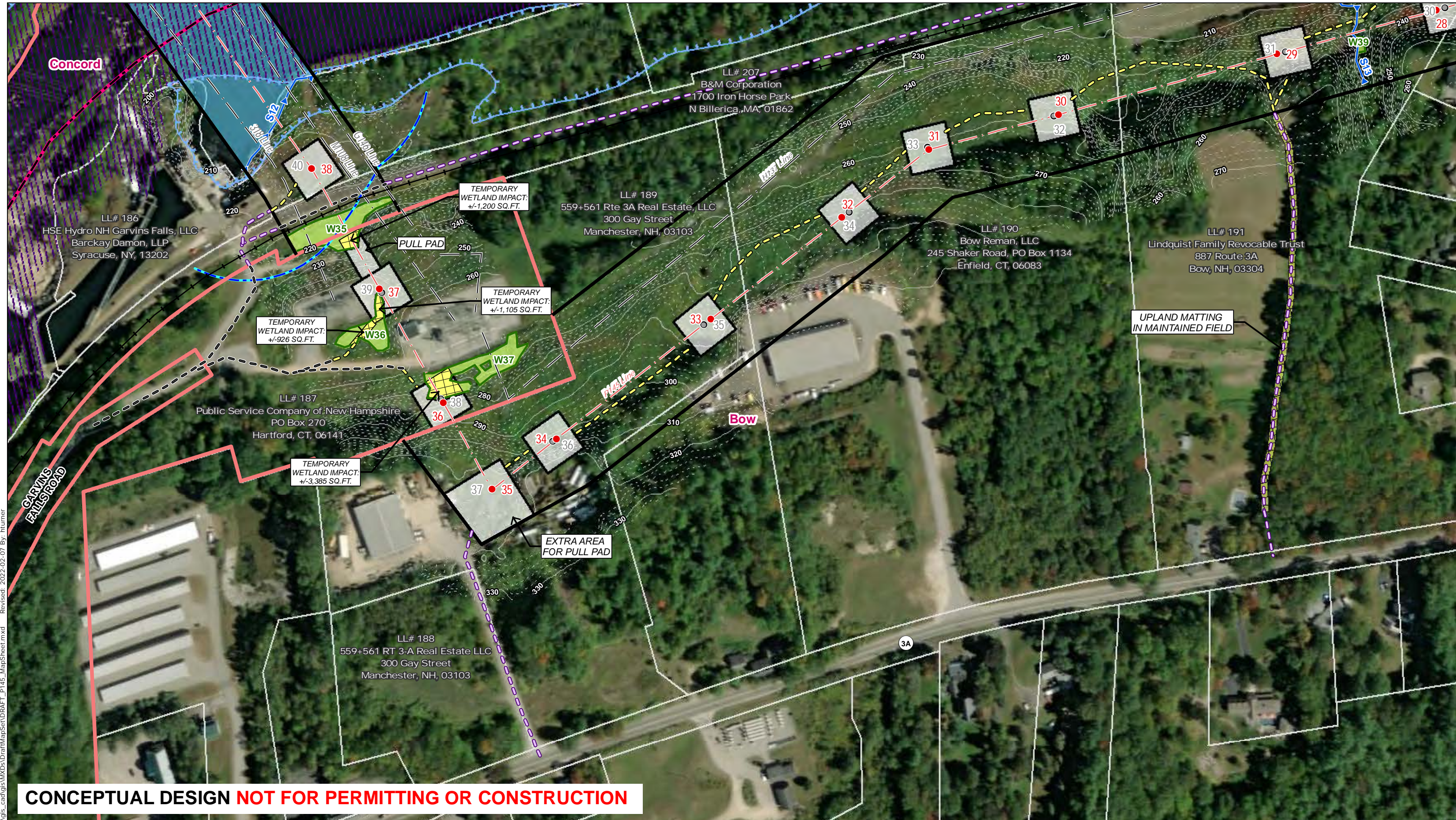


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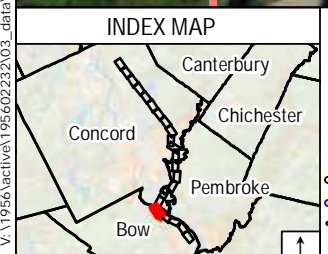
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- Existing Structure
- Existing Structure to be Removed
- Overhead Eversource Line
- Overhead Distribution Line
- Existing Right-of-Way (ROW)
- Proposed Access
- Off-ROW Access Pending Rights
- Existing Access
- Temporary Construction Matting
- Stone Work Pad
- Eversource Owned Property
- State Owned Land
- LLN/Property Owner
- Parcel Boundary
- Municipal Boundary
- 2' Contours
- 10' Contours
- Potential Vernal Pool
- Potential Vernal Pool Extent
- Delineated Perennial Stream
- Delineated Intermittent Stream
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CONCEPTUAL DESIGN NOT FOR PERMITTING OR CONSTRUCTION



- Legend**
- Proposed Structure
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 - Existing Structure to be Removed
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 - Stone Wall
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 - Rare Species

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NO.	DATE	REVISIONS

EVERSOURCE ENERGY **Stantec**

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Draft Map set

Bow, NH MAP SHEET

Date: February 07, 2022

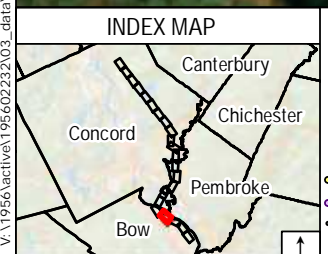
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Merrimack River



CONCEPTUAL DESIGN NOT FOR PERMITTING OR CONSTRUCTION



Legend

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- Overhead Eversource Line
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- Parcel Boundary
- Municipal Boundary
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- Potential Vernal Pool Extent
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- Delineated Ephemeral Stream
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- Delineated Wetland
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- Stone Wall
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EVERSOURCE ENERGY **Stantec**

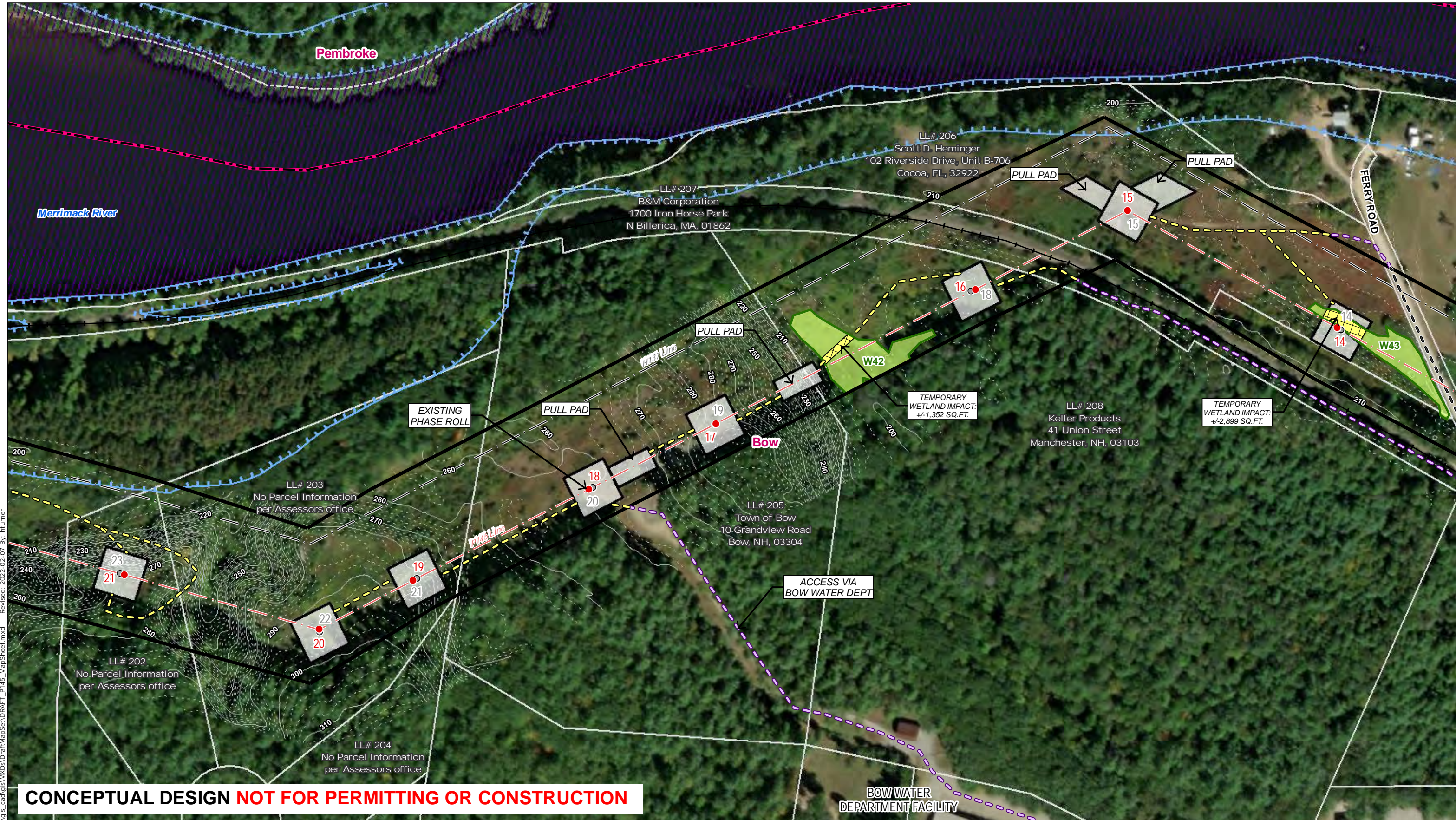
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Bow, NH MAP SHEET

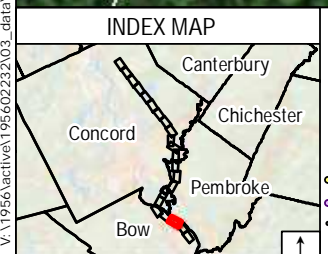
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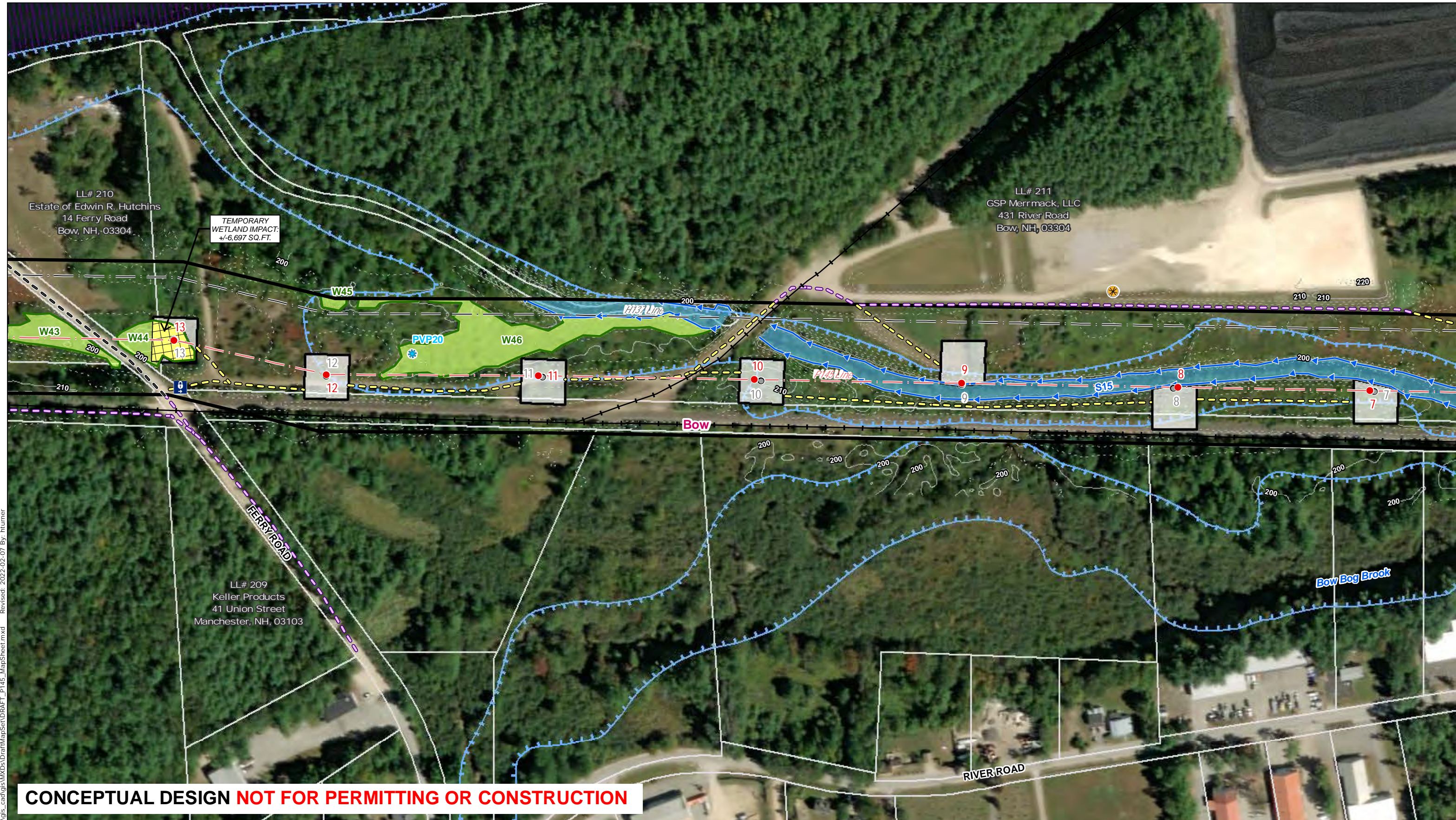
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- Existing Structure
- Existing Structure to be Removed
- Overhead Eversource Line
- Overhead Distribution Line
- Proposed Access
- Off-ROW Access Pending Rights
- Existing Access
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- LLN/Property Owner
- Parcel Boundary
- Municipal Boundary
- 2' Contours
- 10' Contours
- Potential Vernal Pool
- Potential Vernal Pool Extent
- Delineated Perennial Stream
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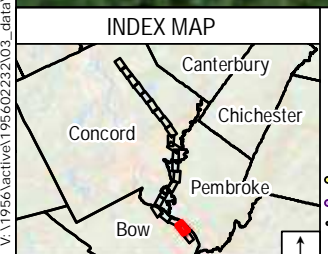
1 inch = 200 feet
 0 50 100 200 Feet

		EVERSOURCE ENERGY		Stantec	
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CONCEPTUAL DESIGN NOT FOR PERMITTING OR CONSTRUCTION



Legend	
● Proposed Structure	Temporary Construction Matting
● Existing Structure	Stone Work Pad
● Existing Structure to be Removed	Eversource Owned Property
— Overhead Eversource Line	State Owned Land
— Overhead Distribution Line	Parcel Boundary
— Existing Right-of-Way (ROW)	LLN/Property Owner
— Proposed Access	Municipal Boundary
— Off-ROW Access Pending Rights	2' Contours
— Existing Access	10' Contours
● Potential Vernal Pool	Potential Vernal Pool Extent
— Delineated Perennial Stream	FEMA 100-Year Flood Zone
— Delineated Intermittent Stream	Floodway
— Delineated Ephemeral Stream	NHDES Protected Shoreland
— Delineated Wetland Boundary	Rail Road
— Delineated Wetland	GAS Approximate Gas Line
— Open Water	—X—X— Fence
— Stone Wall	Gate
— Culvert	Culvert
— Rare Species	Rare Species

Map Notes:
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EVERSOURCE ENERGY Stantec

P145 - Structure Replacement Project Draft Map set

Bow, NH MAP SHEET

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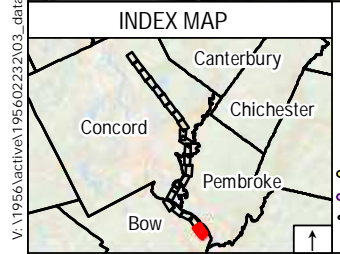
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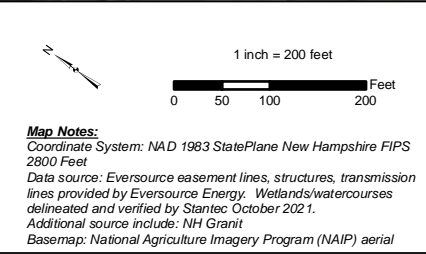


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Legend	
● Proposed Structure	Temporary Construction Matting
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— Delineated Wetland	Delineated Wetland
— Open Water	
— FEMA 100-Year Flood Zone	Stone Wall
— Floodway	Gate
— NHDES Protected Shoreland	Culvert
— Rail Road	Rare Species
— GAS Approximate Gas Line	
— Fence	



NO.	DATE	REVISIONS

EVERSOURCE ENERGY **Stantec**

P145 - Structure Replacement Project
Draft Map set

Bow, NH MAP SHEET

Date: February 07, 2022

22 of 22

February 4, 2022

Kim Tuttle
Attachment

Reference: Summary of Existing Ecological Conditions, P145 Line Structure Replacement Project, Bow, Concord, and Pembroke,
New Hampshire

ATTACHMENT 2. REPRESENTATIVE PHOTOGRAPHS

Eversource P145 Structure Replacement Project

Area A: Farmwood Substation to Shaker Road

Eversource P145 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 P145 Structure Replacement Project



Photo 3. Row near structure 162, view to the south. November 8, 2021.



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

Eversource P145 Structure Replacement Project



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



Photo 6. Representative shrub-dominated ROW uplands near structure 156. November 8, 2021.

Eversource P145 Structure Replacement Project



Photo 7. Representative ROW uplands near structure 149. November 8, 2021.



Photo 8. Wetland W04. October 25, 2021.

Eversource P145 Structure Replacement Project



Photo 9. Representative ROW uplands near structure 146. November 8, 2021.

Eversource P145 Structure Replacement Project

Area B: Shaker Road to Oak Hill Road

Eversource P145 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 P145 Structure Replacement Project



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



Photo 13. Representative grass-dominated ROW uplands near structure 138. November 8, 2021.

Eversource P145 Structure Replacement Project



Photo 14. Wetland W14. October 26, 2021.



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

Eversource P145 Structure Replacement Project

Area C: Oak Hill Road to Appleton Street

Eversource P145 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 structure 131. October 26, 2021.

Eversource P145 Structure Replacement Project



Photo 18. Wetland W16 scrub-shrub and emergent portion near structure 130. October 26, 2021.



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

Eversource P145 Structure Replacement Project

Area D. Appleton Street to Curtisville Road

Eversource P145 Structure Replacement Project



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



Photo 21. Wetland W17 near structure 126. October 26, 2021.

Eversource P145 Structure Replacement Project



Photo 22. Wetland W17 open water impoundment near structure 126. November 8, 2021.



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

Eversource P145 Structure Replacement Project



Photo 24. Potential vernal pool (PVP07) in W17 near structure 124



Photo 25. Shrub-dominated ROW near structure 122. November 8, 2021.

Eversource P145 Structure Replacement Project



Photo 26. Scrub oak near structure 122. November 8, 2021.



Photo 27. Scrub oak-dominated ROW near structure 121. November 8, 2021.

Eversource P145 Structure Replacement Project

Area E: Curtisville Road to Portsmouth Street

Eversource P145 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 P145 Structure Replacement Project



Photo 30. Wetland W18 near structure 116. November 8, 2021.



Photo 31. Potential vernal pool (PVP09) in W18 near structure 115. October 28, 2021.

Eversource P145 Structure Replacement Project



Photo 32. Shrub-dominated ROW uplands near structure 113. November 8, 2021.



Photo 33. Shrub-dominated ROW uplands near structure 113. November 8, 2021.

Eversource P145 Structure Replacement Project



Photo 34. Ribbon snake near structure 111. October 28, 2021.



Photo 35. Shrub-dominated ROW uplands near structure 109. November 8, 2021.

Eversource P145 Structure Replacement Project



Photo 36. Dry ROW dominated by little blue stem near structure 108. November 8, 2021.



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

Eversource P145 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 P145 Structure Replacement Project

Area F: I-393 to Louden Road

Eversource P145 Structure Replacement Project



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

Eversource P145 Structure Replacement Project

Area G: Louden Road to Antrim Avenue

Eversource P145 Structure Replacement Project



Photo 41. Dry shrub-dominated uplands near structure 95. October 26, 2021.



Photo 42. Dry shrub-dominated uplands near structure 92. November 8, 2021.

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Photo 43. Shrub-dominated ROW with pitch pine along ROW edge near structure 91. November 8, 2021.



Photo 44. Shrub-dominated ROW uplands with scrub oak and pitch pine saplings near structure 90. November 8, 2021.

Eversource P145 Structure Replacement Project



Photo 45. Shrub-dominated ROW uplands with scrub oak and pitch pine saplings near structure 89. November 8, 2021.



Photo 46. Shrub-dominated ROW uplands with scrub oak near structure 88. November 8, 2021.

Eversource P145 Structure Replacement Project



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

Eversource P145 Structure Replacement Project

Area H: Antrim Avenue to Pembroke Street

Eversource P145 Structure Replacement Project



Photo 48. Sand pit with off-road vehicle use in ROW near structure 77. November 8, 2021.



Photo 49. Shrub-dominated ROW and Soucook River south of structure 76. November 8, 2021.

Eversource P145 Structure Replacement Project



Photo 50. Sandy south-facing embankment north of Soucook River near structure 76. November 8, 2021.



Photo 51. Soucook River. October 26, 2021

Eversource P145 Structure Replacement Project



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



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Eversource P145 Structure Replacement Project



Photo 54. Scrub oak-dominated ROW near structure 74. November 9, 2021.



Photo 55. Shrub-dominated sandy uplands and existing access road near structure 73. November 9, 2021.

Eversource P145 Structure Replacement Project



Photo 56. Scrub oak and little bluestem-dominated ROW near structure 71. November 9, 2021.



Photo 57. Scrub oak and little bluestem-dominated ROW near structure 70. November 9, 2021.

Eversource P145 Structure Replacement Project



Photo 58. Wild lupine in ROW near structure 68. October 27, 2021.



Photo 59. Existing wild lupine protection area near structure 68. October 27, 2021.

Eversource P145 Structure Replacement Project



Photo 60. Scrub oak-dominated ROW uplands near structure 66. November 9, 2021.



Photo 61. Stream S09. October 27, 2021.

Eversource P145 Structure Replacement Project



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Eversource P145 Structure Replacement Project

Area I: Pembroke Street to Merrimack River

Eversource P145 Structure Replacement Project



Photo 63. Scrub oak and little bluestem-dominated ROW near structure 57. November 9, 2021.



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

Eversource P145 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 P145 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 P145 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 P145 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 P145 Structure Replacement Project



Photo 73. Shrub-dominated ROW and sandy access trail near structure 49. November 9, 2021.



Photo 74. Scrub oak-dominated ROW near structure 46. November 9, 2021.

Eversource P145 Structure Replacement Project



Photo 75. Shrub-dominated ROW and associated existing access road near structure 42. November 9, 2021.



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

Eversource P145 Structure Replacement Project

Area J: Merrimack River to Ferry Road

Eversource P145 Structure Replacement Project



Photo 77. Merrimack River. October 28, 2021.



Photo 78. Early successional shrub-dominated ROW near structure 34. November 9, 2021.

Eversource P145 Structure Replacement Project



Photo 79. Early successional shrub-dominated ROW near structure 32. November 9, 2021.



Photo 80. Stream S13. October 28, 2021.

Eversource P145 Structure Replacement Project



Photo 81. Old field in ROW near structure 29. November 9, 2021.



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

Eversource P145 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 P145 Structure Replacement Project



Photo 84. Early successional shrub-dominated ROW uplands near structure 26. November 9, 2021.



Photo 85. Representative ROW from structure 23. November 9, 2021.

Eversource P145 Structure Replacement Project



Photo 86. Shrub-dominated dry sandy ROW uplands near structure 21. November 9, 2021.



Photo 87. Sandy grassland area near structure 20. November 9, 2021.

Eversource P145 Structure Replacement Project



Photo 88. Sandy ROW uplands near structure 19. October 28, 2021.



Photo 89. Wetland W42. October 28, 2021.

Eversource P145 Structure Replacement Project



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



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

Eversource P145 Structure Replacement Project

Area K: Ferry Road to Merrimack Substation

Eversource P145 Structure Replacement Project



Photo 92. Wetland W44. October 27, 2021.

Eversource P145 Structure Replacement Project



Photo 93. Wetland W46. October 27, 2021.



Photo 94. Early successional shrub-dominated ROW and existing access road near structure 11.
November 9, 2021.

Eversource P145 Structure Replacement Project



Photo 95. Bow Bog Brook near structure 10. November 9, 2021.



Photo 96. Bow Bog Brook near structure 9. October 27, 2021.

Eversource P145 Structure Replacement Project



Photo 97. Early successional sandy shrub-dominated ROW near structure 6. November 9, 2021.



Photo 98. Emergent and aquatic wetland habitat near structure 5 in wetland 50. November 9, 2021.

Eversource P145 Structure Replacement Project



Photo 99. Emergent and aquatic wetland habitat near structure 4 in wetland 50. November 9, 2021.



Photo 100. Early successional ROW uplands near structure 4. November 9, 2021.

Eversource P145 Structure Replacement Project



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

NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

January 27, 2023

Appendix E WILDLIFE PROTECTION PLAN





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

NHB22-3395, NHB22-3396, NHB-3399

Bow, Concord, and Pembroke, New
Hampshire

January 11, 2023

Prepared for:

Public Service Company of New
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January 11, 2023

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January 11, 2023

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.



C189-M108-H137-G146 STRUCTURE REPLACEMENT PROJECT WILDLIFE PROTECTION PLAN

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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.



C189-M108-H137-G146 STRUCTURE REPLACEMENT PROJECT WILDLIFE PROTECTION PLAN

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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.



C189-M108-H137-G146 STRUCTURE REPLACEMENT PROJECT WILDLIFE PROTECTION PLAN

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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 Louden 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 Louden 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.

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



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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.
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.
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.



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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*).

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.



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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.

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.



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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:

- 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

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



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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 31, 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.
 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 31) the following shall apply:



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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.
- 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



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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 September 15 and March 31.
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.



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4. 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.
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 31) 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 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.
- During construction, the work area shall be inspected prior to the start of daily work by a trained individual.

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



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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.

- 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.
- Installation of an exclusionary barrier around the work area may be utilized 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.
- 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.



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- If two layers of matting cannot be accommodated, the work pad shall be surrounded by silt fence stapled to the sides of the matting to prevent access by climbing turtles and snakes.
 - During construction, the work area shall be inspected prior to the start of daily work by a trained individual.
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.
 - 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 $\frac{1}{4}$ 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 Louden Road. It traverses a landscaped 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, steeplebush Herbs: sensitive fern, cinnamon fern, royal fern	Seasonally inundated	No	Includes potential vernal pool PVP12
W27	PSS	Shrubs: buttonbush, common winterberry, broad-leaf meadowsweet, steeplebush, 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, steeplebush, 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, steeplebush 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 Louden 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.

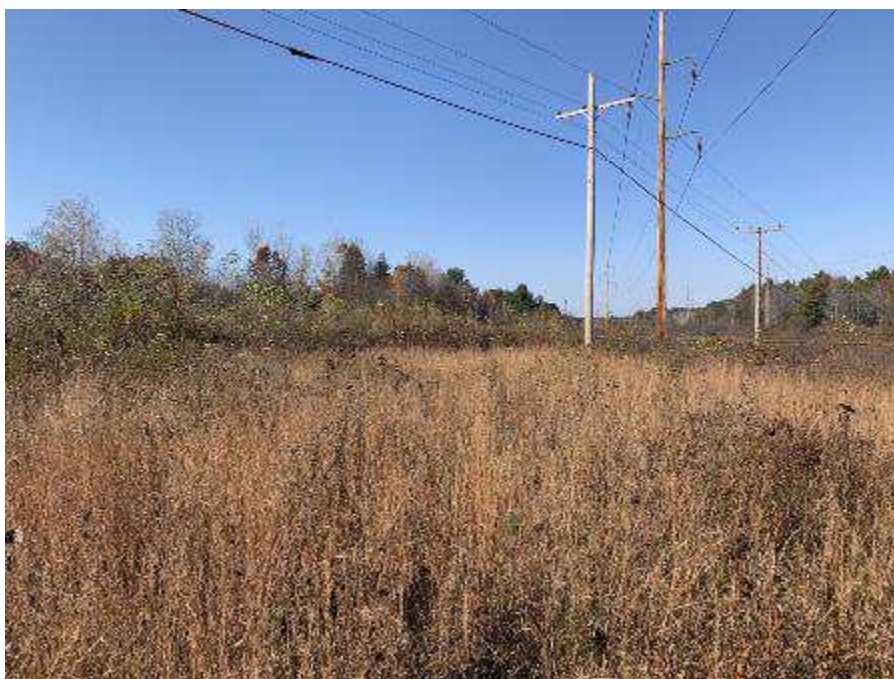


Photo 100. Early successional ROW uplands near H137 Structure 3. November 9, 2021.

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



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

NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

January 27, 2023

Appendix F NRCS SOIL REPORT





United States
Department of
Agriculture

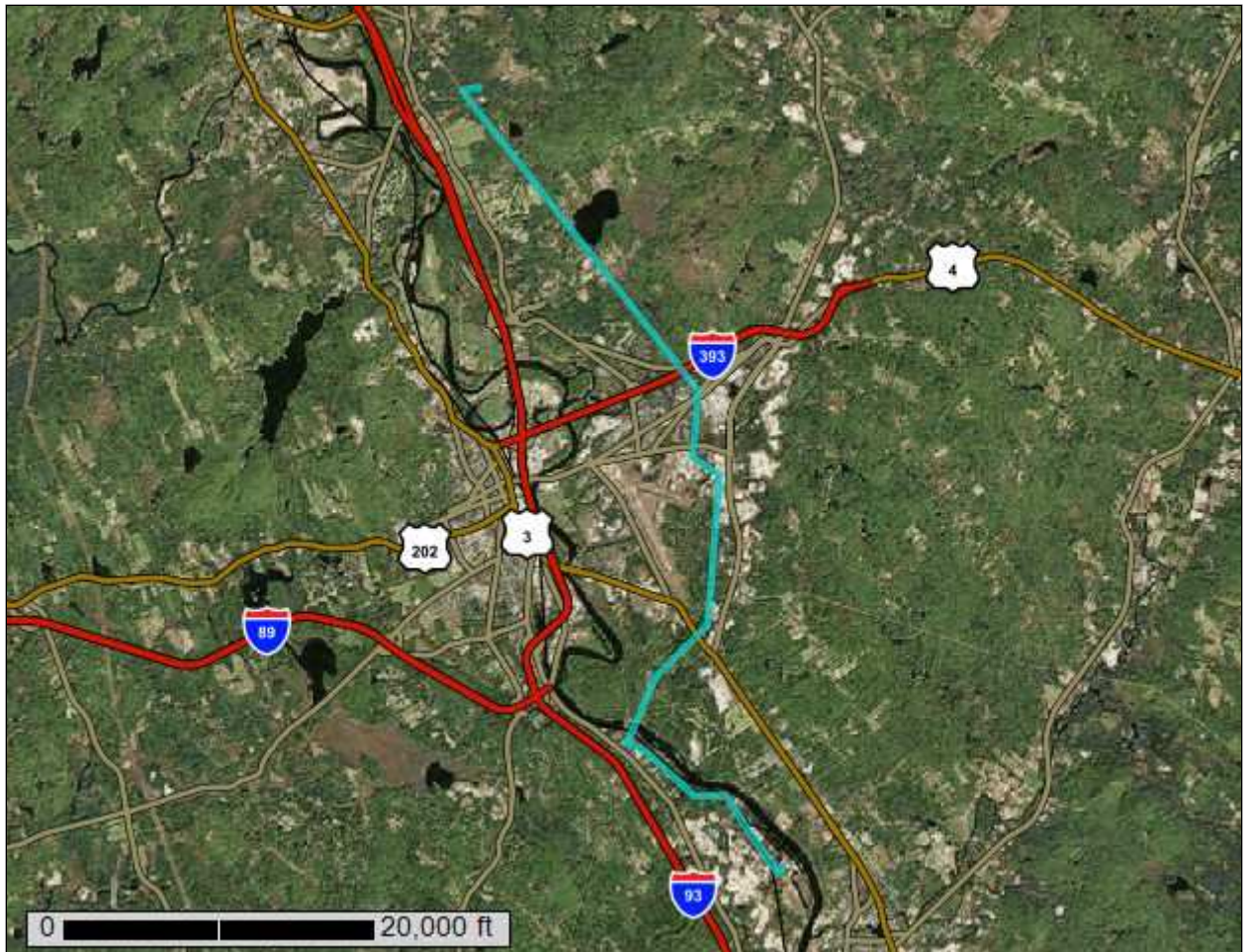
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Merrimack and Belknap Counties, New Hampshire

**C189, M108, H137, G146
Structure Replacement Project**



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

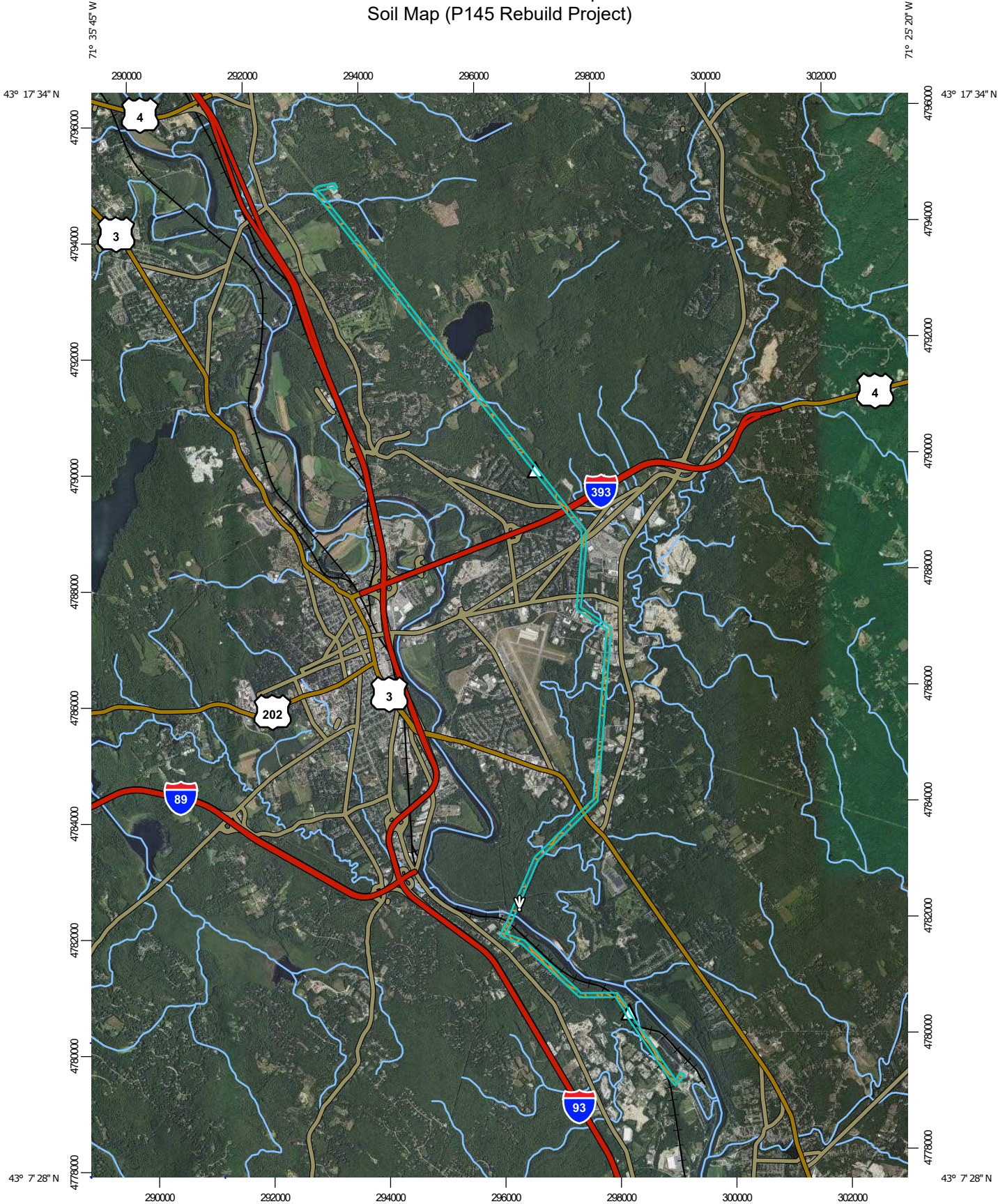
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

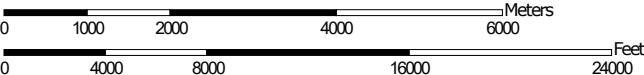
Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map (P145 Rebuild Project)




Map Scale: 1:91,000 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)




















Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines


 Soil Map Unit Points

Special Point Features






-  Blowout
-  Borrow Pit
-  Clay Spot
-  Closed Depression
-  Gravel Pit
-  Gravelly Spot
-  Landfill
-  Lava Flow
-  Marsh or swamp
-  Mine or Quarry
-  Miscellaneous Water
-  Perennial Water
-  Rock Outcrop
-  Saline Spot
-  Sandy Spot
-  Severely Eroded Spot
-  Sinkhole
-  Slide or Slip
-  Sodic Spot

-  Spoil Area
-  Stony Spot
-  Very Stony Spot
-  Wet Spot
-  Other
-  Special Line Features


Water Features

 Streams and Canals

Transportation

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Merrimack and Belknap Counties, New Hampshire
 Survey Area Data: Version 27, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 8, 2011—Aug 13, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (P145 Rebuild Project)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
2A	Suncook loamy fine sand, 0 to 3 percent slopes, occasionally flooded	8.8	2.3%
4A	Pootatuck very fine sandy loam, 0 to 3 percent slopes, occasionally flooded	8.7	2.3%
5A	Rippowam very fine sandy loam, 0 to 3 percent slopes, frequently flooded	17.7	4.7%
6A	Saco mucky silt loam, 0 to 2 percent slopes, frequently flooded	3.6	1.0%
17A	Searsport-Chocorua-Naumburg complex, 0 to 1 percent slopes	3.1	0.8%
26A	Windsor loamy sand, 0 to 3 percent slopes	33.3	8.9%
26B	Windsor loamy sand, 3 to 8 percent slopes	63.1	16.8%
26C	Windsor loamy sand, 8 to 15 percent slopes	7.1	1.9%
26E	Windsor loamy sand, 15 to 60 percent slopes	39.2	10.4%
35C	Champlain loamy fine sand, 8 to 15 percent slopes	12.0	3.2%
43B	Canton fine sandy loam, 0 to 8 percent slopes, very stony	1.7	0.4%
43C	Canton fine sandy loam, 8 to 15 percent slopes, very stony	27.9	7.4%
43D	Canton fine sandy loam, 15 to 25 percent slopes, very stony	2.4	0.6%
46B	Henniker fine sandy loam, 3 to 8 percent slopes	11.6	3.1%
47C	Henniker fine sandy loam, 8 to 15 percent slopes, very stony	9.2	2.4%
167C	Canterbury fine sandy loam, 8 to 15 percent slopes, very stony	1.7	0.4%
167E	Canterbury fine sandy loam, 25 to 35 percent slopes, very stony	1.7	0.4%
196A	Meadowsedge peat, 0 to 1 percent slopes, ponded	6.4	1.7%
214A	Naumburg loamy sand, 0 to 5 percent slopes	0.0	0.0%

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Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
300B	Udipsamments, 0 to 6 percent slopes	1.9	0.5%
313A	Deerfield loamy fine sand, 0 to 3 percent slopes	1.3	0.4%
315A	Mashpee sand 0 to 5 percent slopes	4.2	1.1%
325A	Scarboro mucky fine sandy loam, 0 to 1 percent slopes, very stony	3.0	0.8%
326A	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	6.7	1.8%
394A	Chocorua mucky peat, 0 to 1 percent slopes	4.9	1.3%
401A	Occum very fine sandy loam, 0 to 3 percent slopes, occasionally flooded	21.5	5.7%
449B	Scituate fine sandy loam, 3 to 8 percent slopes, very stony	6.1	1.6%
459C	Metacomet fine sandy loam, 8 to 15 percent slopes, very stony	8.7	2.3%
480C	Millsite-Woodstock-Henniker complex, 8 to 15 percent slopes, very stony	9.5	2.5%
513B	Ninigret fine sandy loam, 0 to 3 percent slopes	3.6	1.0%
533A	Raynham silt loam, 0 to 3 percent slopes	3.6	1.0%
598B	Windsor-Urban land complex, 0 to 8 percent slopes	19.3	5.1%
613A	Croghan loamy fine sand, 0 to 8 percent slopes, wooded	10.3	2.8%
657A	Ridgebury fine sandy loam, 0 to 3 percent slopes, very stony	0.1	0.0%
699B	Urban land, 0 to 8 percent slopes	3.0	0.8%
W	Water	8.2	2.2%
Totals for Area of Interest		374.9	100.0%

Map Unit Descriptions (P145 Rebuild Project)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named

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according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

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An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Merrimack and Belknap Counties, New Hampshire

2A—Suncook loamy fine sand, 0 to 3 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 9dj5
Elevation: 200 to 790 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Suncook, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Suncook, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and/or coarse-loamy alluvium derived from granite, gneiss or schist

Typical profile

O_i - 0 to 1 inches: slightly decomposed plant material
O_e - 1 to 2 inches: slightly decomposed plant material
H₁ - 2 to 7 inches: loamy fine sand
H₂ - 7 to 31 inches: fine sand
H₃ - 31 to 65 inches: fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (K_{sat}): High (1.98 to 5.95 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: A
Ecological site: F144AY006CT - High Floodplain Levee
Hydric soil rating: No

Minor Components

Pootatuck

Percent of map unit: 8 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Occum, frequently flooded

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Occum, occasionally flooded

Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

4A—Pootatuck very fine sandy loam, 0 to 3 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 9dkl
Elevation: 200 to 790 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 160 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Pootatuck, occasionally flooded, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pootatuck, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and/or coarse-loamy alluvium derived from granite, gneiss or schist

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Typical profile

H1 - 0 to 14 inches: very fine sandy loam

H2 - 14 to 60 inches: fine sandy loam

H3 - 60 to 65 inches: fine sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Moderately well drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 6.00 in/hr)

Depth to water table: About 18 to 30 inches

Frequency of flooding: OccasionalNone

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: B

Ecological site: F144AY012CT - Sandy Low Floodplain

Hydric soil rating: No

Minor Components

Rippowam

Percent of map unit: 10 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: Yes

Suncook

Percent of map unit: 5 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Saco

Percent of map unit: 5 percent

Landform: Flood plains

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Occum, frequently flooded

Percent of map unit: 3 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Occum, occasionally flooded

Percent of map unit: 2 percent

Landform: Flood plains

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Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

5A—Rippowam very fine sandy loam, 0 to 3 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 9dl8
Elevation: 200 to 790 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Rippowam, frequently flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rippowam, Frequently Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy and/or coarse-loamy alluvium derived from granite, gneiss or schist

Typical profile

H1 - 0 to 6 inches: very fine sandy loam
H2 - 6 to 26 inches: very fine sandy loam
H3 - 26 to 65 inches: fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F144AY014CT - Wet Sandy Low Floodplain

Hydric soil rating: Yes

Minor Components

Saco

Percent of map unit: 10 percent

Landform: Flood plains

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Pootatuck

Percent of map unit: 5 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

6A—Saco mucky silt loam, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 9dm3

Elevation: 200 to 790 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 37 to 52 degrees F

Frost-free period: 90 to 160 days

Farmland classification: Not prime farmland

Map Unit Composition

Saco, frequently flooded, and similar soils: 75 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Saco, Frequently Flooded

Setting

Landform: Flood plains

Down-slope shape: Concave

Across-slope shape: Concave

Parent material: Sandy and/or coarse-loamy alluvium derived from granite, gneiss or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material

H1 - 2 to 8 inches: mucky silt loam

H2 - 8 to 35 inches: silt loam

H3 - 35 to 65 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

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Drainage class: Very poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 2.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Ecological site: F144AY016MA - Very Wet Low Floodplain
Hydric soil rating: Yes

Minor Components

Timakwa

Percent of map unit: 10 percent
Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Rippowam

Percent of map unit: 10 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: Yes

Pootatuck

Percent of map unit: 5 percent
Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

17A—Searsport-Chocorua-Naumburg complex, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 21xtw
Elevation: 250 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 145 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Searsport and similar soils: 40 percent

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Chocorua and similar soils: 30 percent
Naumburg and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Searsport

Setting

Landform: Outwash terraces
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Stratified sandy and gravelly outwash

Typical profile

Oe - 0 to 12 inches: mucky peat
H1 - 12 to 17 inches: fine sandy loam
H2 - 17 to 65 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F144BY303ME - Acidic Swamp
Hydric soil rating: Yes

Description of Chocorua

Setting

Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over outwash

Typical profile

Oe - 0 to 35 inches: mucky peat
H - 35 to 65 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None

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Frequency of ponding: Frequent

Available water supply, 0 to 60 inches: Very high (about 20.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8w

Hydrologic Soil Group: D

Ecological site: F144BY303ME - Acidic Swamp

Hydric soil rating: Yes

Description of Naumburg

Setting

Landform: Depressions

Down-slope shape: Linear

Across-slope shape: Convex

Typical profile

Oe - 0 to 2 inches: mucky peat

Oa - 2 to 6 inches: muck

H1 - 6 to 8 inches: loamy sand

H2 - 8 to 33 inches: loamy fine sand

H3 - 33 to 68 inches: coarse sand

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Poorly drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 6.00 in/hr)

Depth to water table: About 6 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C

Ecological site: F144BY303ME - Acidic Swamp

Hydric soil rating: Yes

Minor Components

Croghan

Percent of map unit: 5 percent

Landform: Terraces

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Meadowsedge

Percent of map unit: 5 percent

Landform: Bogs

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

26A—Windsor loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkg

Elevation: 0 to 990 feet

Mean annual precipitation: 36 to 71 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 240 days

Farmland classification: Farmland of local importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Outwash plains, outwash terraces, deltas, dunes

Landform position (three-dimensional): Tread, riser

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: loamy sand

Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Custom Soil Resource Report

Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Deerfield, loamy sand

Percent of map unit: 10 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, tal
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hinckley, loamy sand

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, crest, side slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

26B—Windsor loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svkf
Elevation: 0 to 1,210 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Dunes, outwash plains, deltas, outwash terraces
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear

Custom Soil Resource Report

Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material

A - 1 to 3 inches: loamy sand

Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Minor Components

Hinckley, loamy sand

Percent of map unit: 10 percent

Landform: Deltas, kames, eskers, outwash plains

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Head slope, nose slope, crest, side slope, rise

Down-slope shape: Convex

Across-slope shape: Convex, linear

Hydric soil rating: No

Deerfield, loamy sand

Percent of map unit: 5 percent

Landform: Deltas, terraces, outwash plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, tal

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

26C—Windsor loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svkq
Elevation: 0 to 1,260 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Windsor and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor

Setting

Landform: — error in exists on —
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, riser
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
Ap - 1 to 11 inches: loamy sand
Bw - 11 to 31 inches: loamy sand
C - 31 to 65 inches: sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A

Custom Soil Resource Report

Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 10 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Deerfield

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

26E—Windsor loamy sand, 15 to 60 percent slopes

Map Unit Setting

National map unit symbol: 2w2ws
Elevation: 0 to 760 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Windsor and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor

Setting

Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Custom Soil Resource Report

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 15 to 60 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 10 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Deerfield

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

35C—Champlain loamy fine sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9dnc
Elevation: 250 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Farmland of local importance

Map Unit Composition

Champlain and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Champlain

Setting

Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy outwash derived mainly from granite, gneiss and schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 6 inches: loamy fine sand
H2 - 6 to 22 inches: loamy fine sand
H3 - 22 to 65 inches: loamy fine sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F144BY601ME - Dry Sand
Hydric soil rating: No

Minor Components

Becket

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Adams

Percent of map unit: 5 percent
Landform: Outwash terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Croghan

Percent of map unit: 5 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Boscawen

Percent of map unit: 3 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Groveton

Percent of map unit: 2 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

43B—Canton fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w81l
Elevation: 0 to 1,180 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Canton, very stony, and similar soils: 80 percent
Minor components: 20 percent

Custom Soil Resource Report

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Moraines, hills, ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex

Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

O_i - 0 to 2 inches: slightly decomposed plant material

A - 2 to 5 inches: fine sandy loam

Bw₁ - 5 to 16 inches: fine sandy loam

Bw₂ - 16 to 22 inches: gravelly fine sandy loam

2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 0 to 8 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (K_{sat}): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Minor Components

Scituate, very stony

Percent of map unit: 9 percent

Landform: Hills, drumlins, ground moraines

Landform position (two-dimensional): Summit, backslope, footslope

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydric soil rating: No

Montauk, very stony

Percent of map unit: 5 percent

Landform: Recessional moraines, ground moraines, hills, drumlins

Landform position (two-dimensional): Summit, shoulder, backslope

Custom Soil Resource Report

Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Gloucester, very stony

Percent of map unit: 4 percent
Landform: Moraines, hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Swansea

Percent of map unit: 2 percent
Landform: Marshes, depressions, bogs, swamps, kettles
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

43C—Canton fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w814
Elevation: 0 to 1,160 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Canton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Moraines, ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

O_i - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw₁ - 5 to 16 inches: fine sandy loam

Custom Soil Resource Report

Bw2 - 16 to 22 inches: gravelly fine sandy loam

2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Minor Components

Montauk, very stony

Percent of map unit: 6 percent

Landform: Recessional moraines, ground moraines, hills, drumlins

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydric soil rating: No

Scituate, very stony

Percent of map unit: 5 percent

Landform: Ground moraines, hills, drumlins

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydric soil rating: No

Chatfield, very stony

Percent of map unit: 3 percent

Landform: Hills, ridges

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Swansea

Percent of map unit: 1 percent

Landform: Marshes, depressions, bogs, swamps, kettles

Custom Soil Resource Report

Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

43D—Canton fine sandy loam, 15 to 25 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2w81h
Elevation: 70 to 1,120 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of local importance

Map Unit Composition

Canton, very stony, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton, Very Stony

Setting

Landform: Moraines, hills, ridges
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy melt-out till derived from gneiss, granite, and/or schist

Typical profile

O_i - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
Bw₁ - 5 to 16 inches: fine sandy loam
Bw₂ - 16 to 22 inches: gravelly fine sandy loam
2C - 22 to 67 inches: gravelly loamy sand

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 19 to 39 inches to strongly contrasting textural stratification
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (K_{sat}): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Custom Soil Resource Report

Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: B

Ecological site: F144AY034CT - Well Drained Till Uplands

Hydric soil rating: No

Minor Components

Chatfield, very stony

Percent of map unit: 6 percent

Landform: Ridges, hills

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Nose slope, side slope, crest

Down-slope shape: Convex

Across-slope shape: Linear, convex

Hydric soil rating: No

Montauk, very stony

Percent of map unit: 5 percent

Landform: Hills, drumlins, recessional moraines, ground moraines

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex, linear

Across-slope shape: Convex

Hydric soil rating: No

Newfields, very stony

Percent of map unit: 4 percent

Landform: Ground moraines, hills, moraines

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

46B—Henniker fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9dnj

Elevation: 250 to 2,940 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 37 to 46 degrees F

Frost-free period: 90 to 135 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Henniker and similar soils: 75 percent

Minor components: 25 percent

Custom Soil Resource Report

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Henniker

Setting

Landform: Hills

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Basal melt-out till derived from granite, gneiss, or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

H1 - 1 to 4 inches: fine sandy loam

H2 - 4 to 34 inches: fine sandy loam

H3 - 34 to 65 inches: fine sandy loam

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 18 to 38 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C

Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)

Hydric soil rating: No

Minor Components

Metacomet

Percent of map unit: 5 percent

Landform: Hillslopes

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Pillsbury

Percent of map unit: 5 percent

Landform: Ground moraines

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: Yes

Becket

Percent of map unit: 5 percent

Landform: Hills

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Canterbury

Percent of map unit: 5 percent
Landform: Drumlins
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Chichester

Percent of map unit: 3 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Millsite

Percent of map unit: 2 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

47C—Henniker fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9dnl
Elevation: 250 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Farmland of local importance

Map Unit Composition

Henniker and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Henniker

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Basal melt-out till derived from granite, gneiss, or schist

Typical profile

O_i - 0 to 1 inches: slightly decomposed plant material
H₁ - 1 to 4 inches: fine sandy loam
H₂ - 4 to 34 inches: fine sandy loam
H₃ - 34 to 65 inches: fine sandy loam

Custom Soil Resource Report

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 18 to 38 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Minor Components

Canterbury

Percent of map unit: 5 percent
Landform: Drumlins
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Pillsbury

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: Yes

Metacomet

Percent of map unit: 5 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Becket

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Chichester

Percent of map unit: 3 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Millsite

Percent of map unit: 2 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

167C—Canterbury fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9dnv
Elevation: 250 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Farmland of local importance

Map Unit Composition

Canterbury and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canterbury

Setting

Landform: Drumlins
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lodgement till derived from granite, gneiss, or schist

Typical profile

Oe - 0 to 2 inches: slightly decomposed plant material
H1 - 2 to 6 inches: fine sandy loam
H2 - 6 to 28 inches: fine sandy loam
H3 - 28 to 65 inches: fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Minor Components

Chichester

Percent of map unit: 5 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Marlow

Percent of map unit: 5 percent
Landform: Drumlins
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Gilmanton

Percent of map unit: 5 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Henniker

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Metacomet

Percent of map unit: 3 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Metacomet

Percent of map unit: 2 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

167E—Canterbury fine sandy loam, 25 to 35 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9dns
Elevation: 250 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Canterbury and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canterbury

Setting

Landform: Drumlins
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lodgement till derived from granite, gneiss, or schist

Typical profile

Oe - 0 to 2 inches: slightly decomposed plant material
H1 - 2 to 6 inches: fine sandy loam
H2 - 6 to 28 inches: fine sandy loam
H3 - 28 to 65 inches: fine sandy loam

Properties and qualities

Slope: 25 to 35 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 24 to 42 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Minor Components

Marlow

Percent of map unit: 5 percent
Landform: Drumlins
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Millsite

Percent of map unit: 5 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Henniker

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Chichester

Percent of map unit: 5 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Gilmanton

Percent of map unit: 5 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

196A—Meadowsedge peat, 0 to 1 percent slopes, ponded

Map Unit Setting

National map unit symbol: 21xtp
Elevation: 250 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Meadowsedge, ponded, and similar soils: 85 percent
Minor components: 15 percent

Custom Soil Resource Report

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Meadowsedge, Ponded

Setting

Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organics

Typical profile

O_i - 0 to 4 inches: mucky peat
O_e - 4 to 65 inches: moderately decomposed plant material

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (K_{sat}): Moderately high to high
(0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 20.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Minor Components

Chocorua

Percent of map unit: 5 percent
Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Chocorua

Percent of map unit: 3 percent
Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Searsport

Percent of map unit: 3 percent
Landform: Outwash terraces
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Medomak

Percent of map unit: 2 percent

Custom Soil Resource Report

Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Peacham

Percent of map unit: 2 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

214A—Naumburg loamy sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 9dj8
Elevation: 250 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Naumburg and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Naumburg

Setting

Landform: Depressions
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy outwash derived mainly from granite, gneiss and schist

Typical profile

Oe - 0 to 2 inches: slightly decomposed plant material
Oa - 2 to 6 inches: slightly decomposed plant material
H1 - 6 to 8 inches: loamy sand
H2 - 8 to 33 inches: loamy fine sand
H3 - 33 to 68 inches: coarse sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None

Custom Soil Resource Report

Frequency of ponding: None

Available water supply, 0 to 60 inches: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: A/D

Ecological site: F144BY303ME - Acidic Swamp

Hydric soil rating: Yes

Minor Components

Searsport

Percent of map unit: 10 percent

Landform: Outwash terraces

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Chocorua

Percent of map unit: 5 percent

Landform: Bogs

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Croghan

Percent of map unit: 5 percent

Landform: Terraces

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

300B—Udipsamments, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 23g13

Elevation: 200 to 2,940 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 37 to 55 degrees F

Frost-free period: 90 to 200 days

Farmland classification: Not prime farmland

Map Unit Composition

Udipsamments and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udipsamments

Setting

Landform: Terraces

Parent material: Outwash

Typical profile

H1 - 0 to 1 inches: loamy sand

H2 - 1 to 65 inches: gravelly sand

Properties and qualities

Slope: 0 to 6 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydrologic Soil Group: A

Ecological site: F144BY601ME - Dry Sand

Hydric soil rating: No

Minor Components

Adams

Percent of map unit: 3 percent

Landform: Outwash terraces

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Champlain

Percent of map unit: 2 percent

Landform: Terraces

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Windsor

Percent of map unit: 2 percent

Landform: Terraces

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Hinckley

Percent of map unit: 1 percent

Landform: Terraces

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Boscawen

Percent of map unit: 1 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Colton

Percent of map unit: 1 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

313A—Deerfield loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2xfg8
Elevation: 0 to 1,100 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Deerfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deerfield

Setting

Landform: Outwash terraces, outwash deltas, outwash plains, kame terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy outwash derived from granite, gneiss, and/or quartzite

Typical profile

Ap - 0 to 9 inches: loamy fine sand
Bw - 9 to 25 inches: loamy fine sand
BC - 25 to 33 inches: fine sand
Cg - 33 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: About 15 to 37 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Sodium adsorption ratio, maximum: 11.0

Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: A

Ecological site: F144AY027MA - Moist Sandy Outwash

Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 7 percent

Landform: Outwash terraces, kame terraces, outwash deltas, outwash plains

Landform position (three-dimensional): Tread

Down-slope shape: Concave, convex, linear

Across-slope shape: Convex, linear, concave

Hydric soil rating: No

Wareham

Percent of map unit: 5 percent

Landform: Drainageways, depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Sudbury

Percent of map unit: 2 percent

Landform: Outwash plains, kame terraces, outwash deltas, outwash terraces

Landform position (three-dimensional): Tread

Down-slope shape: Concave, convex, linear

Across-slope shape: Convex, linear, concave

Hydric soil rating: No

Ninigret

Percent of map unit: 1 percent

Landform: Kame terraces, outwash plains, outwash terraces

Landform position (three-dimensional): Tread

Down-slope shape: Convex, linear

Across-slope shape: Convex, concave

Hydric soil rating: No

315A—Mashpee sand 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 21pfq
Elevation: 200 to 1,000 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Mashpee and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mashpee

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy outwash

Typical profile

Oi - 0 to 3 inches: mucky peat
Oe - 3 to 6 inches: moderately decomposed plant material
H1 - 6 to 8 inches: sand
H2 - 8 to 11 inches: sand
H3 - 11 to 65 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 6.00 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F144AY028MA - Wet Outwash
Hydric soil rating: Yes

Minor Components

Scarboro

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scituate

Percent of map unit: 5 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Timakwa

Percent of map unit: 5 percent
Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Deerfield

Percent of map unit: 5 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

325A—Scarboro mucky fine sandy loam, 0 to 1 percent slopes, very stony

Map Unit Setting

National map unit symbol: 23g0y
Elevation: 200 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 52 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Scarboro and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scarboro

Setting

Landform: Depressions

Custom Soil Resource Report

Down-slope shape: Concave
Across-slope shape: Concave

Typical profile

Oe - 0 to 4 inches: moderately decomposed plant material
H1 - 4 to 12 inches: mucky fine sandy loam
H2 - 12 to 30 inches: loamy sand
H3 - 30 to 65 inches: stratified stony sand

Properties and qualities

Slope: 0 to 1 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Minor Components

Chocorua

Percent of map unit: 8 percent
Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Moosilauke

Percent of map unit: 5 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: Yes

Walpole

Percent of map unit: 3 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: Yes

Ridgebury

Percent of map unit: 2 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: Yes

Meadowsedge, ponded

Percent of map unit: 2 percent
Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

326A—Scarboro mucky fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svky
Elevation: 0 to 1,320 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Scarboro and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scarboro

Setting

Landform: Drainageways, outwash deltas, outwash terraces, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy glaciofluvial deposits derived from schist and/or sandy glaciofluvial deposits derived from gneiss and/or sandy glaciofluvial deposits derived from granite

Typical profile

Oe - 0 to 3 inches: mucky peat
A - 3 to 11 inches: mucky fine sandy loam
Cg1 - 11 to 21 inches: sand
Cg2 - 21 to 65 inches: gravelly coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: About 0 to 2 inches
Frequency of flooding: None
Frequency of ponding: Frequent

Custom Soil Resource Report

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F144AY031MA - Very Wet Outwash
Hydric soil rating: Yes

Minor Components

Swansea

Percent of map unit: 10 percent
Landform: Bogs, swamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Walpole

Percent of map unit: 5 percent
Landform: Deltas, depressions, outwash terraces, depressions, outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Wareham

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

394A—Chocorua mucky peat, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 21xtn
Elevation: 250 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Not prime farmland

Map Unit Composition

Chocorua and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chocorua

Setting

Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over outwash

Typical profile

Oe - 0 to 35 inches: mucky peat
H - 35 to 65 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 20.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Ecological site: F144BY303ME - Acidic Swamp
Hydric soil rating: Yes

Minor Components

Meadowsedge, ponded

Percent of map unit: 5 percent
Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Searsport

Percent of map unit: 5 percent
Landform: Outwash terraces
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Meadowsedge

Percent of map unit: 5 percent
Landform: Bogs
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Naumburg

Percent of map unit: 3 percent
Landform: Depressions

Custom Soil Resource Report

Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: Yes

Medomak

Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

401A—Occum very fine sandy loam, 0 to 3 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 9dkn
Elevation: 200 to 1,000 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 160 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Occum, occasionally flooded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Occum, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite, gneiss or schist

Typical profile

H1 - 0 to 9 inches: very fine sandy loam
H2 - 9 to 17 inches: fine sandy loam
H3 - 17 to 29 inches: sandy loam
H4 - 29 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.60 to 2.00 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None

Custom Soil Resource Report

Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 1

Hydrologic Soil Group: B

Ecological site: F144AY010NH - Sandy High Floodplain

Hydric soil rating: No

Minor Components

Suncook

Percent of map unit: 5 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Pootatuck

Percent of map unit: 3 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Occum, frequently flooded

Percent of map unit: 3 percent

Landform: Flood plains

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Agawam

Percent of map unit: 2 percent

Landform: Terraces

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Occum, protected

Percent of map unit: 2 percent

Landform: Flood plains

Hydric soil rating: No

449B—Scituate fine sandy loam, 3 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 23blh

Elevation: 200 to 790 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 45 to 52 degrees F

Frost-free period: 100 to 160 days

Custom Soil Resource Report

Farmland classification: Farmland of local importance

Map Unit Composition

Scituate and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scituate

Setting

Landform: Hillslopes

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Basal melt-out till derived from granite, gneiss, or schist

Typical profile

O_i - 0 to 1 inches: slightly decomposed plant material

H₁ - 1 to 4 inches: fine sandy loam

H₂ - 4 to 25 inches: fine sandy loam

H₃ - 25 to 65 inches: gravelly loamy fine sand

Properties and qualities

Slope: 3 to 8 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 20 to 34 inches to densic material

Drainage class: Moderately well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (K_{sat}): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 18 to 36 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: C

Ecological site: F144AY037MA - Moist Dense Till Uplands

Hydric soil rating: No

Minor Components

Newfields

Percent of map unit: 5 percent

Landform: Hillslopes

Hydric soil rating: No

Woodbridge

Percent of map unit: 3 percent

Landform: Hillslopes

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Montauk

Percent of map unit: 3 percent

Landform: Hills

Custom Soil Resource Report

Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury

Percent of map unit: 3 percent
Landform: Ground moraines
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: Yes

Whitman

Percent of map unit: 3 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Canton

Percent of map unit: 3 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

459C—Metacomet fine sandy loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9dpq
Elevation: 250 to 2,940 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Farmland of local importance

Map Unit Composition

Metacomet and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Metacomet

Setting

Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Basal melt-out till derived from granite, gneiss, or schist

Typical profile

Oe - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 9 inches: fine sandy loam

Custom Soil Resource Report

H2 - 9 to 34 inches: fine sandy loam

H3 - 34 to 65 inches: sandy loam

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 20 to 36 inches to densic material

Drainage class: Moderately well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 18 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: C

Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)

Hydric soil rating: No

Minor Components

Chichester

Percent of map unit: 4 percent

Landform: Hillslopes

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Pillsbury

Percent of map unit: 4 percent

Landform: Ground moraines

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: Yes

Peacham

Percent of map unit: 3 percent

Landform: Depressions

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Henniker

Percent of map unit: 3 percent

Landform: Hills

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Gilmanton

Percent of map unit: 3 percent

Landform: Hillslopes

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Skerry

Percent of map unit: 3 percent

Landform: Hillslopes

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

480C—Millsite-Woodstock-Henniker complex, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9dpx

Elevation: 200 to 2,940 feet

Mean annual precipitation: 40 to 50 inches

Mean annual air temperature: 37 to 46 degrees F

Frost-free period: 90 to 135 days

Farmland classification: Farmland of local importance

Map Unit Composition

Millsite and similar soils: 35 percent

Woodstock and similar soils: 20 percent

Henniker and similar soils: 20 percent

Minor components: 25 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Millsite

Setting

Landform: Hillslopes

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Till

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

H1 - 1 to 3 inches: very fine sandy loam

H2 - 3 to 13 inches: very fine sandy loam

H3 - 13 to 24 inches: gravelly very fine sandy loam

H4 - 24 to 28 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)

Depth to water table: More than 80 inches

Custom Soil Resource Report

Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)
Hydric soil rating: No

Description of Woodstock

Setting

Landform: — error in exists on —
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Till derived from granite and gneiss

Typical profile

Oe - 0 to 0 inches: slightly decomposed plant material
H1 - 0 to 2 inches: fine sandy loam
H2 - 2 to 11 inches: fine sandy loam
H3 - 11 to 15 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: F144BY701ME - Shallow Till
Hydric soil rating: No

Description of Henniker

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Basal melt-out till derived from granite, gneiss, or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
H1 - 1 to 4 inches: fine sandy loam
H2 - 4 to 34 inches: fine sandy loam

Custom Soil Resource Report

H3 - 34 to 65 inches: fine sandy loam

Properties and qualities

Slope: 8 to 15 percent

Surface area covered with cobbles, stones or boulders: 1.6 percent

Depth to restrictive feature: 20 to 39 inches to densic material

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)

Depth to water table: About 18 to 38 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: C

Ecological site: F144BY501ME - Loamy Slope (Northern Hardwoods)

Hydric soil rating: No

Minor Components

Canterbury

Percent of map unit: 5 percent

Landform: Drumlins

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Moosilauke

Percent of map unit: 5 percent

Landform: Ground moraines

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: Yes

Metacomet

Percent of map unit: 3 percent

Landform: Hillslopes

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Lyman

Percent of map unit: 2 percent

Landform: Hillslopes

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Searsport

Percent of map unit: 2 percent

Landform: Outwash terraces

Down-slope shape: Concave

Across-slope shape: Concave

Hydric soil rating: Yes

Becket

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Hydric soil rating: Unranked

Chichester

Percent of map unit: 2 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Tunbridge

Percent of map unit: 2 percent
Landform: Hillslopes
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

513B—Ninigret fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tyr6
Elevation: 0 to 1,250 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Ninigret and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ninigret

Setting

Landform: Drainageways, depressions, kame terraces, outwash plains, moraines, kames, outwash terraces
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Crest, side slope, tread, dip, rise
Down-slope shape: Concave, convex, linear

Custom Soil Resource Report

Across-slope shape: Concave, convex

Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from gneiss, granite, schist, and/or phyllite

Typical profile

Ap - 0 to 8 inches: fine sandy loam

Bw1 - 8 to 16 inches: fine sandy loam

Bw2 - 16 to 26 inches: fine sandy loam

2C - 26 to 65 inches: stratified loamy sand to loamy fine sand

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 18 to 38 inches to strongly contrasting textural stratification

Drainage class: Moderately well drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)

Depth to water table: About 17 to 39 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C

Ecological site: F144AY026CT - Moist Silty Outwash

Hydric soil rating: No

Minor Components

Deerfield

Percent of map unit: 5 percent

Landform: Deltas, terraces, outwash plains

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread, talf

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Windsor

Percent of map unit: 5 percent

Landform: Outwash terraces, dunes, outwash plains, deltas

Landform position (three-dimensional): Tread, riser

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Hydric soil rating: No

Agawam

Percent of map unit: 5 percent

Landform: Kame terraces, moraines, outwash plains, outwash terraces, kames

Landform position (two-dimensional): Summit, shoulder, backslope, footslope

Landform position (three-dimensional): Side slope, crest, riser, tread, rise

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

533A—Raynham silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9dlg
Elevation: 200 to 1,000 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Raynham and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Raynham

Setting

Landform: Lake terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 36 inches: silt loam
H3 - 36 to 65 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F144AY019NH - Wet Lake Plain
Hydric soil rating: Yes

Minor Components

Scarboro

Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Agawam

Percent of map unit: 5 percent
Landform: Terraces
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ninigret

Percent of map unit: 5 percent
Landform: Terraces
Hydric soil rating: No

598B—Windsor-Urban land complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2w2wq
Elevation: 0 to 920 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Windsor and similar soils: 45 percent
Urban land: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor

Setting

Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

A - 0 to 3 inches: loamy sand

Custom Soil Resource Report

Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Excessively drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A

Ecological site: F144AY022MA - Dry Outwash

Hydric soil rating: No

Description of Urban Land

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: 0 inches to manufactured layer

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Hydric soil rating: Unranked

Minor Components

Udorthents

Percent of map unit: 10 percent

Landform: Dunes, deltas, outwash terraces, outwash plains

Landform position (three-dimensional): Tread, riser

Down-slope shape: Convex, linear

Across-slope shape: Convex, linear

Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent

Landform: Deltas, kames, eskers, outwash plains

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise

Custom Soil Resource Report

Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Deerfield

Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

613A—Croghan loamy fine sand, 0 to 8 percent slopes, wooded

Map Unit Setting

National map unit symbol: 2wqp0
Elevation: 150 to 2,300 feet
Mean annual precipitation: 40 to 55 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 90 to 135 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Croghan and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Croghan

Setting

Landform: Marine terraces, outwash deltas
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy glaciofluvial deposits

Typical profile

Oa - 0 to 4 inches: highly decomposed plant material
E - 4 to 6 inches: loamy fine sand
Bs - 6 to 17 inches: loamy fine sand
BC - 17 to 30 inches: fine sand
C - 30 to 65 inches: sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(1.42 to 14.17 in/hr)

Depth to water table: About 18 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Colton

Percent of map unit: 5 percent

Landform: Outwash deltas, marine terraces

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Crest

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Adams

Percent of map unit: 5 percent

Landform: Outwash deltas, marine terraces

Landform position (two-dimensional): Summit, shoulder

Landform position (three-dimensional): Crest

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Naumburg

Percent of map unit: 3 percent

Landform: Outwash deltas, marine terraces

Landform position (two-dimensional): Footslope, toeslope

Landform position (three-dimensional): Base slope

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

Nicholville

Percent of map unit: 2 percent

Landform: Outwash deltas, marine terraces

Landform position (two-dimensional): Backslope, footslope

Landform position (three-dimensional): Side slope, base slope

Down-slope shape: Linear

Across-slope shape: Linear

Hydric soil rating: No

657A—Ridgebury fine sandy loam, 0 to 3 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2xffq
Elevation: 90 to 1,190 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, very stony, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Very Stony

Setting

Landform: Ground moraines, hills, drainageways, depressions, drumlins
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 6 inches: fine sandy loam
Bw - 6 to 10 inches: sandy loam
Bg - 10 to 19 inches: gravelly sandy loam
Cd - 19 to 66 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 15 to 35 inches to densic material
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5s

Custom Soil Resource Report

Hydrologic Soil Group: D
Ecological site: F144AY009CT - Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Walpole

Percent of map unit: 9 percent
Landform: Drainageways, outwash terraces, depressions
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Woodbridge, very stony

Percent of map unit: 6 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Summit, backslope, footslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Whitman, very stony

Percent of map unit: 3 percent
Landform: Drainageways, depressions, drumlins, ground moraines, hills
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Leicester, very stony

Percent of map unit: 2 percent
Landform: Depressions, hills, ground moraines, drainageways
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear, concave
Across-slope shape: Concave
Hydric soil rating: Yes

699B—Urban land, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9dmm
Elevation: 200 to 1,970 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 37 to 52 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Typical profile

H1 - 0 to 6 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

Minor Components

Udipsamments

Percent of map unit: 10 percent

Landform: Terraces

Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: wm74

Elevation: 200 to 2,610 feet

Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

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NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

January 27, 2023

Appendix G REPRESENTATIVE PHOTOGRAPHS



NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

January 27, 2023



Photo 1. Existing ROW conditions near existing C189 Structure 109 and Farmwood S/S in Concord, NH. Stantec, October 25, 2021.



NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

January 27, 2023



Photo 2. Existing ROW conditions and trail near proposed C189 Structure 47 in Concord, NH. Stantec, November 8, 2021.



NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

January 27, 2023

Photo 3. Existing ROW conditions near proposed C189 Structure 35 in Concord, NH.
Stantec, October 25, 2021.



Photo 4. Existing ROW conditions near proposed C189 Structure 25 and Turtle Pond in Concord, NH.
Stantec, October 26, 2021.



Photo 5. Existing ROW conditions near proposed C189 Structure 23 and Turtle Pond outlet
in Concord, NH. Stantec, October 26, 2021.



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Photo 6. Existing ROW conditions and wetland near proposed C189 Structure 21 in Concord, NH.
Stantec, October 26, 2021.



Photo 7. Existing ROW conditions near proposed C189 Structure 16 in Concord, NH.
Stantec, October 26, 2021.



NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

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Photo 8. Existing ROW conditions near proposed C189 Structure 13 and wetland / PVP in Concord, NH.
Stantec, October 28, 2021.



Photo 9. Existing ROW conditions and wetland near proposed M108 Structure 60 in Concord, NH.
Stantec, October 28, 2021.



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Photo 10. Existing ROW conditions and wetland near proposed M108 Structure 58 in Concord, NH. Stantec, October 28, 2021.



Photo 11. Existing ROW conditions and access road near proposed M108 Structure 50 in Concord, NH. Stantec, October 26, 2021.



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Photo 12. Existing ROW conditions near proposed Structure 46 in Concord, NH.
Stantec, October 26, 2021.



Photo 13. Existing ROW conditions and wetland near proposed M108 Structure 31 in Pembroke, NH.
Stantec, October 27, 2021.



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January 27, 2023



Photo 14. Existing ROW conditions near existing M108 Structure 28 in Pembroke, NH.
Stantec, October 27, 2021.



Photo 15. Existing ROW conditions and wetland near proposed G146 Structure 174 in Pembroke, NH.
Stantec, October 29, 2021.



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Photo 16. Existing ROW conditions and Soucook River near proposed M108 Structure 11 and G146 Structure 177 in Pembroke, NH. Stantec, October 29, 2021.



Photo 17. Existing ROW conditions and access road near proposed G146 Structure 184 in Concord, NH. Stantec, November 30, 2021.



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Photo 18. Existing ROW conditions near Garvins S/S and proposed H137 Structures 31 and 32 in Bow, NH. Stantec, October 28, 2021.



Photo 19. Existing ROW conditions and wetland near proposed H137 Structure 24 in Bow, NH. Stantec, October 28, 2021.



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January 27, 2023



Photo 20. Existing ROW conditions near proposed H137 Structure 17 in Bow, NH.
Stantec, October 28, 2021.



Photo 21. Existing ROW conditions and Bow Bog Brook near proposed H137 Structure 8 in Bow, NH.
Stantec, October 27, 2021.



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Photo 22. Existing ROW conditions and large ponded wetland near proposed H137 Structure 3 in Bow, NH. Stantec, October 27, 2021.



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Photo 23. Existing ROW conditions and large ponded wetland near proposed H137 Structure 2 and the Merrimack substation in Bow, NH. Stantec, October 27, 2021.



NHDES ALTERATION OF TERRAIN PERMIT APPLICATION

January 27, 2023

Appendix H WAIVER REQUEST



Alteration of Terrain Waiver Request

RSA/Rule: RSA 485-A:17, Env – WQ 1500

Water Division / Alteration of Terrain Bureau / Land resources Management
29 Hazen Drive, PO Box 95
Concord, New Hampshire 03302-0095

A. PROJECT INFORMATION		
C189, M108, H137, G146 Structure Replacement Project Project Name		
Existing C189, M108, H137, G146 Right-of-Way Street Address		
Concord, Pembroke, Bow City/Town	Multiple Zip Code	
Multiple – see attached plans Tax Map/Lot Number		
B. APPLICANT/OWNER INFORMATION		
Ashley First Name	Friend Last Name	
Public Service Company of New Hampshire d/b/a Eversource Energy (Eversource) Organization		
13 Legends Drive Street Address		
Hooksett City/Town	New Hampshire State	03106 Zip Code
ashley.friend@eversource.com Email		603-634-2992 Telephone Number
C. APPLICANT/OWNER AGENT INFORMATION		
Tom First Name	Tetreau Last Name	
Stantec Consulting Services Inc. Organization		
30 Park Drive Street Address		
Topsham City/Town	Maine State	04086 Zip Code
tom.tetreau@stantec.com Email		207-504-7231 Telephone Number

D. WAIVER REQUESTS	
<p>Env-Wq 1503.21 (d)(6&7)</p> <p>Rule Section Waiver Request</p>	<p>Notification; Certification</p> <p>Name of Rule</p>
<p>Reason for Waiver Request</p> <p>Eversource is requesting a waiver for deviations from the approved plans without applying for an amended permit or a new permit if shifts in the proposed project layout occur. Changes in project layout are sometimes identified during construction by Eversource and their contractors and may be necessary to safely perform the work or avoid rare species locations identified during field surveys or biological monitoring. The need for additional permit applications can impact construction schedules and incur costly delays.</p>	
<p>Waiver Timeline</p> <p>Permanent</p>	
<p>Proposed Alternative</p> <p>Allow for the access road centerlines to be relocated during construction, if necessary, up to a distance equal to the approximate width of the ROW (approximately 250 to 350 feet in the P145 and CHMG ROW). Shifts would not create greater than 5% increase in disturbed area along the individual access segment, which is assumed to be the length of the access road and associated work pads between designated access points from public or private roads.</p> <p>Allow for the center point of the parking area, assumed to be the structure replacement work pads for transmission line projects, to be relocated during construction, if necessary, up to a distance equal to half the approximate width of the ROW (approximately 125 to 175 feet in the P145 and CHMG ROW). Shifts would not create greater than 5% increase in disturbed area at each work pad.</p> <p>This would allow contractors to avoid steep terrain or other hazardous areas, or areas that may require significant grading or earthwork that may not have been identified during initial constructability reviews. Landowners may also request layout changes be made after project permitting is complete. Avoidance of rare species may also necessitate shifts. In most cases this shift is done to reduce the amount of disturbed area. Increased wetland impacts, or impacts to new wetlands, would not be allowed under this waiver.</p>	
<p>Compliance with Env-Wq 1503.21 (d)(6&7)</p> <p>The project proposes to improve access routes and work pads around utility structures for the purpose of maintaining existing utility infrastructure. This project is necessary to maintain the safety and reliability of the electrical infrastructure. Proposed disturbances shown on Figures 3 and 4 of the project's AoT application are the result of avoidance and minimization measures and constructability reviews. Layout changes and shifts will be limited to the proposed alternative above. A reduction in disturbed area is often the result. All other Best Management Practices will be utilized to protect wetlands from erosion, sedimentation, or other environmental degradation as originally proposed. Eversource respectfully requests a waiver from limiting shifts of the project road centerlines and parking areas to 20 feet.</p>	

E. SIGNATURES



Applicant/Owner, **Ashley Friend,**
Public Service Company of New Hampshire d/b/a Eversource Energy

1/27/2023

Date



Applicant/Owner Agent, **Tom Tetreau,**
Stantec Consulting Services Inc.

1/27/2023

Date

Alteration of Terrain Waiver Request

RSA/Rule: RSA 485-A:17, Env – WQ 1500

Water Division / Alteration of Terrain Bureau / Land resources Management
29 Hazen Drive, PO Box 95
Concord, New Hampshire 03302-0095

A. PROJECT INFORMATION		
C189, M108, H137, G146 Structure Replacement Project Project Name		
Existing C189, M108, H137, G146 Right-of-Way Street Address		
Concord, Pembroke, Bow City/Town	Multiple Zip Code	
Multiple – see attached plans Tax Map/Lot Number		
B. APPLICANT/OWNER INFORMATION		
Ashley First Name	Friend Last Name	
Public Service Company of New Hampshire d/b/a Eversource Energy (Eversource) Organization		
13 Legends Drive Street Address		
Hooksett City/Town	New Hampshire State	03106 Zip Code
ashley.friend@eversource.com Email		603-634-2992 Telephone Number
C. APPLICANT/OWNER AGENT INFORMATION		
Tom First Name	Tetreau Last Name	
Stantec Consulting Services Inc. Organization		
30 Park Drive Street Address		
Topsham City/Town	Maine State	04086 Zip Code
tom.tetreau@stantec.com Email		207-504-7231 Telephone Number

D. WAIVER REQUESTS

Env-Wq 1504.09 Rule Section Waiver Request	Stormwater Drainage Report; Drainage Area Plans; Hydrologic Soil Group Plans Name of Rule
--	--

Reason for Waiver Request
Eversource is requesting a waiver for preparing a Stormwater Drainage Report, Drainage Area Plans and Hydrologic Soil Group Plans for proposed access improvements and work pad grading associated with the CHMG Structure Replacement Project. The proposed access and work pad improvements for the transmission line rebuild work will not result in new impervious surfaces. As a result, stormwater treatment practices are not proposed.


Waiver Timeline
Permanent

Proposed Alternative
The proposed access and work pad improvements will not result in new impervious surfaces. Therefore, there is no proposed alternative to substitute the requirements of Env-Wq 1504.09.

Compliance with Env-Wq 1504.09
The project proposes to improve access routes and work pads around utility structures for the purpose of maintaining existing utility infrastructure. This project is necessary to maintain the safety and reliability of the electrical infrastructure. Access and work pad improvements will be completed using stone and gravel; therefore, stormwater drainage should not be affected by the proposed project. In addition, it is not anticipated that stormwater drainage area plans would show significant differences between existing and proposed conditions. An NRCS Web Soil Survey report was generated to show general soil information within the project area. Since there is no new impervious surface area proposed, and stormwater drainage is not anticipated to be affected by the proposed project, it is not anticipated that soils will be significantly impacted by the project.

Best Management Practices will be utilized to protect wetlands from erosion, sedimentation, or other environmental degradation. In addition, gravel work pads will be coated with seed and mulch to allow vegetation growth on the surface, further minimizing and preventing erosion and sedimentation. As a result, Eversource respectfully requests a waiver from providing a Stormwater Drainage Report, Drainage Area Plans, and Hydrologic Soil Group Plans for the purposes of the proposed utility line maintenance project.

E. SIGNATURES



Applicant/Owner, **Ashley Friend,**
Public Service Company of New Hampshire d/b/a Eversource Energy

1/27/2023
Date



Applicant/Owner Agent, **Tom Tetreau,**
Stantec Consulting Services Inc.

1/27/2023
Date

Redaction Log

Total Number of Redactions in Document: 146

Redaction Reasons by Page

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173	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
174	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
175	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
176	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
177	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
178	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
179	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
180	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
181	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1

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183	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
184	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
185	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
186	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
187	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
188	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
189	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
190	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1

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191	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
192	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
193	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
194	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
195	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
196	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
197	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
198	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
199	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1

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200	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
201	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
202	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
203	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
204	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
205	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
206	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
207	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
208	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1

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209	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
210	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
211	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
212	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
213	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
214	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
215	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
216	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
217	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1

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218	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
219	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
220	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
221	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
222	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
223	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
224	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
225	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
226	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1

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227	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
228	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
229	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
230	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
231	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
235	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
236	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
237	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
238	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1

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240	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
241	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
242	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
243	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
244	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
245	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
246	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
247	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1

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249	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1
250	CONFIDENTIAL DNCR	NH RSA 91-A:5, IV Confidential information. NH Department of Natural and Cultural Resources (DNCR) has asserted a claim of confidentiality. See also NH RSA 212-A, RSA 212-B, RSA 217-A, and/or RSA 227-C:11.	1

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Redaction Reasons by Exemption

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