

**Original Alteration of Terrain Permit Application**



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# L163 Transmission Line Structure Replacement Project

## Eversource Energy

**Keene, Stoddard, and Antrim  
New Hampshire**

NHDES Alteration of Terrain Permit Application

January 30, 2020

File No. 04.0190923.05



### PREPARED FOR:

Eversource Energy  
Hooksett, New Hampshire

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January 30, 2020  
File No. 04.0190923.05

Mr. Ridgely Mauck, P.E.  
Program Supervisor - Permitting  
NHDES Land Resources Management  
Alteration of Terrain Bureau  
29 Hazen Drive, PO Box 95  
Concord, New Hampshire 03302

Re: Alteration of Terrain Permit  
L163 Transmission Line Structure Replacement Project  
Keene, Stoddard, and Antrim, New Hampshire

Dear Mr. Mauck:

On behalf of Public Service Company of New Hampshire dba Eversource Energy (Eversource), GZA GeoEnvironmental, Inc. (GZA) is submitting this Alteration of Terrain (AoT) Permit Application for the proposed L163 Transmission Line Structure Replacement Project in accordance with Terrain Alteration Law (RSA 485-A:17), Administrative Rules (Env-Wq 1500 Alteration of Terrain), and recent discussions between New Hampshire Department of Environmental Services (NHDES) AoT Bureau and Eversource.

The proposed project includes the replacement of 29 existing utility structures. The project area crosses through portions of Keene, Stoddard, and Antrim, New Hampshire for a distance of approximately 4.7 miles. Replacement of the existing utility structures is necessary in order to maintain the safety and reliability of the system. In order to more efficiently conduct routine maintenance of the existing L163 Transmission Line, work pad grading and access road improvements are proposed as part of this project. Based on the planned scope of work, we identified six separate proposed work areas in Keene, Stoddard, and Antrim that are subject to the Terrain Alteration Law and Rules referenced above.

The proposed project will require disturbance subject to AoT permitting through the NHDES as result of;

- 1) An impact area that:
  - A. Is more than 2,500 square feet in size;
  - B. Is within 50 feet of any surface water;
  - C. Is sloped such that runoff is in the direction of the surface water; and
  - D. Is subject to runoff over 50 feet or more of land having a grade of 25% or greater when measured at 2-foot intervals; and
- 2) Impact area cumulatively exceeding 100,000 square feet of contiguous area.



- 3) Impact area cumulatively exceeding 50,000 square feet of contiguous area located within Protected Shoreland Zones.

In addition, included with this submittal is a copy of the application fee check, completed AoT Permit Application Form, detailed project overview narrative, required plans and figures, and additional required supporting documentation. In addition, a waiver request for the preparation of a stormwater drainage report, drainage area plans, and hydrologic soil group plans is enclosed as required by Env-Wq 1509.04. The proposed project is scheduled to start in early April 2020. Eversource appreciates the efforts of the Alteration of Terrain Bureau in helping to maintain the anticipated construction schedule, which is dependent on previously scheduled outages dictated by regional outage planning.

Please feel free to contact us with any questions.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Anthony Damiano  
Assistant Project Manager

Tracy Tarr, CWS, CESSWI  
Consultant/Reviewer

Deborah M. Zarta Gier, CNRP  
Principal

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Attachments: Alteration of Terrain Permit Application

cc: City of Keene, New Hampshire  
Town of Stoddard, New Hampshire  
Town of Antrim, New Hampshire  
Ashuelot River Local Advisory Committee  
Contoocook and North Branch River Local Advisory Committee



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## 1.0 PROJECT BACKGROUND AND PURPOSE

The proposed project involves the replacement of select L163 Transmission Line structures leading from NH Route 12 in Keene, New Hampshire, and generally heading in a northeasterly direction to Elm Avenue in Antrim, New Hampshire. The utility structures are approximately 60 years old and have been subject to environmental damage (i.e., weathering, woodpecker holes) and must be replaced for the lines to continue to function safely and reliably. If utility structures fail, it could result in widespread electrical outages to customers. Impacts have been minimized and avoided to the greatest extent practicable through site evaluations of access routes and work pad placements.

Recent transmission line inspections determined that a total of 29 existing utility structures must be replaced due to environmental damage. The project requires approximately 643,464 square feet (sq. ft.) of total disturbance including 168,820 sq. ft. of temporary wetland matting and 474,644 sq. ft. of ground disturbance. Six separate portions of the proposed structure replacement project are subject to Alteration of Terrain disturbance threshold (Env-Wq 1500 and RSA 485-A:17), including (See **Figure 4- Alteration of Terrain Permitting Plans** and **Appendix A – Alteration of Terrain Application Form**):

- 1) Area A (Keene) – approximately 61,329 sq. ft. of work pad grading and associated access improvements at L163 Structures 208 to 214.
- 2) Area B (Keene) – approximately 128,189 sq. ft. of work pad grading and associated access improvements at L163 Structures 178 to 189.
- 3) Area C (Keene) – approximately 109,375 sq. ft. of work pad grading and associated access improvements at L163 Structures 166 to 175.
- 4) Area D (Stoddard and Antrim)– approximately 61,646 sq. ft. of work pad grading and associated access improvements at L163 Structures 21 to 30.
- 5) Area E (Antrim)– approximately 105,907 sq. ft. of work pad grading and associated access improvements at L163 Structures 1 to 20.
- 6) Area F (Antrim)– approximately 7,858 sq. ft. of work pad grading at X104 Structure 44.

## 2.0 SITE INFORMATION

### 2.1 SITE LOCATION AND DESCRIPTION

The project area includes portions of the L163 Transmission Line ROW from NH Route 12 in Keene, New Hampshire to Elm Avenue in Antrim, New Hampshire. It should be noted that the portion of the L163 Transmission Line located between Structure 1 in Antrim and the Jackman Substation in Hillsborough has been renamed as the X104 Transmission Line. The work area located within the ROW is approximately 4.7 miles in length and ranges in width from approximately 150 to 265 feet (ft).



The total project area includes the replacement of 29 utility structures in total. The project area primarily crosses privately owned rural/residential properties, 6 public roads, and 10 unnamed perennial streams (see **Figure 1 – USGS Topographic Map**). There are approximately 60 wetlands along the project route located in the towns of Keene, Stoddard, and Antrim. The majority of ground disturbance resulting from the project will be related to access and work pad preparations.

## 2.2 TAX MAP AND LOT(S)

Eversource holds easements across the majority of the parcels along the ROW with the exception of two Eversource-owned parcels: Tax Map 233 Lot 2 in Keene and Tax Map 212 Lot 27-1 in Antrim (see **Figure 4**).

There are approximately 23 abutting properties that contain pre-existing Eversource easements for the ROW involved in the project. In those project locations, the easements are considered to be the “subject property” because Eversource is the applicant/owner and only has control over the easement. These abutters have been identified and listed on the enclosed abutters list. See **Appendix B** for Abutters List.

## 2.3 IDENTIFICATION OF NATURAL AND CULTURAL RESOURCES

GZA GeoEnvironmental, Inc. (GZA) has been retained by Eversource to provide professional services on this project that relate to natural and cultural resource identification and assessment as well as permit applications for natural resource and alteration of terrain impacts required to complete the project. GZA has conducted field evaluations and has corresponded with the appropriate agencies to identify natural and cultural resources present in the vicinity of the proposed project.

### 2.3.1 Identification of Jurisdictional Wetlands and Vernal Pools

Wetlands were delineated by GZA in 2016 in accordance with the United States Army Corps of Engineers (ACOE) Wetlands Delineation Manual using the Routine Determinations Method, and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual as required by the New Hampshire Department of Environmental Services (NHDES) Wetlands Bureau and the ACOE. GZA photographed resources and recorded data relevant to functions and values provided by these natural resources within the ROW in August 2019. GZA performed a wetlands functions and values assessment in accordance with the ACOE’s “Highway Methodology Workbook Supplement,” September 1999, and classified wetlands in accordance with the “Classification of Wetlands and Deepwater Habitats of United States” (Federal Geographic Committee, 2013). The area of evaluation included approximately 5 miles of ROW. The wetland function-value assessment was conducted by Anthony Damiano and Logan Young of GZA, in consultation with Tracy Tarr, CWS, CWB, CESSWI, on August 14, 15, 22, and 27, 2019.

The vernal pool evaluation was conducted in August 2016 in accordance with “Identification and Documentation of Vernal Pools in New Hampshire,” 2016, New Hampshire Fish and Game Department (NHFG), Nongame and Endangered Wildlife Program. Vernal pool areas exist as confined basins and must exhibit vernal pool criteria outlined in the New Hampshire Code of Administrative Rules, Env-Wt 101.76, 101.87, and 101.108. GZA assigned potential vernal pool status based on observed signs of hydrology at the time of the evaluation. No temporary or permanent impacts are proposed to any documented or potential vernal pools as a result of this project.

### 2.3.2 Identification of Surface Waters

Jurisdictional limits of surface waters of the State of New Hampshire were delineated and confirmed by GZA in accordance with their definition in RSA 485-A:2 XIV, 482-A:4 II and rule Env Wt 101.99. Surface waters include





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. In addition, jurisdiction extends to the portion of any bank or shore which borders such surface waters, and to any swamp or bog subject to periodic flooding by fresh water including the surrounding shore. The limit of jurisdiction for surface water areas was delineated as the top of bank, where a natural bank occurs or its ordinary high-water mark where a natural bank is not present. Surface waters within the project area include 10 unnamed perennial streams.

### 2.3.3 Identification of Rare, Threatened, and Endangered Species

The Natural Heritage Bureau (NHB) determined that although there are NHB records of rare wildlife, plant, and/or natural communities present in the vicinity of the L163 ROW, it is not anticipated that there will be impacts as a result of the proposed structure replacement project (See **Appendix C** for the NHB Report and regulatory correspondence).

GZA is retained to complete construction oversight and will monitor for the presence of turtles and snakes within the ROW. In addition, construction personnel will be made aware of potential to encounter rare turtles [i.e., Blanding's turtle (*Emydoidea blandingii*), wood turtle (*Glyptemys insculpta*), spotted turtle (*Clemmys guttata*)] more frequently during turtle nesting season from late May through the beginning of July. GZA will notify the NHFG and NHB of any rare species observations for inclusion in the statewide database.

In addition, the U.S. Fish & Wildlife Service (USFWS) identified the potential presence of the northern long-eared bat (*Myotis septentrionalis*) and the dwarf wedge mussel (*Alasmidonta heterodon*) near the ROW. However, the proposed project does not involve tree clearing for trees greater than 3-inch diameter at breast height (dbh). As a result, there are no anticipated impacts to the northern long-eared bat. In addition, the current range of the dwarf wedge mussel within the project area is contained to the Ashuelot River. Since the proposed project avoids crossing the Ashuelot River, there are no anticipated impacts to the dwarf wedge mussel. The NHFG has determined that although there are records of rare species, the department does not have concerns based on the project scope (see NHB report dated April 23, 2019).

### 2.3.4 Identification of Cultural and Historical Resources

GZA submitted a Request for Project Review (RPR) to the New Hampshire Division of Historical Resources (NHDHR) for the proposed project. Eversource retained Commonwealth Heritage Group Inc. (CHG) to conduct a Phase IB archeological survey of the L163 Transmission Line corridor for the purposes of identifying archeological artifacts within areas of archaeological and historical sensitivity in Antrim, Keene and Stoddard, New Hampshire. A Phase IA archeological assessment was completed for the L163 Transmission Line corridor in Spring 2016 by CHG. CHG identified 88 archeological sensitivity areas within the L163 ROW during Phase IA survey. CHG conducted a Phase IB archeological survey of the sensitivity areas identified during the Phase IA archeological assessment and has provided a memo of their findings for review by NHDHR. The project will incorporate best management practice for archeological resources as recommended by CHG and included in NHDHR response dated January 10, 2020.

GZA will continue to coordinate with the NHDHR and the ACOE to meet the requirements of Section 106 as it pertains to the protection of historical resources.



### 3.0 EXISTING CONDITIONS

The proposed project is located within the existing L163 Transmission Line ROW. The proposed project work areas cross through portions of the City of Keene, and the Towns of Stoddard and Antrim, New Hampshire. Existing dirt and/or grass access routes currently used for access to existing utility structures within the ROW are proposed to be improved using gravel and stone as a part of a routine structure maintenance project. Proposed access road improvements include 12- to 16-foot-wide gravel and stone roads with a 20-foot total width limit of disturbance. Based on NRCS soil mapping, existing upland soils include rock outcrop complexes and very stony fine sandy loams. Slopes are variable and generally range from 0 to 77%, with an average of approximately 9%. As previously noted, the project has six separate areas that are subject to AoT permitting throughout the proposed project, and are referred to as Areas A, B, C, D, E, and F.

The project area includes upland and wetland areas located in primarily rural areas. Upland areas consist primarily of shrubs including common juniper (*Juniperus communis*), eastern white pine (*Pinus strobus*), gray birch (*Betula populifolia*) saplings, and red maple (*Acer rubrum*) saplings. Wetlands on Site are comprised of poorly or very poorly drained soils. The emergent and excavated wetlands primarily contain phragmites (*Phragmites australis*), glossy buckthorn (*Frangula alnus*), speckled alder (*Alnus incana* spp. *rugosa*), multiflora rose (*Rosa multiflora*), broad-leaved cattail (*Typha latifolia*), narrow leaf cattail (*Typha angustifolia*), and golden rod (*Solidago* spp.). The natural scrub shrub and forested wetlands primarily contain speckled alder, silky dogwood (*Cornus amomum*), broad-leaved cattail, cinnamon fern (*Osmundastrum cinnamomeum*), sensitive fern (*Onoclea sensibilis*), gray birch (*Betula populifolia*), winterberry holly (*Ilex verticillata*), meadowsweet (*Spiraea latifolia*), steeplebush (*Spiraea tomentosa*), American elm (*Ulmus americana*), staghorn sumac (*Rhus typhina*), white ash (*Fraxinus americana*), white pine (*Pinus strobus*), and red maple (*Acer rubrum*).

Existing conditions along the L163 Transmission Line are discussed below by areas subject to jurisdiction under the Alteration of Terrain Law and Rules and consistent with recent discussions with the AoT Bureau for Eversource Line projects.

#### 3.1 AOT AREA A - KEENE

Area A begins at NH Route 12 and ends approximately 250 feet south of the Ashuelot River in Keene, New Hampshire. This stretch includes upland and wetland areas with elevations ranging from approximately 476 feet adjacent to L163 Structure 210 to approximately 488 feet between L163 Structures 213 and 212. This portion of the ROW is located in a primarily forested undeveloped area of Keene and lacks documented drainage structures in the proposed access route.

Land disturbance subject to Alteration of Terrain Law and Rules due to *Env-Wq 1502.58 (b) (2)* (see Section 5.1.2 below) within Area A includes;

- L163 Structures 212 to 208 Work Pads, and
- Access roads between L163 Structures 215 to 208.



### 3.1.1 Surface and Groundwater Protection – Area A

There is one unnamed stream within this portion of the project area associated with Wetland KW-19 (see **Figure 3 – Surface Water and Groundwater Overlay Plans**). This portion of the project area includes temporary wetland matting in three wetland systems; Wetland KW-17, KW-18, and KW19 for access and work pad placement. Temporary wetland matting totals are summarized in the table below. AoT disturbance area is summarized in *Section 5.1.2*.

<b>Temporary Matting</b>	<b>Impact (sq. ft)</b>
Wetland Access Matting	16,069
Wetland Work Pad	17,664
<b>Total</b>	<b>33,733</b>

According to **Figure 3**, a majority of Area A is located within the Designated Rivers Quarter Mile Buffer associated with the Ashuelot River. This area begins at L163 Line Structure 214 and continues through the remainder of Area A, ending at L163 Line Structure 208. A majority of Area A is also located in the “Surface Waters with Impairment 2016 with Quarter Mile Buffer” screening area associated with an impairment of Escherichia coli in the Ashuelot River. Area A is located outside of the remaining AoT screening layers including “Watershed with 2016 Chloride Impairments,” “Outstanding Resource Water,” “All Lakes with a Quarter Mile Buffer,” “Class A Surface Waters,” “Wellhead Protection Areas,” “Groundwater Classification Areas,” and “Water Supply Intake Protection.”

### 3.1.2 FEMA 100-year Floodplain, Shoreland Protection, Designated Rivers – Area A

According to the FEMA Flood Insurance layer on **Figure 3**, a portion of the proposed gravel work pads associated with L163 Structures 210 and 209 are located within the 100-year floodplain zone for an unnamed stream and associated wetland. However, it is not anticipated that the proposed grading and improvement of existing access and work pads will significantly affect drainage within the 100-year floodplain as no new impervious surface area is proposed and minimal grading is required.

According to the Consolidated List of Water Bodies Subject to RSA 483-B (May 22, 2019), and the NHDES Designated River Corridor Web Map, the Ashuelot River is subject to RSA 483-B and is considered a Designated River in New Hampshire. No work is proposed in the Ashuelot River; however, there are proposed impacts to the associated 250-foot Shoreland Regulated Area. A copy of this application will be submitted to the Ashuelot River Local Advisory Committee.

### 3.2 AOT AREA B - KEENE

Area B begins at Old Gilsum Road and ends approximately 940 feet west/northwest of NH Route 10 in Keene, New Hampshire. This stretch includes upland and wetland areas with elevations ranging from approximately 940 feet at the entrance off Old Gilsum Road to approximately 1,152 feet adjacent to L163 Structure 184. This portion of the ROW is located in a primarily forested undeveloped areas of Keene and lacks documented drainage structures in the proposed access route.



Land disturbance subject to Alteration of Terrain Law and Rules due to *Env-Wq 1502.58 (b) (2)* (see Section 5.1.2 below) within Area B includes;

- L163 Structures 185, 184, and 181 to 178 Work Pads, and
- Access roads between L163 Structures 189 to 178.

3.2.1 Surface and Groundwater Protection – Area B

There is one unnamed stream within this portion of the project area associated with Wetland KW-34 (see **Figure 3 – Surface Water and Groundwater Overlay Plans**). This portion of the project area includes temporary wetland matting in three wetland systems; Wetland KW-29, KW-32, and KW-34 for access. Temporary wetland matting totals are summarized in the table below. AoT disturbance area is summarized in *Section 5.1.2*.

Temporary Matting	Impact (sq. ft)
Wetland Access Matting	6,543
Wetland Work Pad	0
<b><u>Total</u></b>	<b><u>6,543</u></b>

According to **Figure 3**, a portion of Area B is within the “All Lakes with a Quarter Mile Buffer” associated with Three Mile Reservoir, and “Surface Waters with Impairment 2016 with Quarter Mile Buffer” area associated with a Benthic-Macroinvertebrate Bioassessments impairment at Beaver Brook – Unnamed Brook. Area B is located outside of the remaining AoT screening layers including “Designated Rivers Quarter Mile Buffer,” “Watershed with 2016 Chloride Impairments,” “Outstanding Resource Water,” “Class A Surface Waters,” “Wellhead Protection Areas,” “Groundwater Classification Areas,” and “Water Supply Intake Protection.”

3.2.2 FEMA 100-year Floodplain, Shoreland Protection, Designated Rivers – Area B

According to the FEMA Flood Insurance layer on **Figure 3**, there are no mapped 100-year floodplain areas within Area B.

According to the Consolidated List of Water Bodies Subject to RSA 483-B (May 22, 2019), and the NHDES Designated River Corridor Web Map, there are no rivers within Area B that are protected under RSA 483-B.

3.3 AOT AREA C – KEENE

Area C begins approximately 400 feet east of NH Route 10 and ends at Ferry Brook Road in Keene, New Hampshire. This stretch includes upland and wetland areas with elevations ranging from approximately 790 feet adjacent to L163 Structure 175 to approximately 992 feet adjacent to L163 Line Structure 168. This portion of the ROW is located in a primarily forested undeveloped areas of Keene and lacks documented drainage structures in the proposed access route.



Land disturbance subject to Alteration of Terrain Law and Rules due to *Env-Wq 1502.58 (b) (2)* (see Section 5.1.2 below) within Area C includes;

- L163 Structure 175 to 166 Work Pads, and
- Access roads between L163 Structures 175 to 166.

3.3.1 Surface and Groundwater Protection – Area C

There is one named stream (Beaver Brook) within this portion of the project area associated with Wetland KW-39 (see **Figure 3 – Surface Water and Groundwater Overlay Plans**). This portion of the project area includes temporary wetland matting in 7 wetland systems; Wetland KW-39, KW-40, KW-41, KW-42, KW-44, KW-45, and KW-50 for access and work pad placement. Temporary wetland matting totals are summarized in the table below. AoT disturbance area is summarized in *Section 5.1.2*.

Temporary Matting	Impact (sq. ft)
Wetland Access Matting	16,178
Wetland Work Pad	23,319
<b><u>Total</u></b>	<b><u>39,497</u></b>

According to **Figure 3**, a portion of Area C is within the “All Lakes with a Quarter Mile Buffer” associated with Three Mile Reservoir, and “Surface Waters with Impairment 2016 with Quarter Mile Buffer” area associated with a Benthic-Macroinvertebrate Bioassessments impairment at Beaver Brook – Unnamed Brook. Area C is located outside of the remaining AoT screening layers including “Designated Rivers Quarter Mile Buffer,” “Watershed with 2016 Chloride Impairments,” “Outstanding Resource Water,” “Class A Surface Waters,” “Wellhead Protection Areas,” “Groundwater Classification Areas,” and “Water Supply Intake Protection.”

3.3.2 FEMA 100-year Floodplain, Shoreland Protection, Designated Rivers – Area C

According to the FEMA Flood Insurance layer on **Figure 3**, a portion of Area C is located within the 100-year floodplain zone. This include a portion of the proposed work pad associated with L163 Line Structure 175, which is in the 100-year floodplain zone for Beaver Brook. However, it is not anticipated that the proposed grading and improvement of existing access and work pads will significantly affect drainage within the 100-year floodplain as no new impervious surface area is proposed and minimal grading is required.

According to the Consolidated List of Water Bodies Subject to RSA 483-B (May 22, 2019), and the NHDES Designated River Corridor Web Map, there are no rivers within Area C that are protected under RSA 483-B.

3.4 AOT AREA D – STODDARD AND ANTRIM

Area D begins approximately 0.25 miles east/southeast of NH Route 9 in Stoddard and ends at Salmon Brook Road in Antrim, New Hampshire. This stretch includes upland and wetland areas with elevations ranging from approximately 1,170 feet at the proposed access off Salmon Brook Road to approximately 1,310 feet adjacent to L163 Structure 28. This portion of the ROW is located in a primarily undeveloped forested and rural residential areas of Stoddard and Antrim.



Land disturbance subject to Alteration of Terrain Law and Rules due to *Env-Wq 1502.58 (b) (2)* (see Section 5.1.2 below) within Area D includes;

- L163 Structure 30 Work Pad, and
- Access road between Line L163 Structures 30 to 21.

3.4.1 Surface and Groundwater Protection – Area D

There is one named river (Contoocook River [North Branch]) associated with Wetland KW-39 and one unnamed stream associated with Wetland AW-2 within this portion of the project area (see **Figure 3 – Surface Water and Groundwater Overlay Plans**). This portion of the project area includes temporary wetland matting in three wetland systems; Wetland STW-72, AW-2, and AW-3 for access. Temporary wetland matting totals are summarized in the table below. AoT disturbance area is summarized in *Section 5.1.2*.

Temporary Matting	Impact (sq. ft)
Wetland Access Matting	8,003
Wetland Work Pad	0
<b><u>Total</u></b>	<b><u>8,003</u></b>

According to **Figure 3**, a portion of Area D is located within Designated Rivers Quarter Mile Buffer associated with the Contoocook River (North Branch). This area begins at L163 Line Structure 30 and continues to approximately 200 feet east/southeast of the Stoddard and Antrim town line between L163 Structures 27 and 26. Screening layers that do not coincide with Area D include “Surface Waters with Impairment 2016 with Quarter Mile Buffer,” “Watershed with 2016 Chloride Impairments,” “Outstanding Resource Water,” “All Lakes with a Quarter Mile Buffer,” “Class A Surface Waters,” “Wellhead Protection Areas,” “Groundwater Classification Areas,” and “Water Supply Intake Protection.”

3.4.2 FEMA 100-year Floodplain, Shoreland Protection, Designated Rivers – Area D

According to the FEMA Flood Insurance layer on **Figure 3**, there are no mapped 100-year floodplain areas within Area D.

According to the Consolidated List of Water Bodies Subject to RSA 483-B (May 22, 2019), and the NHDES Designated River Corridor Web Map, the Contoocook River (North Branch) is subject to RSA 483-B and is considered a Designated River in New Hampshire. No work is proposed in the Contoocook River (North Branch); however, there are proposed impacts to the associated 250-foot and 150-foot regulated shoreland areas. A copy of this application will be submitted to the Contoocook River (North Branch) Local Advisory Committee.

3.5 AOT AREA E – ANTRIM

Area E begins approximately 0.25 miles east/southeast of Salmon Brook Road and ends at the Tuttle Hill Substation just north of High Range Road in Antrim, New Hampshire. This stretch includes upland and wetland areas with elevations ranging from approximately 1,100 feet adjacent to L163 Structure 3 to approximately 1,270 feet



adjacent to L163 Structure 14. This portion of the ROW is located in primarily forested undeveloped areas of Antrim.

Land disturbance subject to Alteration of Terrain Law and Rules due to *Env-Wq 1502.58 (b) (2)* (see Section 5.1.2 below) within Area E includes;

- L163 Structures 20, 10, 9, 8, 3, 4, and
- Access road between L163 Structures 20 to 1.

3.5.1 Surface and Groundwater Protection – Area E

There are 7 unnamed streams within this portion of the project area associated with Wetlands AW-7, AW-9, AW-15, AW-16, AW-18, AW-20, and AW-21 (see **Figure 3 – Surface Water and Groundwater Overlay Plans**). This portion of the project area includes temporary wetland matting in 16 wetland systems; Wetlands AW-7 to AW-22 for access and work pad placement. Temporary wetland matting totals are summarized in the table below. AoT disturbance area is summarized in *Section 5.1.2*.

Temporary Matting	Impact (sq. ft)
Wetland Access Matting	37,865
Wetland Work Pad	43,179
<b><i>Total</i></b>	<b><i>81,044</i></b>

According to **Figure 3**, a portion of Area E is located within Designated Rivers Quarter Mile Buffer associated with the Contoocook River (North Branch). This area begins at L163 Line Structure 18 and continues to approximately L163 Line Structure 6. Screening layers that do not coincide with Area E include “Surface Waters with Impairment 2016 with Quarter Mile Buffer,” “Watershed with 2016 Chloride Impairments,” “Outstanding Resource Water,” “All Lakes with a Quarter Mile Buffer,” “Class A Surface Waters,” “Wellhead Protection Areas,” “Groundwater Classification Areas,” and “Water Supply Intake Protection.”

3.5.2 FEMA 100-year Floodplain, Shoreland Protection, Designated Rivers – Area E

According to the FEMA Flood Insurance layer on **Figure 3**, there are no mapped 100-year floodplain areas within Area E.

According to the Consolidated List of Water Bodies Subject to RSA 483-B (May 22, 2019), and the NHDES Designated River Corridor Web Map, the Contoocook River (North Branch) is subject to RSA 483-B and is considered a Designated River in New Hampshire. No work is proposed in the Contoocook River (North Branch) or its associated Regulated Shoreland Areas. A copy of this application will be submitted to the Contoocook River (North Branch) Local Advisory Committee.

3.6 AOT AREA F - ANTRIM

Area F is limited to the work pad associated with L163 Structure 44, located approximately 0.22 miles southwest of Elm Avenue in Antrim, New Hampshire. The area is specific to one proposed gravel work pad and is located



entirely in uplands with elevations ranging from approximately 850 feet approximately 882 feet. This portion of the ROW is located in a rural residential portion of Antrim and lacks documented drainage structures in the proposed access route.

Land disturbance subject to Alteration of Terrain Law and Rules due to *Env-Wq 1502.58 (b) (1)* (see Section 5.1.2 below) within Area F includes the Line L163 Structure 44 work pad.

### 3.6.1 Surface and Groundwater Protection – Area F

There are no surface waters or wetlands located within this portion of the project area (see **Figure 3 – Surface Water and Groundwater Overlay Plans**). AoT disturbance area is summarized in Section 5.1.2.

According to **Figure 3**, the entirety of Area F is located within the Designated Rivers Quarter Mile Buffer associated with the Contoocook River (North Branch), the Lakes Quarter Mile Buffer associated with Steels Pond, and a Wellhead Protection Area. Screening layers that do not coincide with Area F include “Surface Waters with Impairment 2016 with Quarter Mile Buffer,” “Watershed with 2016 Chloride Impairments,” “Outstanding Resource Water,” “Class A Surface Waters,” “Groundwater Classification Areas,” and “Water Supply Intake Protection.”

### 3.6.2 FEMA 100-year Floodplain, Shoreland Protection, Designated Rivers – Area F

According to the FEMA Flood Insurance layer on **Figure 3**, a portion of the proposed gravel work pad associated with L163 Line Structure 44 is located within the 100-year floodplain zone for the North Branch River and associated wetland. However, it is not anticipated that the proposed grading and improvement of existing access and work pads will significantly affect drainage within the 100-year floodplain as no new impervious surface area is proposed and minimal grading is required.

According to the Consolidated List of Water Bodies Subject to RSA 483-B (May 22, 2019), and the NHDES Designated River Corridor Web Map, the Contoocook River (North Branch) is subject to RSA 483-B and is considered a Designated River in New Hampshire. No work is proposed in the Contoocook River (North Branch); however, there are proposed impacts to the associated 250-foot, 150-foot, and 50-foot regulated shoreland areas. A copy of this application will be submitted to the Contoocook River (North Branch) Local Advisory Committee.

## 4.0 PROJECT DESCRIPTION

### 4.1 STRUCTURE REPLACEMENT AND MAINTENANCE

As previously mentioned, the proposed project includes the replacement of 29 existing utility structures that must be replaced due to environmental damage. The process for replacing structures consists of drilling approximately 4-ft diameter holes to install a caisson approximately 15 to 20 ft below the ground surface. New structures will be installed in caissons and backfilled with clean, suitable materials. Spoils produced from drilling will be disposed in approved upland areas at a minimum distance of 100 ft from wetland areas. Any disturbed upland and wetland areas will be restored or stabilized upon completion of work. Anchors will also be installed to stabilize new structures. Anchors will be installed by excavating trenches, installing the concrete block anchors, and backfilling trenches. Backfill for anchors in wetlands will consist of hydric soils to maintain hydric conditions in the soil.





Old structures will be cut at the ground surface. In addition to removal of old structures, old cross-arms, wires and accessory equipment will be removed off site and disposed. Old structure butts will not be dug up and removed unless they impact the structural integrity of new structures.

#### 4.1.1 Access

The proposed structure replacement project utilizes existing access routes within the existing L163 ROW to the greatest extent practicable. The majority of existing access routes are comprised of dirt or grassy areas and are proposed to be improved as part of this project. Proposed access routes are shown on the plans in both **Figures 3 and 4**. Access into the existing ROW will be obtained from various state and local roadways, and private properties where permission shall be obtained. Proposed access routes as shown on **Figures 3 and 4** were identified to minimize ground disturbance to the greatest extent practicable while providing safe and efficient access to existing utility structures. Access through existing wetlands within the project area will be completed using temporary timber matting.

##### 4.1.1.1 Road Construction

Proposed access road improvements include 12- to 16-foot-wide gravel and stone roads with a 20-foot total width limit of disturbance. The roads will provide access to existing utility structures for routine maintenance activities. Improved access will provide reliable, permanent and efficient access to utility structures for future maintenance activities and when emergency repairs are required.

##### 4.1.1.2 Wetland and Upland Temporary Matting

Access through existing wetlands in the project area will be completed using temporary timber matting to minimize and prevent rutting in the wetlands (see **Figure 4- Alteration of Terrain Permitting Plans**). In addition, upland matting may be used rather than improving access with gravel and stone if access is necessary through maintained property owner lawns or farm fields.

#### 4.1.2 Work Pad Construction

The proposed project includes the construction of 100-foot by 100-foot gravel work pads to stage construction equipment and vehicles necessary to replace utility structures. Work pads will be constructed using clean modified riprap (6- to 8-inch diameter) or equivalent stone. In addition, the work pad will be top dressed with 1.5- to 3-inch diameter clean stone. Lastly, disturbed areas in proximity to the final work pad configuration will be stabilized with upland seed mix.

Proposed work pads in wetland areas will be constructed using temporary timber matting and removed upon completion of work.

## 4.2 CONSTRUCTION SEQUENCE

The work is proposed to be undertaken during the early April of 2020 following the receipt of all regulatory approvals. The following is a description of anticipated construction sequence for this type of routine maintenance work. Once contractor(s) are scheduled, a more finalized sequence and schedule will be determined.

1. Install sediment and erosion controls in proposed locations as shown on **Figure 4**.



2. Upgrade access routes and build work pads. Timber matting to be used in uplands and wetlands as designated by **Figure 4**.
3. Conduct structure replacement activities including installation of new structures, removal of old structures, and transfer of wires.
4. Remove temporary timber matting and stabilized exposed soils within the ROW and restore temporarily disturbed wetland areas with appropriate wetland seed mix.
5. Remove erosion and sedimentation controls following stabilization.

#### 4.3 BEST MANAGEMENT PRACTICES

Work will be conducted in accordance with Eversource's standard Best Management Practices (BMPs) as designated by the NHDES Best Management Practices Manual for Utility Maintenance in and Adjacent to Wetlands and Waterbodies in New Hampshire dated March 2019. By implementing these BMPs, impacts to both wetland and upland areas will be minimized and prevented to the greatest extent practicable.

Where necessary, perimeter protective measures consisting of silt fence, straw wattle, mulch, and straw bales will be installed around the structures to minimize potential impacts to nearby resource areas. Water bars will be installed in areas of road improvements with steep slopes as identified by the Contractor. If necessary and based on localized site conditions, silt fence may be used. Disturbed soil will be seeded and mulched with hay or straw for stabilization as needed following completion of work. No equipment or material will be stored within wetland areas. Erosion controls will be implemented during construction as detailed in Note Sheets 1 and 2 of **Figures 3 and 4** to minimize potential impacts during construction (see **Figure 3 – Surface Water and Groundwater Overlay Plans** and **Figure 4 – Alteration of Terrain Permitting Plans**).

Timber matting will be used in wetlands and in some upland areas to minimize impacts and provide level work pads.

Upon completion of work, disturbed upland areas will be restored and stabilized to pre-existing conditions and areas of exposed soils will be seeded and/or mulched. Additionally, should any removal of BMPs be necessary, it will occur during restoration activities.

## 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 sq. ft. of terrain (50,000 sq. ft. if within a protected shoreland). This NHDES requirement, which is found in Administrative Rule Env-Wq-1500, is intended to protect New Hampshire surface waters by controlling soil erosion and managing stormwater runoff from developed areas. The project contains six distinct AoT regulated areas (referred to respectively as Areas A, B, C, D, E, and F) along the L163 Transmission Line ROW based on continuous areas of disturbance and the various criteria listed under Env-Wq 1502.58 (b) (1). Details on impacts in each regulated area are provided below in Section 5.1.2 Quantification of Impacts Subject to AoT.



5.1.1 Waiver Request: Stormwater Drainage Report; Drainage Area Plan; Hydrologic Soil Group Plans (Env-WQ 15.09) and Information Required for Projects within the 100-year Floodplain (Env-Wq 1503.09)

Per Env-Wq 1509.02, a waiver is being requested from the requirements to prepare a Stormwater Drainage Report, Drainage Area Plans and Hydrologic Soil Group Plans and a supplementary report for work within the 100-year floodplain because new impervious surface is limited to the footprint of new transmission line structures. It is not anticipated that the proposed structures will have a significant impact on site drainage patterns. Accordingly, stormwater treatment practices are not proposed. A formal waiver request is provided in **Appendix F**.

5.1.2 Quantification of Impacts Subject to AOT

The project requires approximately 643,464 square feet (sq. ft.) of total disturbance including 168,820 sq. ft. of temporary wetland matting and 474,644 sq. ft. of ground disturbance along the L163 Transmission Line ROW that requires an AoT permit in accordance with Env-Wq 1502.58. Specific areas and construction activities that significantly alter the terrain are detailed below. Additional details are shown in **Figure 4**.

**AoT Area A - Keene**

Structure 214 to 208

Map Sheets 1 to 3

<b>Disturbance Type</b>	<b>Impact (sq. ft)</b>
New Access	26,450
Gravel Work Pad	34,879
<b><u>Total AoT Disturbed Area</u></b>	<b><u>61,329</u></b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period... cumulatively exceeds 50,000 square feet of contiguous area if any portion of the disturbance is within the protected shoreland as defined in RSA 483-B..."

**AoT Area B - Keene**

Structure 189 to 178

Map Sheets 4 to 7

<b>Disturbance Type</b>	<b>Impact (sq. ft)</b>
New Access	69,423
Gravel Work Pad	58,766
<b><u>Total AoT Disturbed Area</u></b>	<b><u>128,189</u></b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period, cumulatively exceeds 100,000 square feet of contiguous area..."



**AoT Area C - Keene**

Structure 175 to 166

Map Sheets 8 to 10

<b>Disturbance Type</b>	<b>Impact (sq. ft)</b>
New Access	38,809
Gravel Work Pad	70,926
<b><u>Total AoT Disturbed Area</u></b>	<b><u>109,735</u></b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period, cumulatively exceeds 100,000 square feet of contiguous area..."

**AoT Area D - Stoddard and Antrim**

Structure 30 to 21

Map Sheets 11 to 13

<b>Disturbance Type</b>	<b>Impact (sq. ft)</b>
New Access	51,646
Gravel Work Pad	10,000
<b><u>Total AoT Disturbed Area</u></b>	<b><u>61,646</u></b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period... cumulatively exceeds 50,000 square feet of contiguous area if any portion of the disturbance is within the protected shoreland as defined in RSA 483-B..."

**AoT Area E - Antrim**

Structure 20 to 1

Map Sheets 14 to 19

<b>Disturbance Type</b>	<b>Impact (sq. ft)</b>
New Access	89,144
Gravel Work Pad	16,763
<b><u>Total AoT Disturbed Area</u></b>	<b><u>105,907</u></b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period, cumulatively exceeds 100,000 square feet of contiguous area..."

**AoT Area F- Antrim**

Structure 44

Map Sheet 20

<b>Disturbance Type</b>	<b>Impact (sq. ft)</b>
-------------------------	------------------------



New Access	0
Gravel Work Pad	7,858
<b><u>Total AoT Disturbed Area</u></b>	<b><u>7,858</u></b>

Criteria: Env-Wq 1502.58 (b) (1) "An area that: Is more than 2,500 square feet in size; Is within 50 feet of any surface water; Is sloped such that runoff is in the direction of the surface water; and Is subject to runoff over 50 feet or more of land having a grade of 25% or greater when measured at 2-foot intervals..."

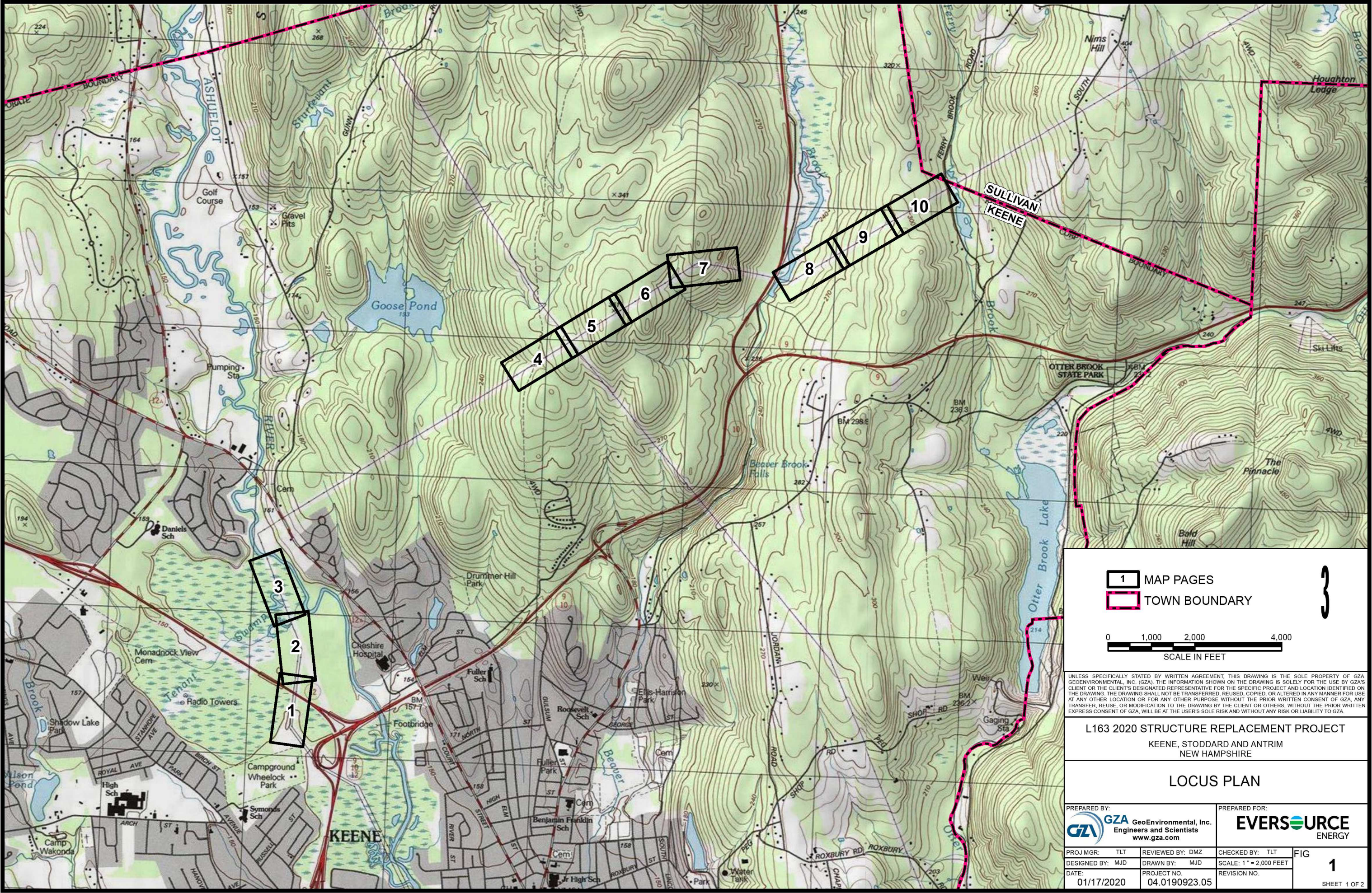
## 5.2 OTHER REGULATORY PROGRAMS

Other regulatory permits and notifications required for the proposed project are summarized below.

Agency	Permit/Notification		Status
<i>Local</i>			
City of Keene	Conditional Use Permit		Pending
Town of Stoddard	N/A		N/A
Town of Antrim	N/A		N/A
<i>State</i>			
NHDES Statutory Permit by Notification	Statutory Permit by Notification		Pending
	Town/City	SPN File No.	
	Keene Stoddard	N/A N/A	
NHDES Standard Dredge and Fill Permit	Antrim	2019-03242	Approved
<i>Federal</i>			
EPA (Construction General Permit)	Stormwater Pollution Prevention Plan (SWPPP)		Approved



**Figure 1 – USGS Topographic Map**



1 MAP PAGES  
  TOWN BOUNDARY

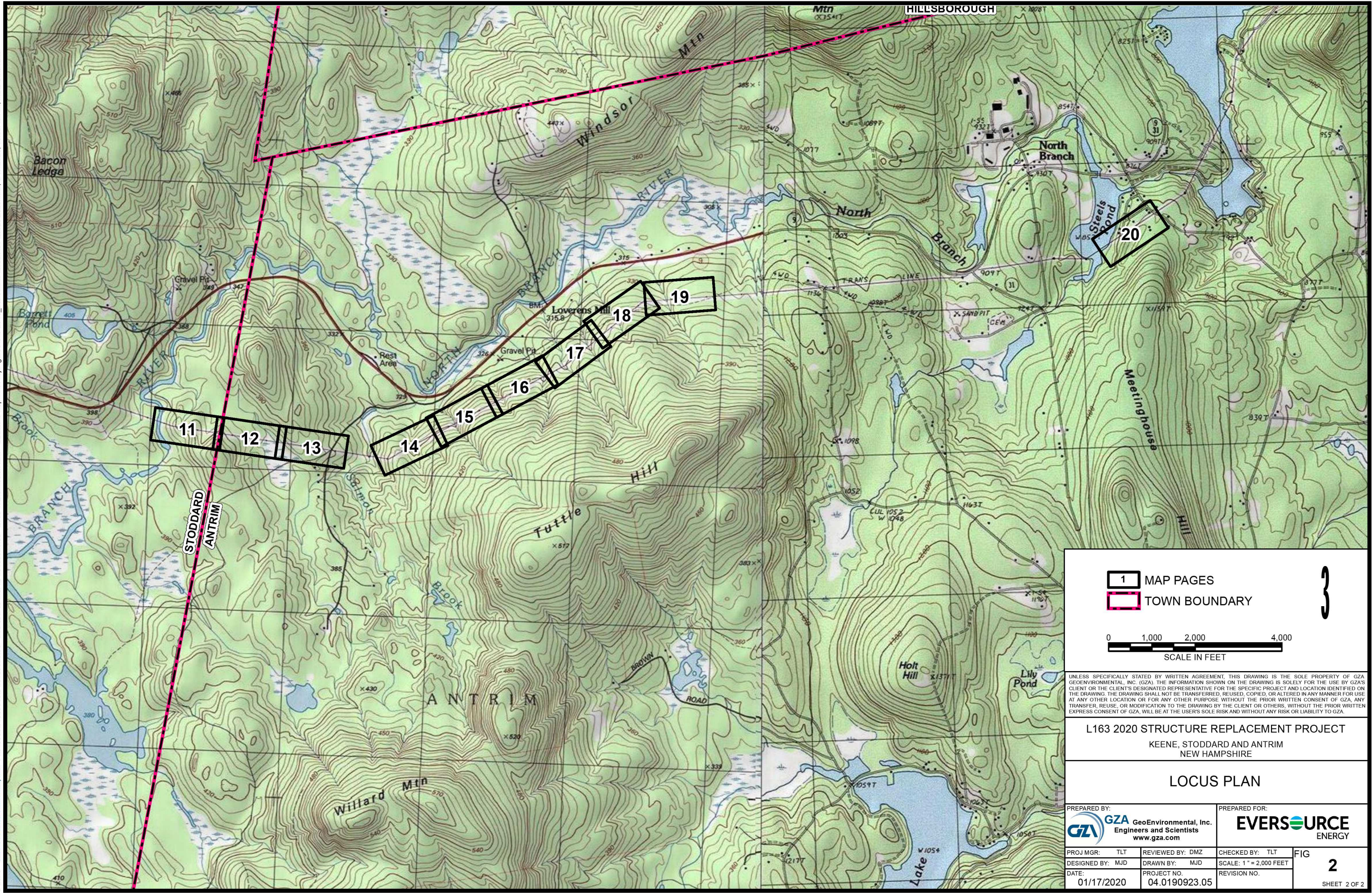
0 1,000 2,000 4,000  
 SCALE IN FEET

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**L163 2020 STRUCTURE REPLACEMENT PROJECT**  
 KEENE, STODDARD AND ANTRIM  
 NEW HAMPSHIRE

**LOCUS PLAN**

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: 	
PROJ MGR: TLT DESIGNED BY: MJD DATE: 01/17/2020	REVIEWED BY: DMZ DRAWN BY: MJD PROJECT NO.: 04.0190923.05	CHECKED BY: TLT SCALE: 1" = 2,000 FEET REVISION NO.	FIG <b>1</b> SHEET 1 OF 2



1 MAP PAGES  
  TOWN BOUNDARY



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**L163 2020 STRUCTURE REPLACEMENT PROJECT**  
 KEENE, STODDARD AND ANTRIM  
 NEW HAMPSHIRE

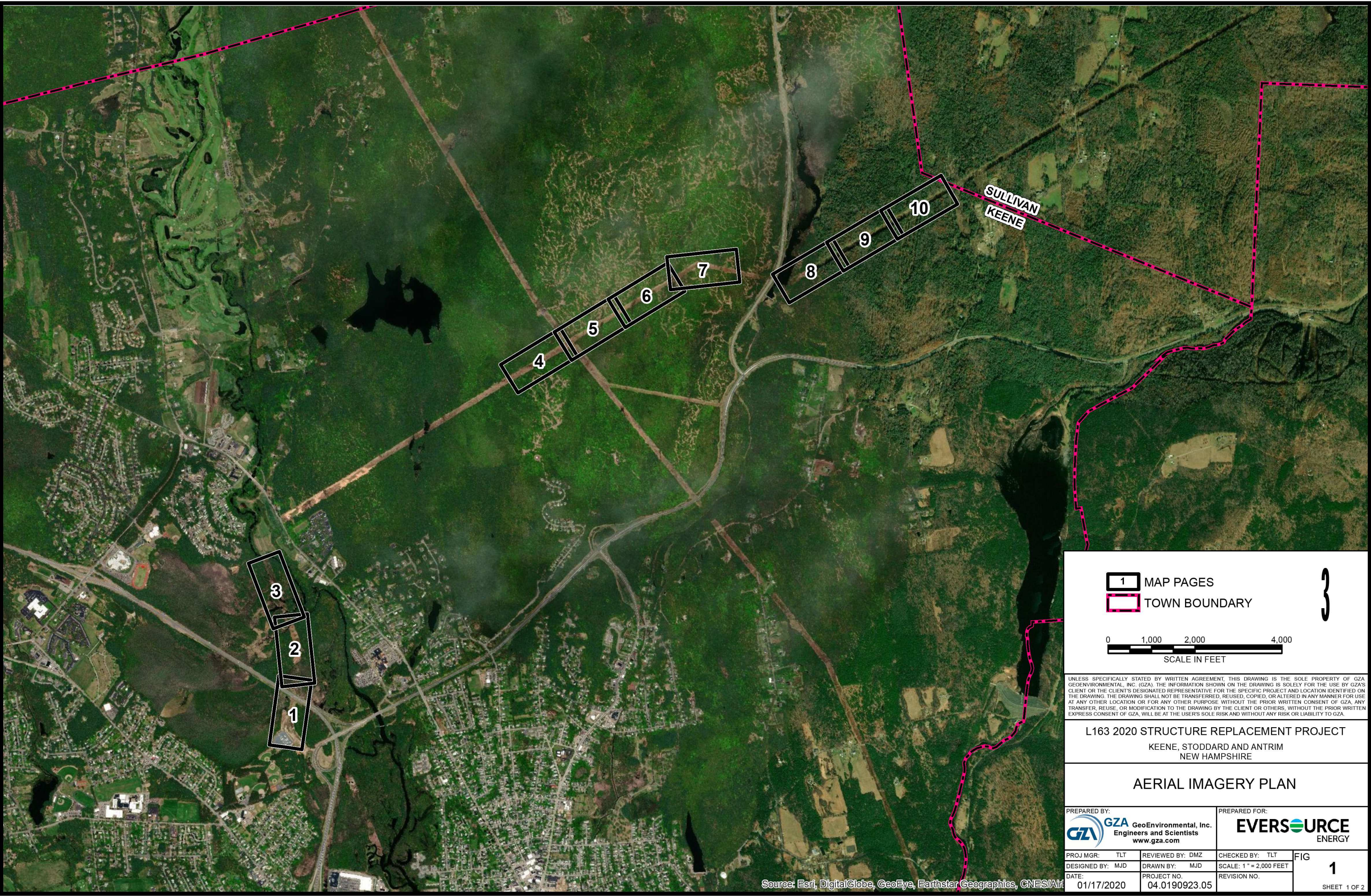
**LOCUS PLAN**

PREPARED BY: <b>GZA</b> GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: <b>EVERSOURCE</b> ENERGY	
PROJ MGR: TLT	REVIEWED BY: DMZ	CHECKED BY: TLT	FIG <b>2</b>
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE: 1" = 2,000 FEET	
DATE: 01/17/2020	PROJECT NO: 04.0190923.05	REVISION NO.	SHEET 2 OF 2





**Figure 2 – Orthophotograph Site Map**



1 MAP PAGES  
  TOWN BOUNDARY



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L163 2020 STRUCTURE REPLACEMENT PROJECT  
 KEENE, STODDARD AND ANTRIM  
 NEW HAMPSHIRE

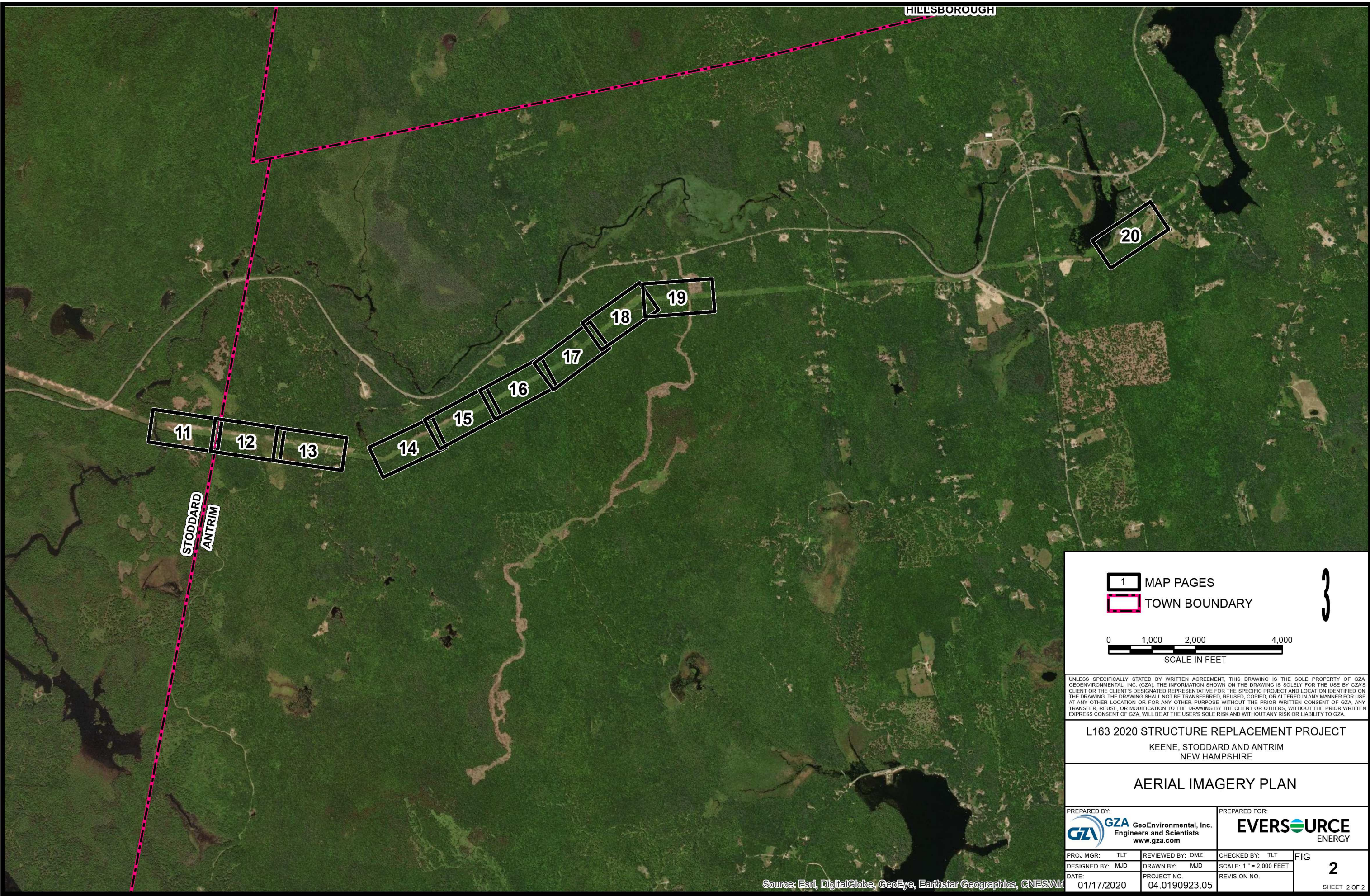
AERIAL IMAGERY PLAN



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 GZA GeoEnvironmental, Inc.  
 Engineers and Scientists  
 www.gza.com

PREPARED FOR:  
 EVERSOURCE ENERGY

PROJ MGR: TLT	REVIEWED BY: DMZ	CHECKED BY: TLT	FIG <b>1</b>
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE: 1" = 2,000 FEET	
DATE: 01/17/2020	PROJECT NO: 04.0190923.05	REVISION NO:	SHEET 1 OF 2

© 2020 - GZA GeoEnvironmental, Inc. P:\04.Jobs\01909023\04\_0190923\_00 - Eversource MSA\04\_0190923\_05 - L163 Transmission Line - Structure Replmnt Proj\Figures\GIS 2019\_2020\MXD\L163\_AoT\_Aerial Plan 2020.mxd, 1/17/2020, 10:46:57 AM, matthew.deane



-  MAP PAGES
-  TOWN BOUNDARY

3



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KEENE, STODDARD AND ANTRIM  
NEW HAMPSHIRE

AERIAL IMAGERY PLAN

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ENERGY

PROJ MGR: TLT	REVIEWED BY: DMZ	CHECKED BY: TLT	FIG <b>2</b> SHEET 2 OF 2
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE: 1" = 2,000 FEET	
DATE: 01/17/2020	PROJECT NO: 04.0190923.05	REVISION NO.	

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Air



**Figure 3 – Surface Water and Groundwater Overlay Plans**

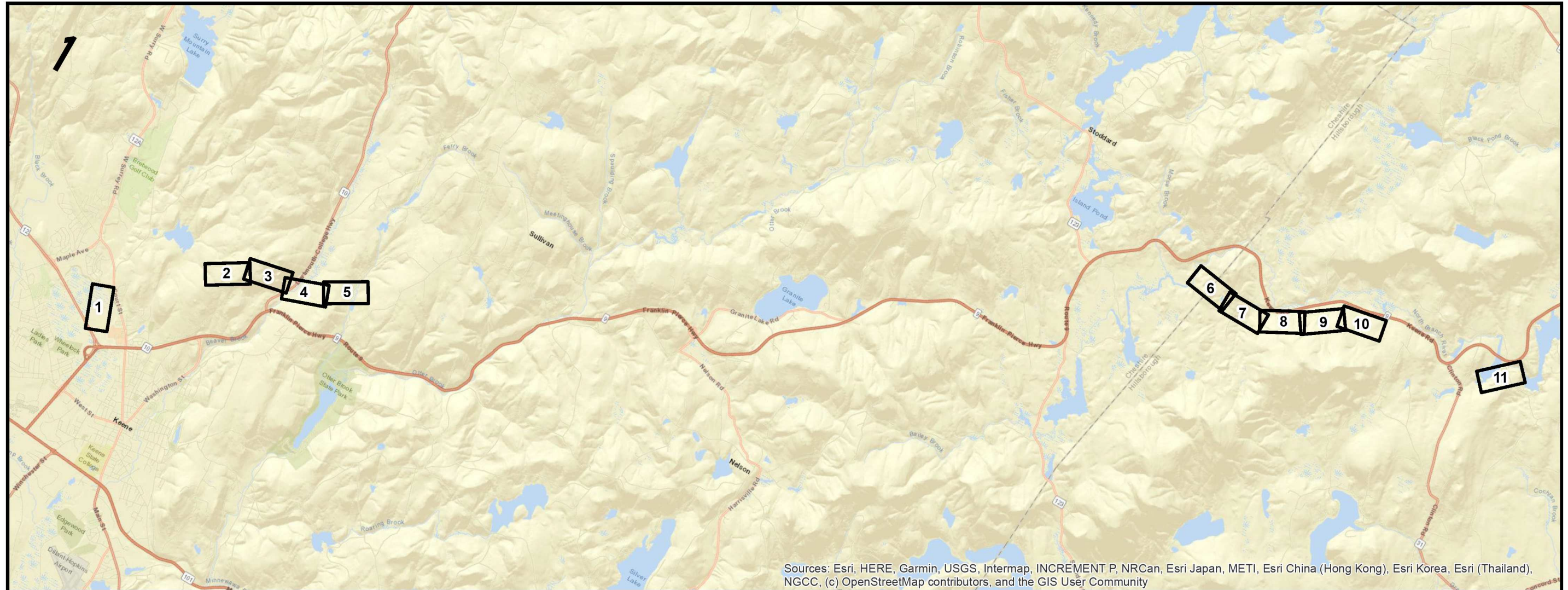
# L163 TRANSMISSION LINE 2020 STRUCTURE REPLACEMENT PROJECT

## SURFACE WATER AND GROUNDWATER OVERLAY PLANS

KEENE, STODDARD, AND ANTRIM

NEW HAMPSHIRE

1/17/2020



PREPARED FOR

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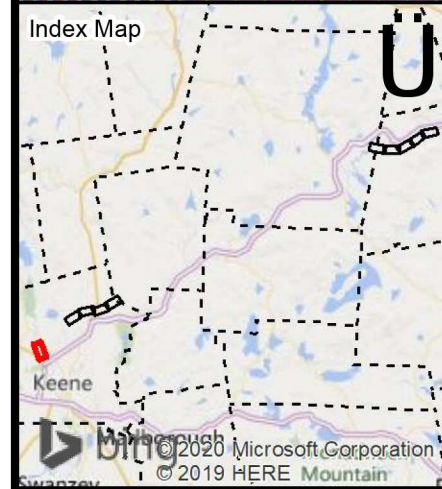
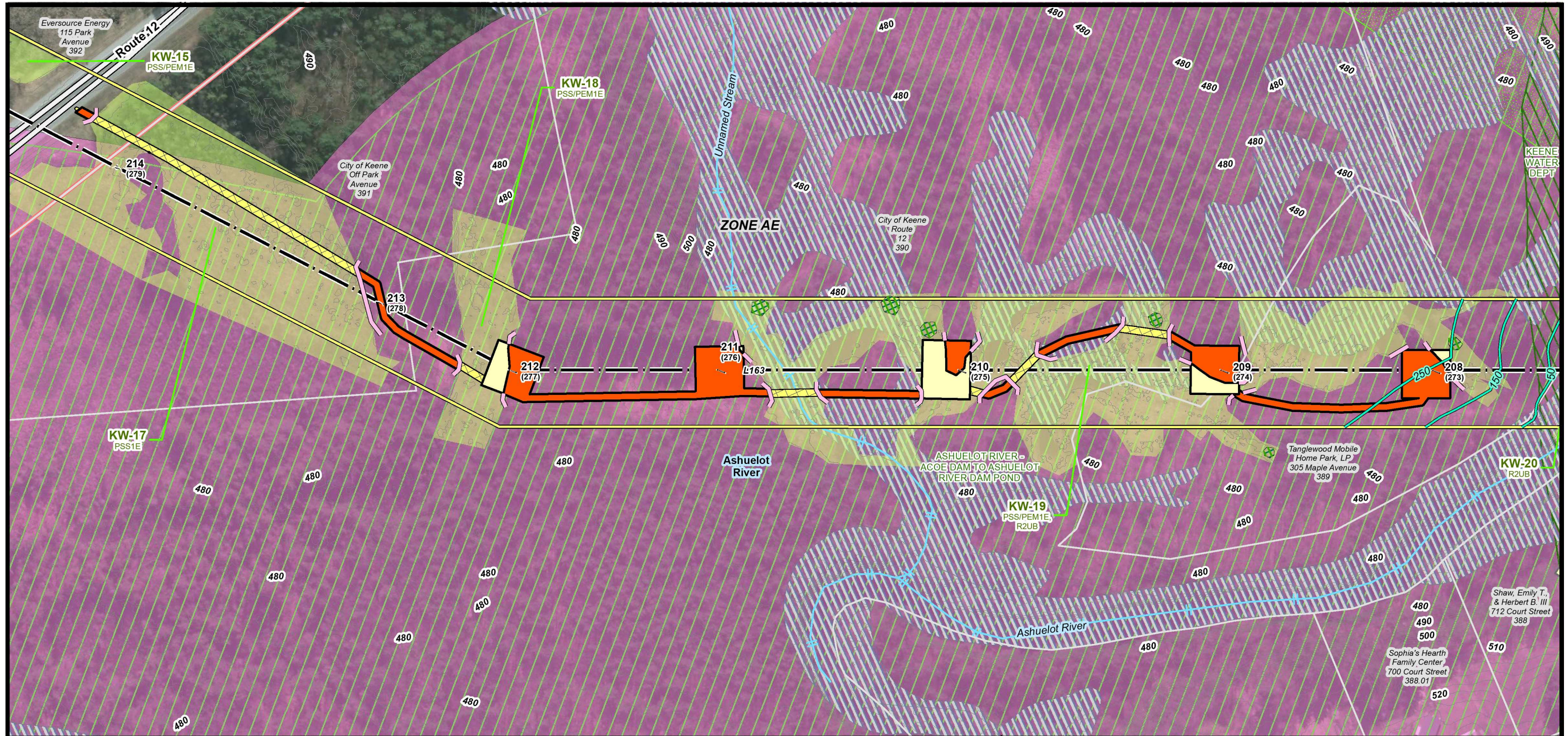
### INDEX OF FIGURES

1 inch = 7,500 feet

- T1: TITLE SHEET
- 1-11: MAP SHEETS
- S1: NOTES
- S2: DETAILS
- S3: DETAILS (CONT.)

PREPARED BY

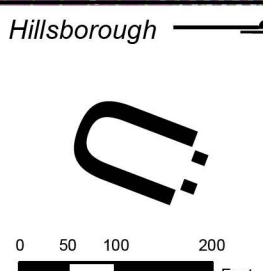
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<p><b>Keene</b></p> <ul style="list-style-type: none"> <li>EXISTING STRUCTURE - NO WORK PROPOSED</li> <li>EXISTING STRUCTURE TO BE REPLACED</li> <li>EXISTING STRUCTURE TO BE WRECKED OUT</li> <li>SHORELAND ZONE</li> <li>WORK PAD</li> <li>AOT DISTURBANCE</li> <li>TEMPORARY WETLAND IMPACT</li> <li>GATE</li> <li>ABUTTER PARCEL</li> <li>EVERSOURCE OWNED PARCEL</li> <li>STATE OWNED PARCEL</li> <li>POTENTIAL VERNAL POOL</li> <li>EVERSOURCE TRANSMISSION LINE</li> <li>APPROXIMATE ROW</li> <li>FENCE</li> <li>STONE WALL</li> <li>WETLAND</li> </ul>	<p><b>Current Town: Keene</b></p> <ul style="list-style-type: none"> <li>SUBSTATION</li> <li>DOT ROADS</li> <li>NHD FLOWLINE</li> <li>PRIMARY</li> <li>SECONDARY</li> <li>2 FT CONTOURS</li> <li>STRAW WATTLE</li> <li>WATER BAR</li> <li>TOWN BOUNDARY</li> <li>WELLHEAD PROTECTION</li> <li>WATERSHEDS WITH CHLORIDE IMPAIRMENTS 2016 (NONE)</li> <li>WATER SUPPLY INTAKE PROTECTION</li> <li>SURFACE WATERS WITH IMPAIRMENTS 2016 WITH QUARTER MILE BUFFER</li> <li>OUTSTANDING RESOURCE WATER WATERSHEDS (NONE)</li> <li>LAKES WITH A QUARTER MILE BUFFER (CLASS A SURFACE WATERS RSA485A9) (NONE)</li> </ul>	<p><b>Hillsborough</b></p> <ul style="list-style-type: none"> <li>LAKES WITH A QUARTER MILE BUFFER</li> <li>GROUNDWATER CLASSIFICATION AREAS GAA (NONE)</li> <li>GROUNDWATER CLASSIFICATION AREAS GA2</li> <li>GROUNDWATER CLASSIFICATION AREAS GA1 (NONE)</li> <li>DESIGNATED RIVERS QUARTERMILE BUFFER</li> <li>COASTAL AND GREAT BAY REGION COMMUNITIES (NONE)</li> <li>ALL FEATURES (CLASS A SURFACE WATERS RSA485A9)</li> <li>LOCAL POTENTIAL CONTAMINATION SOURCES</li> <li>FEMA FLOOD ZONE</li> </ul>
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**NOTES:**

- AERIAL IMAGERY WAS OBTAINED FROM UNH GRANIT AND DATED TO 2015.
- THE LAYERS TITLED "NHD FLOWLINE", "DOT ROADS", "PARCEL BOUNDARY," AND "TOWN BOUNDARY" WERE OBTAINED FROM UNH GRANIT.
- THE LAYER TITLED "WETLAND" WAS DELINEATED BY GZA, GEOENVIRONMENTAL, INC. IN 2016 AND SURVEYED BY DOUCET SURVEY, INC. IN 2016.
- L163 STRUCTURE DATA WAS PROVIDED BY EVERSOURCE ENERGY.
- PROPOSED ACCESS ROUTES AND WORK PAD LOCATIONS HAVE NOT BEEN FIELD VERIFIED.
- 2 FOOT GROUND SURFACE ELEVATION CONTOURS WERE OBTAINED FROM UNH GRANIT.
- AOT SCREENING LAYERS WERE PROVIDED BY NHDES.



**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

SURFACE WATER AND GROUNDWATER  
OVERLAY PLANS  
JANUARY 21, 2020

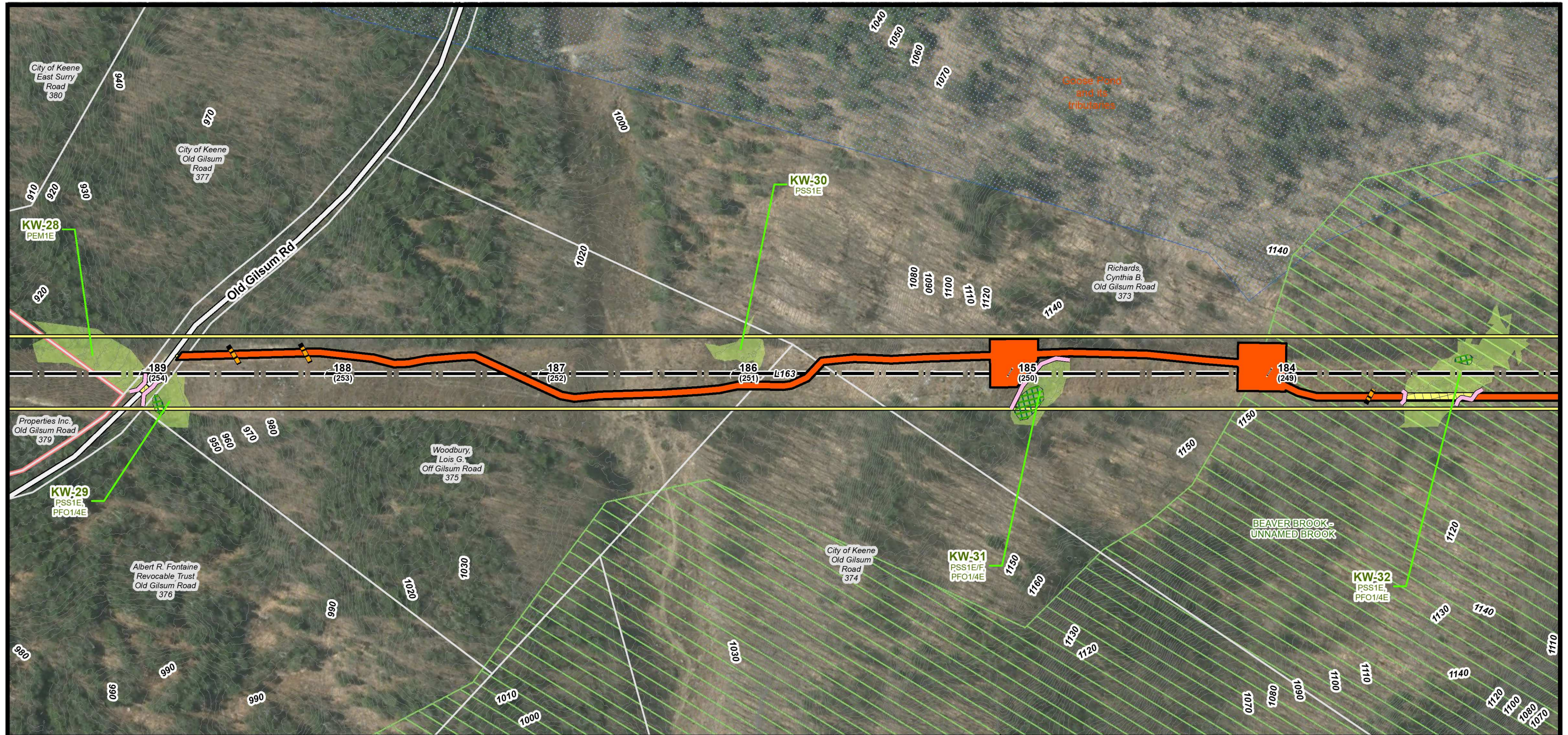
KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 1 OF 11

Project No.: 04.0190923.05 1 inch = 200 Feet

**EVERSOURCE ENERGY**

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Keene	
—	EXISTING STRUCTURE - NO WORK PROPOSED
- - -	EXISTING STRUCTURE TO BE REPLACED
—	EXISTING STRUCTURE TO BE WRECKED OUT
—	SHORELAND ZONE
—	WORK PAD
—	AOT DISTURBANCE
—	TEMPORARY WETLAND IMPACT
—	GATE
—	ABUTTER PARCEL
—	EVERSOURCE OWNED PARCEL
—	STATE OWNED PARCEL
—	POTENTIAL VERNAL POOL
—	EVERSOURCE TRANSMISSION LINE
—	APPROXIMATE ROW
—	FENCE
—	STONE WALL
—	WETLAND
—	SUBSTATION
—	DOT ROADS
—	NHD FLOWLINE
—	PRIMARY
—	SECONDARY
—	2 FT CONTOURS
—	STRAW WATTLE
—	WATER BAR
—	TOWN BOUNDARY
—	WELLHEAD PROTECTION
—	WATERSHEDS WITH CHLORIDE IMPAIRMENTS 2016 (NONE)
—	WATER SUPPLY INTAKE PROTECTION
—	SURFACE WATERS WITH IMPAIRMENTS 2016 WITH QUARTER MILE BUFFER
—	OUTSTANDING RESOURCE WATER WATERSHEDS (NONE)
—	LAKES WITH A QUARTER MILE BUFFER (CLASS A SURFACE WATERS RSA485A9) (NONE)

Current Town: Keene	
—	LAKES WITH A QUARTER MILE BUFFER
—	GROUNDWATER CLASSIFICATION AREAS GAA (NONE)
—	GROUNDWATER CLASSIFICATION AREAS GA2
—	GROUNDWATER CLASSIFICATION AREAS GA1 (NONE)
—	DESIGNATED RIVERS QUARTERMILE BUFFER
—	COASTAL AND GREAT BAY REGION COMMUNITIES (NONE)
—	ALL FEATURES (CLASS A SURFACE WATERS RSA485A9)
—	LOCAL POTENTIAL CONTAMINATION SOURCES
—	FEMA FLOOD ZONE

Hillsborough	
—	LAKES WITH A QUARTER MILE BUFFER
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—	GROUNDWATER CLASSIFICATION AREAS GA2
—	GROUNDWATER CLASSIFICATION AREAS GA1 (NONE)
—	DESIGNATED RIVERS QUARTERMILE BUFFER
—	COASTAL AND GREAT BAY REGION COMMUNITIES (NONE)
—	ALL FEATURES (CLASS A SURFACE WATERS RSA485A9)
—	LOCAL POTENTIAL CONTAMINATION SOURCES
—	FEMA FLOOD ZONE

**NOTES:**

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7. AOT SCREENING LAYERS WERE PROVIDED BY NHDES.

**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

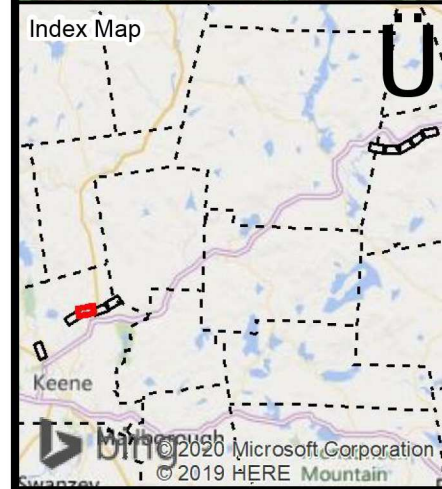
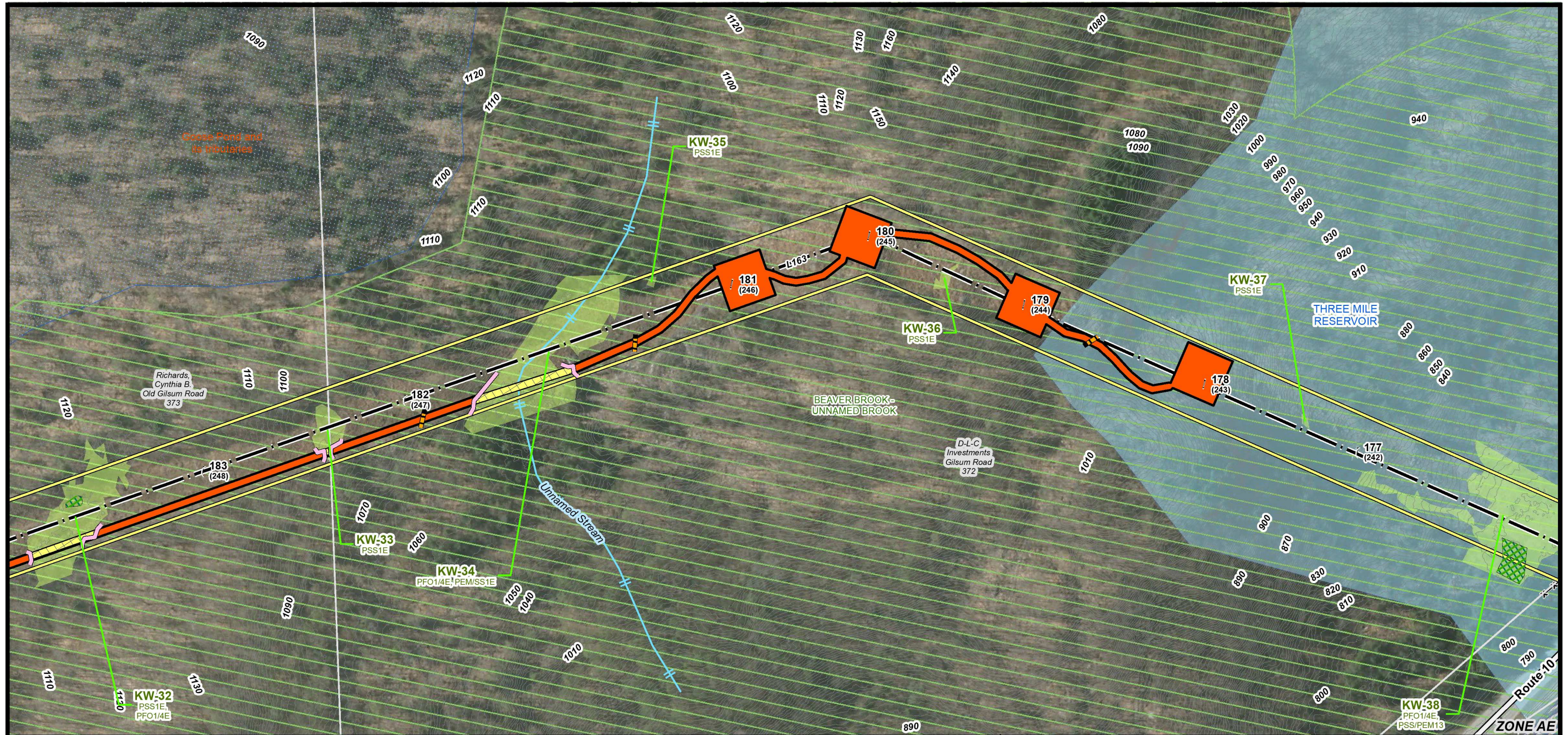
**SURFACE WATER AND GROUNDWATER  
OVERLAY PLANS  
JANUARY 21, 2020**

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 2 OF 11

Project No.: 04.0190923.05 1 inch = 200 Feet

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ENERGY**

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Keene	
—	EXISTING STRUCTURE - NO WORK PROPOSED
- - -	EXISTING STRUCTURE TO BE REPLACED
—	EXISTING STRUCTURE TO BE WRECKED OUT
—	SHORELAND ZONE
—	WORK PAD
—	AOT DISTURBANCE
—	TEMPORARY WETLAND IMPACT
—	GATE
—	ABUTTER PARCEL
—	EVERSOURCE OWNED PARCEL
—	STATE OWNED PARCEL
—	POTENTIAL VERNAL POOL
—	EVERSOURCE TRANSMISSION LINE
—	APPROXIMATE ROW
—	FENCE
—	STONE WALL
—	WETLAND
—	SUBSTATION
—	DOT ROADS
—	NHD FLOWLINE
—	PRIMARY
—	SECONDARY
—	2 FT CONTOURS
—	STRAW WATTLE
—	WATER BAR
—	TOWN BOUNDARY
—	WELLHEAD PROTECTION
—	WATERSHEDS WITH CHLORIDE IMPAIRMENTS 2016 (NONE)
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Hillsborough	
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**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

SURFACE WATER AND GROUNDWATER  
OVERLAY PLANS  
JANUARY 21, 2020

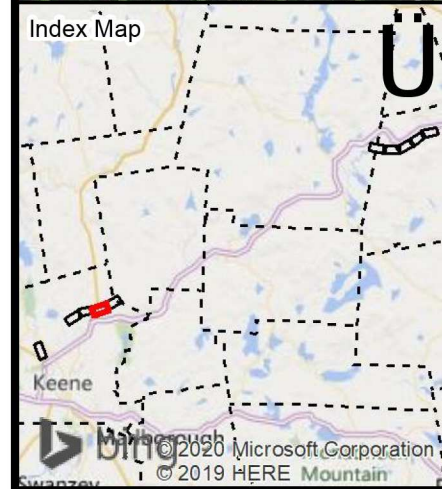
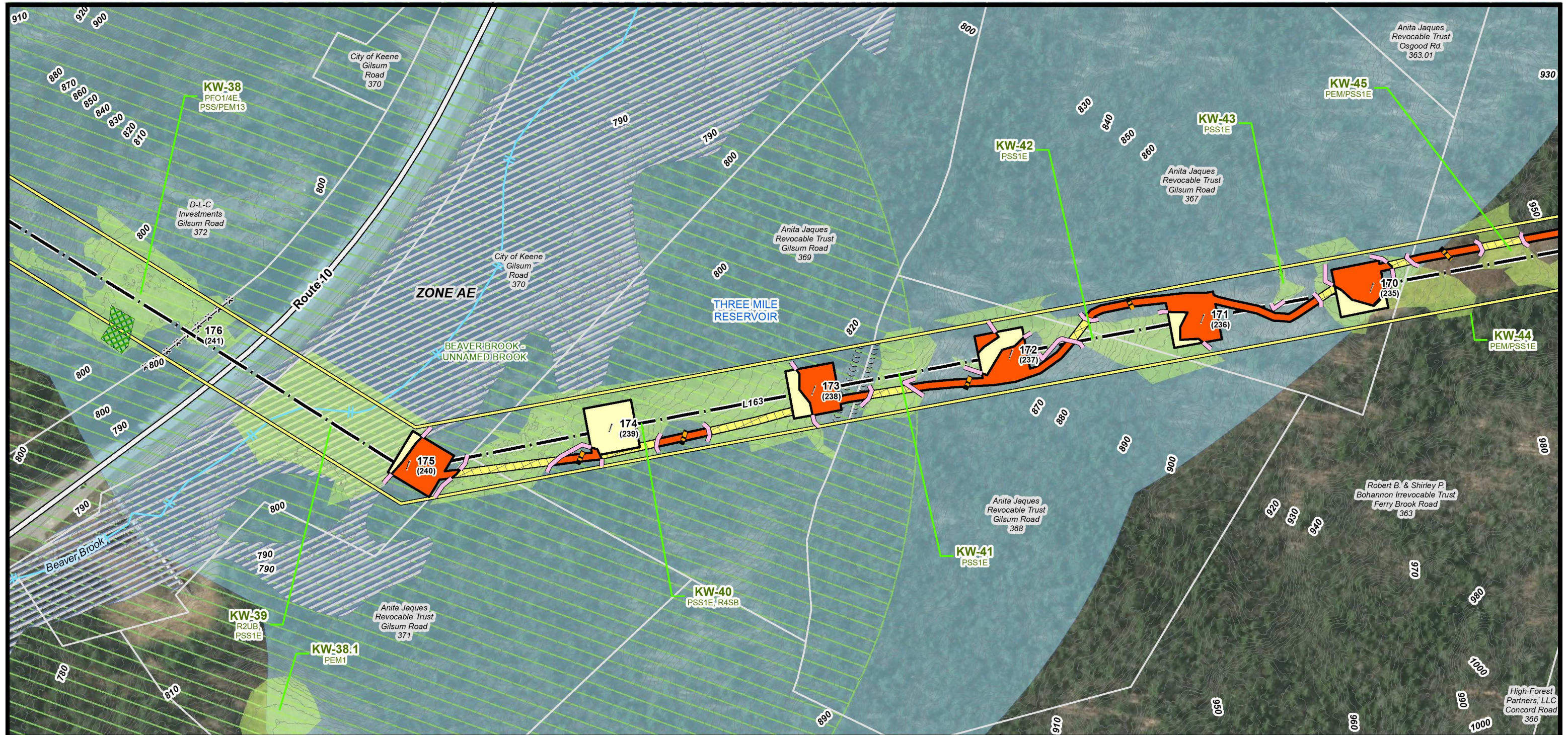
KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
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Project No.: 04.0190923.05 1 inch = 200 Feet

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**Keene**

EXISTING STRUCTURE - NO WORK PROPOSED	SUBSTATION
EXISTING STRUCTURE TO BE REPLACED	DOT ROADS
EXISTING STRUCTURE TO BE WRECKED OUT	NHD FLOWLINE
SHORELAND ZONE	PRIMARY
WORK PAD	SECONDARY
AOT DISTURBANCE	2 FT CONTOURS
TEMPORARY WETLAND IMPACT	STRAW WATTLE
GATE	WATER BAR
ABUTTER PARCEL	TOWN BOUNDARY
EVERSOURCE OWNED PARCEL	WELLHEAD PROTECTION
STATE OWNED PARCEL	WATERSHEDS WITH CHLORIDE IMPAIRMENTS 2016 (NONE)
POTENTIAL VERNAL POOL	WATER SUPPLY INTAKE PROTECTION
EVERSOURCE TRANSMISSION LINE	SURFACE WATERS WITH IMPAIRMENTS 2016 WITH QUARTER MILE BUFFER
APPROXIMATE ROW	OUTSTANDING RESOURCE WATER WATERSHEDS (NONE)
FENCE	LAKES WITH A QUARTER MILE BUFFER (CLASS A SURFACE WATERS RSA485A9) (NONE)
STONE WALL	
WETLAND	

**Current Town: Keene**

LAKES WITH A QUARTER MILE BUFFER
GROUNDWATER CLASSIFICATION AREAS GAA (NONE)
GROUNDWATER CLASSIFICATION AREAS GA2
GROUNDWATER CLASSIFICATION AREAS GA1 (NONE)
DESIGNATED RIVERS QUARTERMILE BUFFER
COASTAL AND GREAT BAY REGION COMMUNITIES (NONE)
ALL FEATURES (CLASS A SURFACE WATERS RSA485A9)
LOCAL POTENTIAL CONTAMINATION SOURCES
FEMA FLOOD ZONE

**Hillsborough**

0 50 100 200 Feet

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**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

**SURFACE WATER AND GROUNDWATER  
OVERLAY PLANS  
JANUARY 21, 2020**

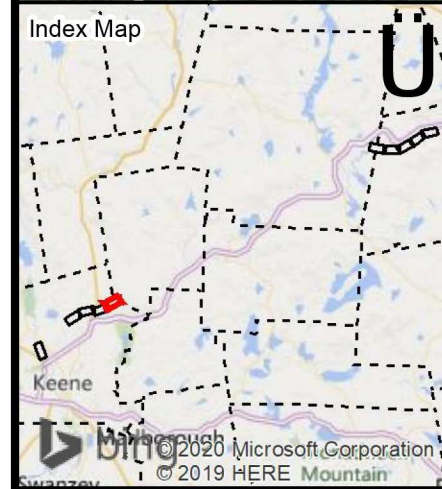
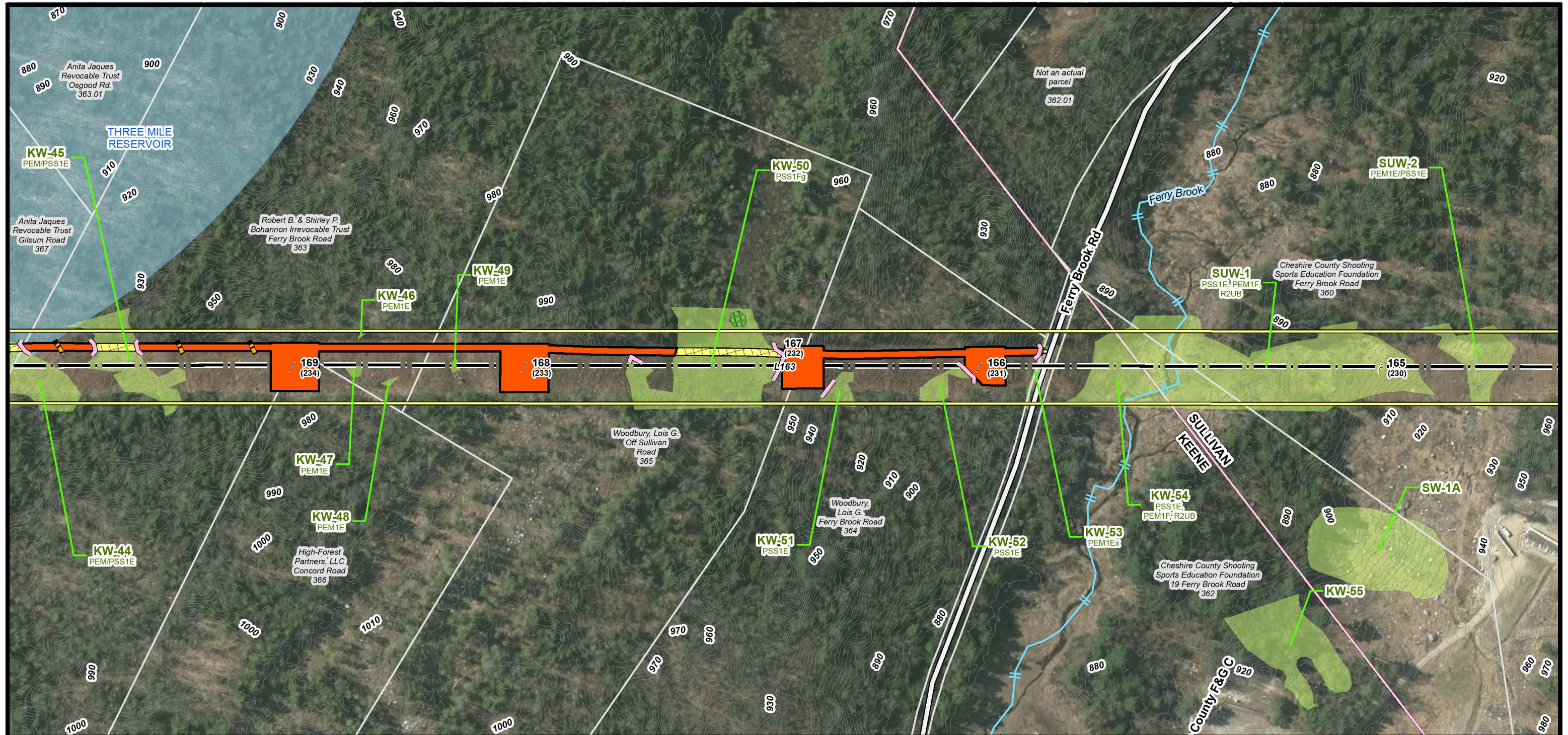
KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE

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Project No.: 04.0190923.05 1 inch = 200 Feet

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Keene	
EXISTING STRUCTURE - NO WORK PROPOSED	SUBSTATION
EXISTING STRUCTURE TO BE REPLACED	DOT ROADS
EXISTING STRUCTURE TO BE WRECKED OUT	NHD FLOWLINE
SHORELAND ZONE	PRIMARY
WORK PAD	SECONDARY
AOT DISTURBANCE	2 FT CONTOURS
TEMPORARY WETLAND IMPACT	STRAW WATTLE
GATE	WATER BAR
ABUTTER PARCEL	TOWN BOUNDARY
EVERSOURCE OWNED PARCEL	WELLHEAD PROTECTION
STATE OWNED PARCEL	WATERSHEDS WITH CHLORIDE IMPAIRMENTS 2016 (NONE)
POTENTIAL VERNAL POOL	WATER SUPPLY INTAKE PROTECTION
EVERSOURCE TRANSMISSION LINE	SURFACE WATERS WITH IMPAIRMENTS 2016 WITH QUARTER MILE BUFFER
APPROXIMATE ROW	OUTSTANDING RESOURCE WATER WATERSHEDS (NONE)
FENCE	LAKES WITH A QUARTER MILE BUFFER (CLASS A SURFACE WATERS RSA485A9) (NONE)
STONE WALL	
WETLAND	

Current Town: Keene/Sullivan Hillsborough	
LAKES WITH A QUARTER MILE BUFFER	
GROUNDWATER CLASSIFICATION AREAS GAA (NONE)	
GROUNDWATER CLASSIFICATION AREAS GA2	
GROUNDWATER CLASSIFICATION AREAS GA1 (NONE)	
DESIGNATED RIVERS QUARTERMILE BUFFER	
COASTAL AND GREAT BAY REGION COMMUNITIES (NONE)	
ALL FEATURES (CLASS A SURFACE WATERS RSA485A9)	
LOCAL POTENTIAL CONTAMINATION SOURCES	
FEMA FLOOD ZONE	

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**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

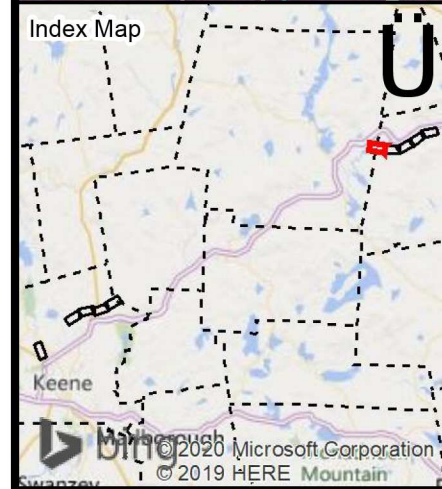
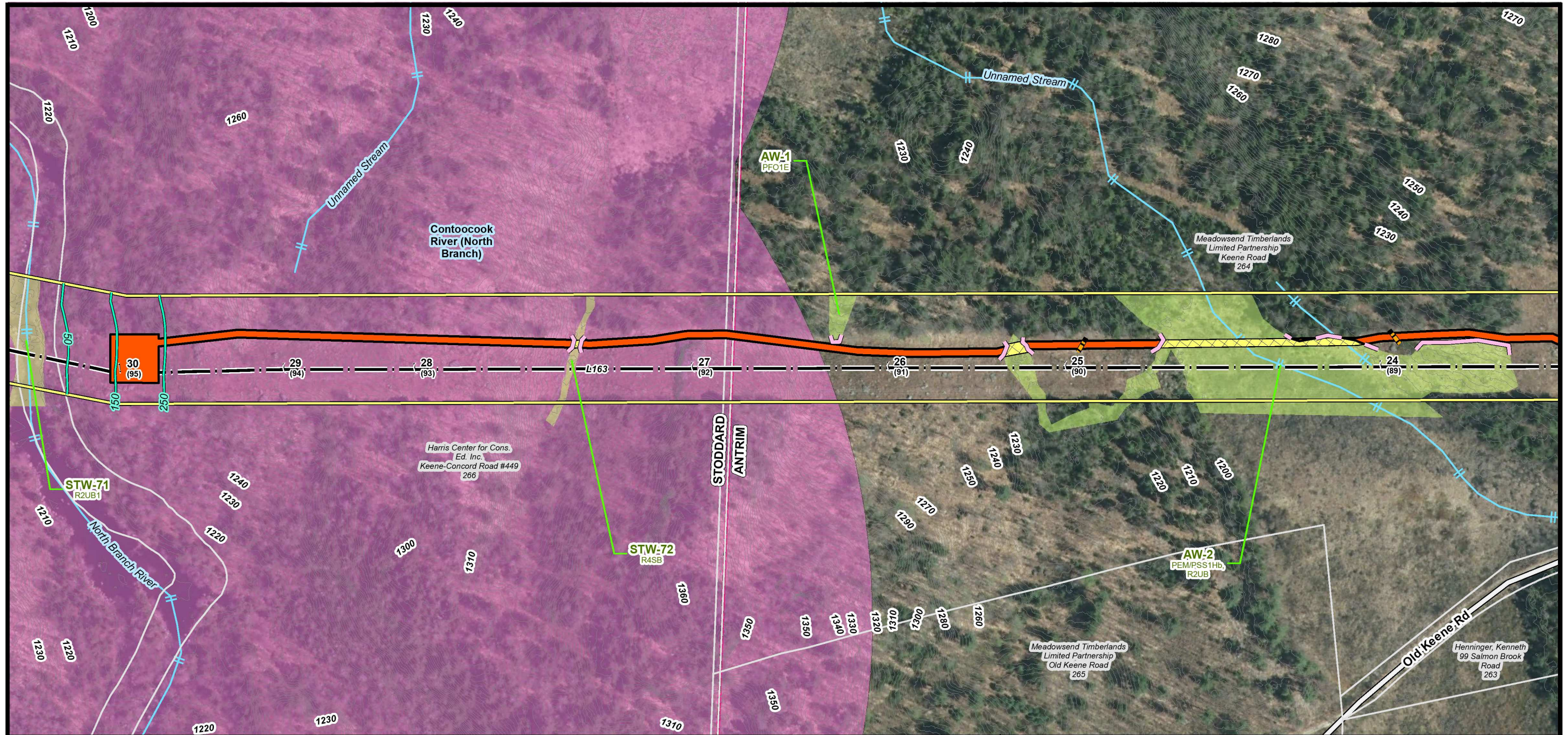
SURFACE WATER AND GROUNDWATER  
OVERLAY PLANS  
JANUARY 21, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 5 OF 11

Project No.: 04.0190923.05 1 inch = 200 Feet

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Keene	Current Town: Stoddard/Antrim	Hillsborough
<ul style="list-style-type: none"> <li>EXISTING STRUCTURE - NO WORK PROPOSED</li> <li>EXISTING STRUCTURE TO BE REPLACED</li> <li>EXISTING STRUCTURE TO BE WRECKED OUT</li> <li>SHORELAND ZONE</li> <li>WORK PAD</li> <li>AOT DISTURBANCE</li> <li>TEMPORARY WETLAND IMPACT</li> <li>GATE</li> <li>ABUTTER PARCEL</li> <li>EVERSOURCE OWNED PARCEL</li> <li>STATE OWNED PARCEL</li> <li>POTENTIAL VERNAL POOL</li> <li>EVERSOURCE TRANSMISSION LINE</li> <li>APPROXIMATE ROW</li> <li>FENCE</li> <li>STONE WALL</li> <li>WETLAND</li> </ul>	<ul style="list-style-type: none"> <li>SUBSTATION</li> <li>DOT ROADS</li> <li>NHD FLOWLINE</li> <li>PRIMARY</li> <li>SECONDARY</li> <li>2 FT CONTOURS</li> <li>STRAW WATTLE</li> <li>WATER BAR</li> <li>TOWN BOUNDARY</li> <li>WELLHEAD PROTECTION</li> <li>WATERSHEDS WITH CHLORIDE IMPAIRMENTS 2016 (NONE)</li> <li>WATER SUPPLY INTAKE PROTECTION</li> <li>SURFACE WATERS WITH IMPAIRMENTS 2016 WITH QUARTER MILE BUFFER</li> <li>OUTSTANDING RESOURCE WATER WATERSHEDS (NONE)</li> <li>LAKES WITH A QUARTER MILE BUFFER (CLASS A SURFACE WATERS RSA485A9) (NONE)</li> </ul>	<ul style="list-style-type: none"> <li>LAKES WITH A QUARTER MILE BUFFER</li> <li>GROUNDWATER CLASSIFICATION AREAS GAA (NONE)</li> <li>GROUNDWATER CLASSIFICATION AREAS GA2</li> <li>GROUNDWATER CLASSIFICATION AREAS GA1 (NONE)</li> <li>DESIGNATED RIVERS QUARTERMILE BUFFER</li> <li>COASTAL AND GREAT BAY REGION COMMUNITIES (NONE)</li> <li>ALL FEATURES (CLASS A SURFACE WATERS RSA485A9)</li> <li>LOCAL POTENTIAL CONTAMINATION SOURCES</li> <li>FEMA FLOOD ZONE</li> </ul>

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**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

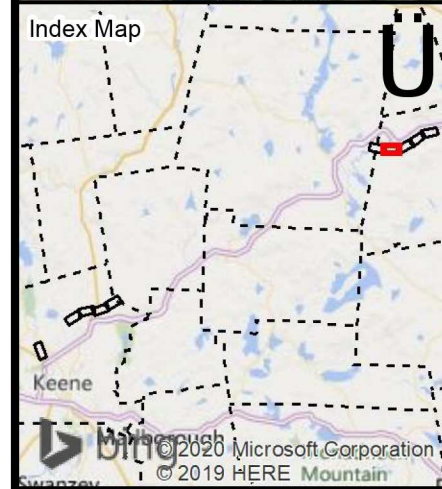
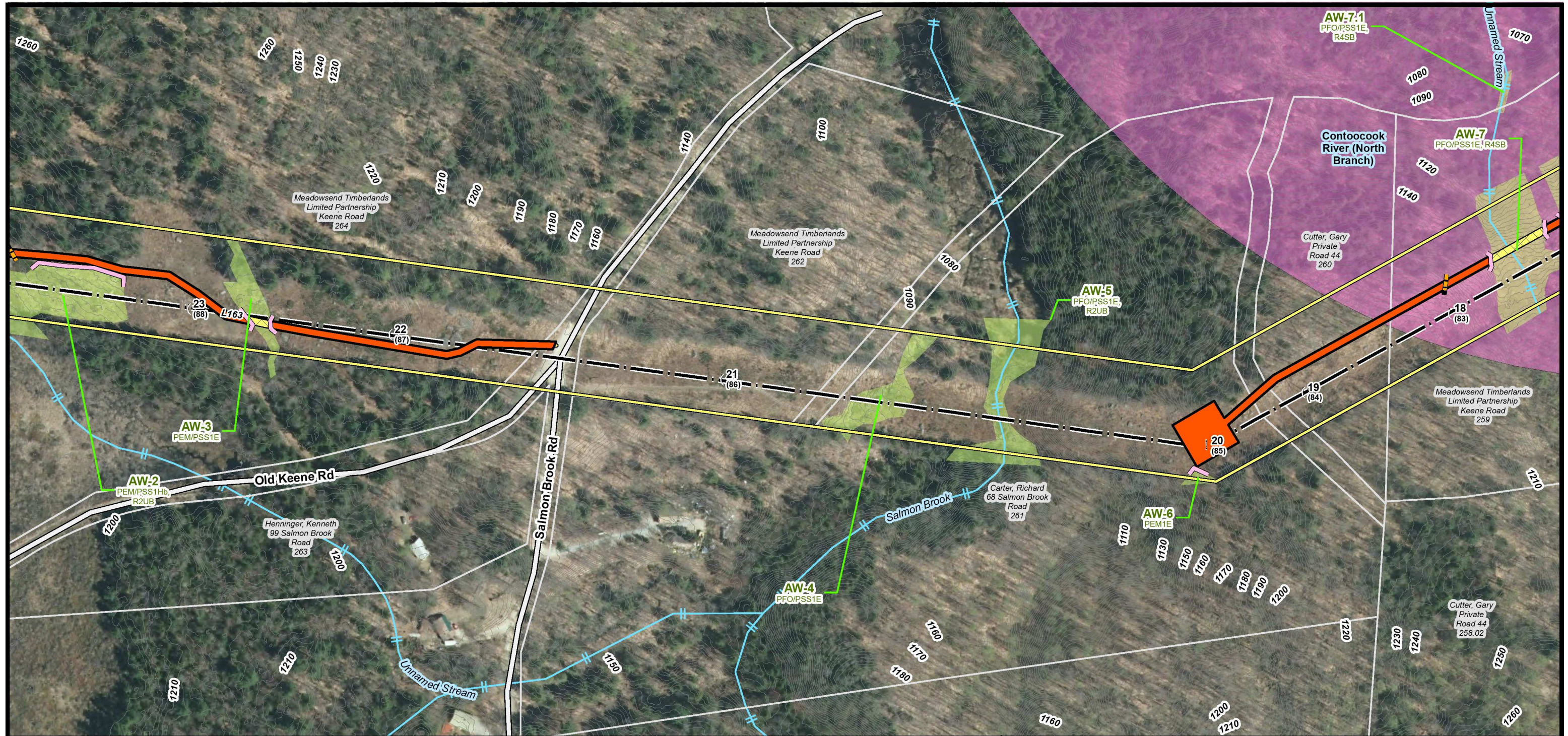
SURFACE WATER AND GROUNDWATER  
OVERLAY PLANS  
JANUARY 21, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 6 OF 11

Project No.: 04.0190923.05 1 inch = 200 Feet

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<p><b>Keene</b></p> <ul style="list-style-type: none"> <li>EXISTING STRUCTURE - NO WORK PROPOSED</li> <li>EXISTING STRUCTURE TO BE REPLACED</li> <li>EXISTING STRUCTURE TO BE WRECKED OUT</li> <li>SHORELAND ZONE</li> <li>WORK PAD</li> <li>AOT DISTURBANCE</li> <li>TEMPORARY WETLAND IMPACT</li> <li>GATE</li> <li>ABUTTER PARCEL</li> <li>EVERSOURCE OWNED PARCEL</li> <li>STATE OWNED PARCEL</li> <li>POTENTIAL VERNAL POOL</li> <li>EVERSOURCE TRANSMISSION LINE</li> <li>APPROXIMATE ROW</li> <li>FENCE</li> <li>STONE WALL</li> <li>WETLAND</li> </ul>	<p><b>Current Town: Antrim</b></p> <ul style="list-style-type: none"> <li>LAKES WITH A QUARTER MILE BUFFER</li> <li>GROUNDWATER CLASSIFICATION AREAS GAA (NONE)</li> <li>GROUNDWATER CLASSIFICATION AREAS GA2</li> <li>GROUNDWATER CLASSIFICATION AREAS GA1 (NONE)</li> <li>DESIGNATED RIVERS QUARTERMILE BUFFER</li> <li>COASTAL AND GREAT BAY REGION COMMUNITIES (NONE)</li> <li>ALL FEATURES (CLASS A SURFACE WATERS RSA485A9)</li> <li>LOCAL POTENTIAL CONTAMINATION SOURCES</li> <li>FEMA FLOOD ZONE</li> </ul> <p><b>Hillsborough</b></p>
<ul style="list-style-type: none"> <li>SUBSTATION</li> <li>DOT ROADS</li> <li>NHD FLOWLINE</li> <li>PRIMARY</li> <li>SECONDARY</li> <li>2 FT CONTOURS</li> <li>STRAW WATTLE</li> <li>WATER BAR</li> <li>TOWN BOUNDARY</li> <li>WELLHEAD PROTECTION</li> <li>WATERSHEDS WITH CHLORIDE IMPAIRMENTS 2016 (NONE)</li> <li>WATER SUPPLY INTAKE PROTECTION</li> <li>SURFACE WATERS WITH IMPAIRMENTS 2016 WITH QUARTER MILE BUFFER</li> <li>OUTSTANDING RESOURCE WATER WATERSHEDS (NONE)</li> <li>LAKES WITH A QUARTER MILE BUFFER (CLASS A SURFACE WATERS RSA485A9) (NONE)</li> </ul>	<p><b>NOTES:</b></p> <ol style="list-style-type: none"> <li>AERIAL IMAGERY WAS OBTAINED FROM UNH GRANIT AND DATED TO 2015.</li> <li>THE LAYERS TITLED "NHD FLOWLINE", "DOT ROADS", "PARCEL BOUNDARY," AND "TOWN BOUNDARY" WERE OBTAINED FROM UNH GRANIT.</li> <li>THE LAYER TITLED "WETLAND" WAS DELINEATED BY GZA, GEOENVIRONMENTAL, INC. IN 2016 AND SURVEYED BY DOUCET SURVEY, INC. IN 2016.</li> <li>L163 STRUCTURE DATA WAS PROVIDED BY EVERSOURCE ENERGY.</li> <li>PROPOSED ACCESS ROUTES AND WORK PAD LOCATIONS HAVE NOT BEEN FIELD VERIFIED.</li> <li>2 FOOT GROUND SURFACE ELEVATION CONTOURS WERE OBTAINED FROM UNH GRANIT.</li> <li>AOT SCREENING LAYERS WERE PROVIDED BY NHDES.</li> </ol>

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2020 STRUCTURE  
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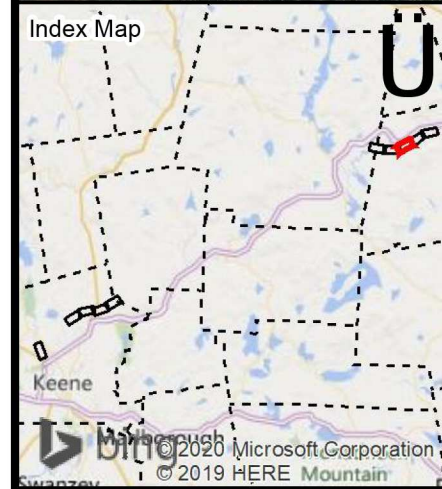
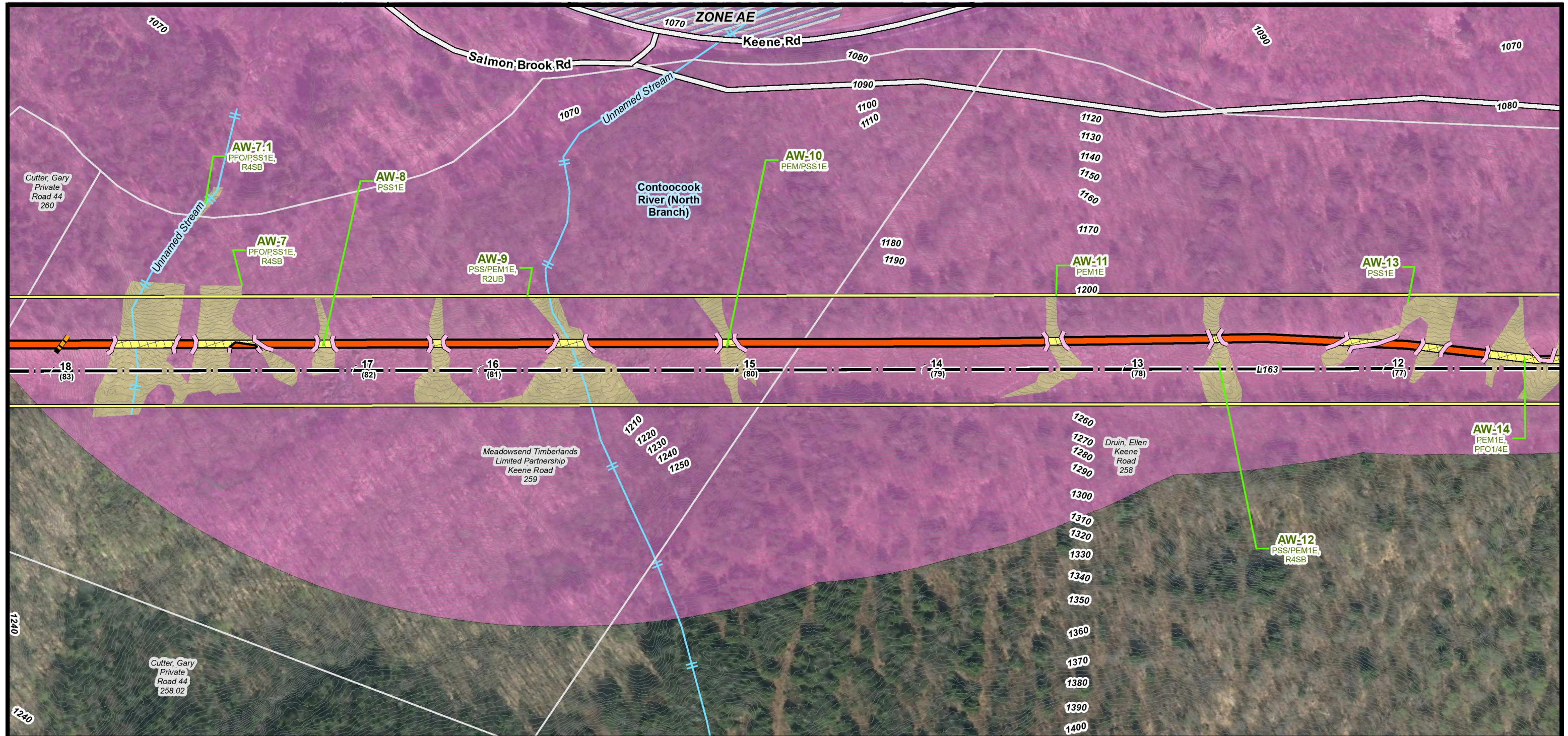
**SURFACE WATER AND GROUNDWATER  
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KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
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Project No.: 04.0190923.05 1 inch = 200 Feet

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**Keene**

EXISTING STRUCTURE - NO WORK PROPOSED	SUBSTATION
EXISTING STRUCTURE TO BE REPLACED	DOT ROADS
EXISTING STRUCTURE TO BE WRECKED OUT	NHD FLOWLINE
SHORELAND ZONE	PRIMARY
WORK PAD	SECONDARY
AOT DISTURBANCE	2 FT CONTOURS
TEMPORARY WETLAND IMPACT	STRAW WATTLE
GATE	WATER BAR
ABUTTER PARCEL	TOWN BOUNDARY
EVERSOURCE OWNED PARCEL	WELLHEAD PROTECTION
STATE OWNED PARCEL	WATERSHEDS WITH CHLORIDE IMPAIRMENTS 2016 (NONE)
POTENTIAL VERNAL POOL	WATER SUPPLY INTAKE PROTECTION
EVERSOURCE TRANSMISSION LINE	SURFACE WATERS WITH IMPAIRMENTS 2016 WITH QUARTER MILE BUFFER
APPROXIMATE ROW	OUTSTANDING RESOURCE WATER WATERSHEDS (NONE)
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STONE WALL	
WETLAND	

**Current Town: Antrim**

LAKES WITH A QUARTER MILE BUFFER
GROUNDWATER CLASSIFICATION AREAS GAA (NONE)
GROUNDWATER CLASSIFICATION AREAS GA2
GROUNDWATER CLASSIFICATION AREAS GA1 (NONE)
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COASTAL AND GREAT BAY REGION COMMUNITIES (NONE)
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LOCAL POTENTIAL CONTAMINATION SOURCES
FEMA FLOOD ZONE

**Hillsborough**

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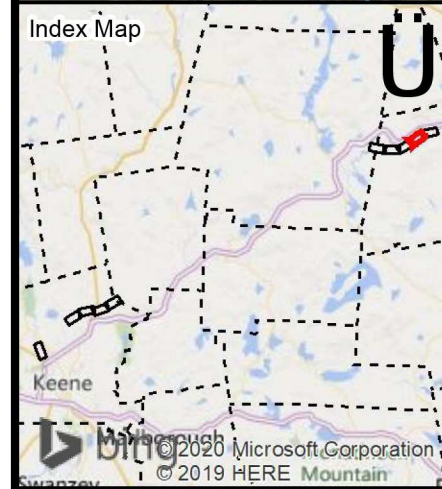
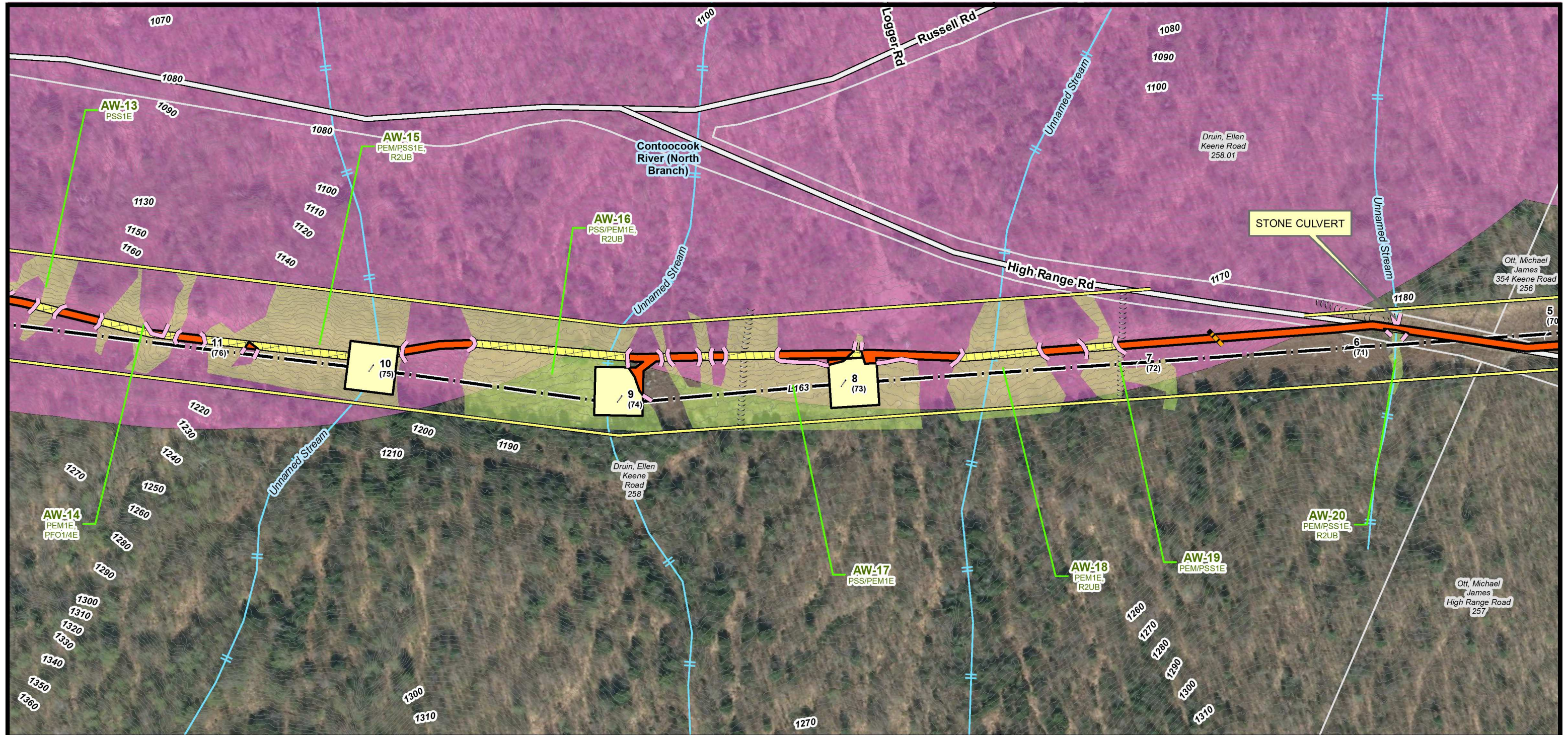
**SURFACE WATER AND GROUNDWATER  
OVERLAY PLANS  
JANUARY 21, 2020**

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
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Project No.: 04.0190923.05      1 inch = 200 Feet

**EVERSOURCE ENERGY**

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**Keene**

—	EXISTING STRUCTURE - NO WORK PROPOSED	□	SUBSTATION
- - -	EXISTING STRUCTURE TO BE REPLACED	—	DOT ROADS
⊥	EXISTING STRUCTURE TO BE WRECKED OUT	+	NHD FLOWLINE
—	SHORELAND ZONE	—	PRIMARY
□	WORK PAD	—	SECONDARY
□	AOT DISTURBANCE	—	2 FT CONTOURS
□	TEMPORARY WETLAND IMPACT	—	STRAW WATTLE
—	GATE	—	WATER BAR
□	ABUTTER PARCEL	—	TOWN BOUNDARY
□	EVERSOURCE OWNED PARCEL	—	WELLHEAD PROTECTION
□	STATE OWNED PARCEL	—	WATERSHEDS WITH CHLORIDE IMPAIRMENTS 2016 (NONE)
□	POTENTIAL VERNAL POOL	—	WATER SUPPLY INTAKE PROTECTION
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—	STONE WALL	—	
—	WETLAND		

**Current Town: Antrim**

—	LAKES WITH A QUARTER MILE BUFFER
—	GROUNDWATER CLASSIFICATION AREAS GAA (NONE)
—	GROUNDWATER CLASSIFICATION AREAS GA2
—	GROUNDWATER CLASSIFICATION AREAS GA1 (NONE)
—	DESIGNATED RIVERS QUARTERMILE BUFFER
—	COASTAL AND GREAT BAY REGION COMMUNITIES (NONE)
—	ALL FEATURES (CLASS A SURFACE WATERS RSA485A9)
—	LOCAL POTENTIAL CONTAMINATION SOURCES
—	FEMA FLOOD ZONE

**Hillsborough**

**NOTES:**

1. AERIAL IMAGERY WAS OBTAINED FROM UNH GRANIT AND DATED TO 2015.
2. THE LAYERS TITLED "NHD FLOWLINE", "DOT ROADS", "PARCEL BOUNDARY", AND "TOWN BOUNDARY" WERE OBTAINED FROM UNH GRANIT.
3. THE LAYER TITLED "WETLAND" WAS DELINEATED BY GZA, GEOENVIRONMENTAL, INC. IN 2016 AND SURVEYED BY DOUCET SURVEY, INC. IN 2016.
4. L163 STRUCTURE DATA WAS PROVIDED BY EVERSOURCE ENERGY.
5. PROPOSED ACCESS ROUTES AND WORK PAD LOCATIONS HAVE NOT BEEN FIELD VERIFIED.
6. 2 FOOT GROUND SURFACE ELEVATION CONTOURS WERE OBTAINED FROM UNH GRANIT.
7. AOT SCREENING LAYERS WERE PROVIDED BY NHDES.

**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

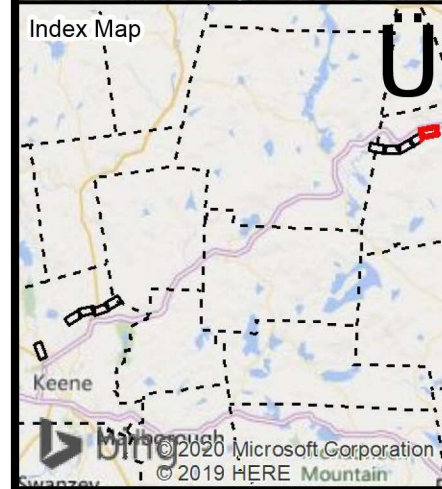
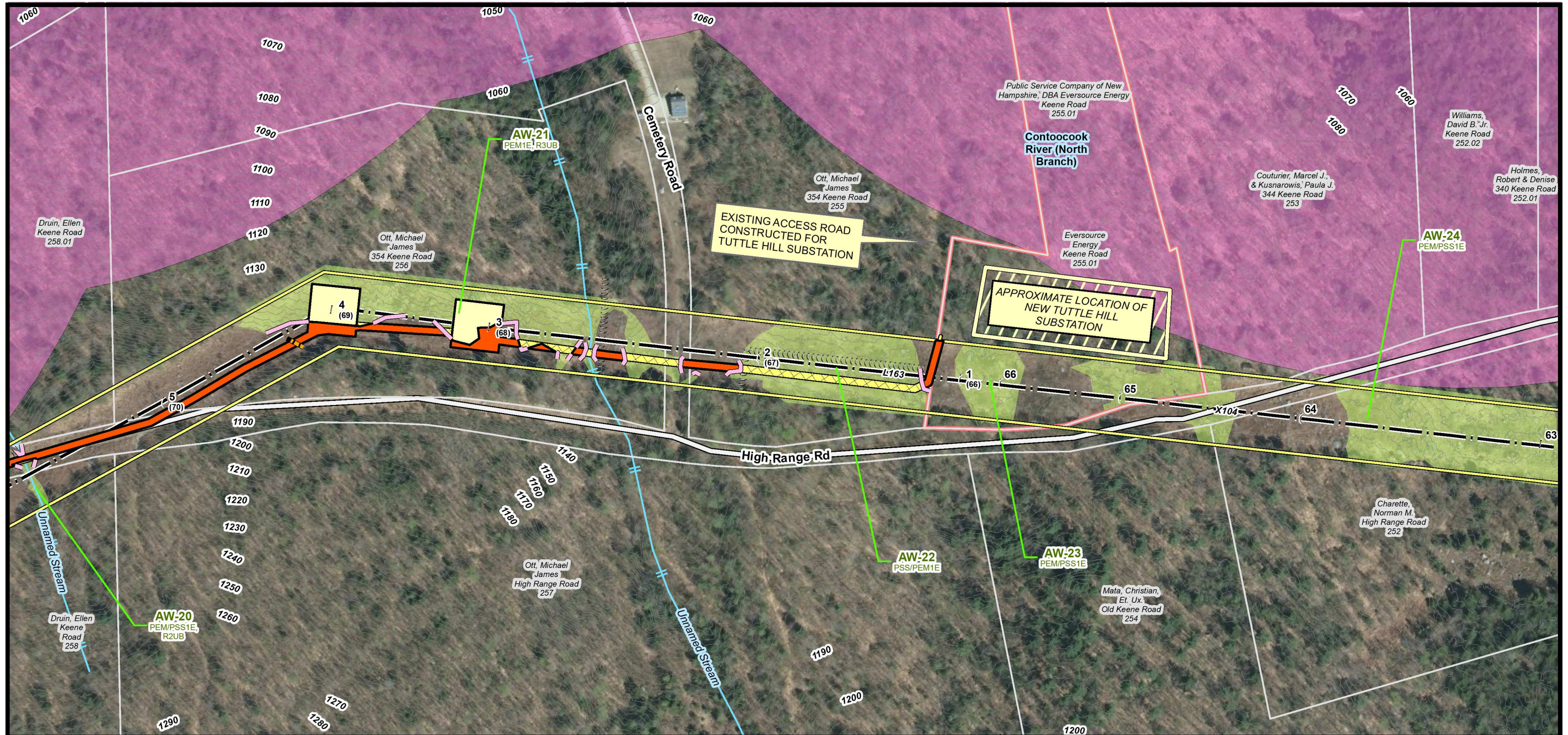
**SURFACE WATER AND GROUNDWATER  
OVERLAY PLANS  
JANUARY 21, 2020**

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 9 OF 11

Project No.: 04.0190923.05      1 inch = 200 Feet

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Keene	
—	EXISTING STRUCTURE - NO WORK PROPOSED
- - -	EXISTING STRUCTURE TO BE REPLACED
⋈	EXISTING STRUCTURE TO BE WRECKED OUT
—	SHORELAND ZONE
—	WORK PAD
—	AOT DISTURBANCE
—	TEMPORARY WETLAND IMPACT
—	GATE
—	ABUTTER PARCEL
—	EVERSOURCE OWNED PARCEL
—	STATE OWNED PARCEL
—	POTENTIAL VERNAL POOL
—	EVERSOURCE TRANSMISSION LINE
—	APPROXIMATE ROW
—	FENCE
—	STONE WALL
—	WETLAND
—	SUBSTATION
—	DOT ROADS
—	NHD FLOWLINE
—	PRIMARY
—	SECONDARY
—	2 FT CONTOURS
—	STRAW WATTLE
—	WATER BAR
—	TOWN BOUNDARY
—	WELLHEAD PROTECTION
—	WATERSHEDS WITH CHLORIDE IMPAIRMENTS 2016 (NONE)
—	WATER SUPPLY INTAKE PROTECTION
—	SURFACE WATERS WITH IMPAIRMENTS 2016 WITH QUARTER MILE BUFFER
—	OUTSTANDING RESOURCE WATER WATERSHEDS (NONE)
—	LAKES WITH A QUARTER MILE BUFFER (CLASS A SURFACE WATERS RSA485A9) (NONE)

Current Town: Antrim	
—	LAKES WITH A QUARTER MILE BUFFER
—	GROUNDWATER CLASSIFICATION AREAS GAA (NONE)
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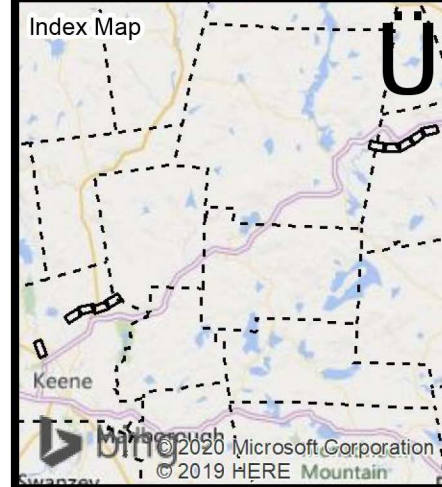
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[Symbol]	WORK PAD
[Symbol]	AOT DISTURBANCE
[Symbol]	TEMPORARY WETLAND IMPACT
[Symbol]	GATE
[Symbol]	ABUTTER PARCEL
[Symbol]	EVERSOURCE OWNED PARCEL
[Symbol]	STATE OWNED PARCEL
[Symbol]	POTENTIAL VERNAL POOL
[Symbol]	EVERSOURCE TRANSMISSION LINE
[Symbol]	APPROXIMATE ROW
[Symbol]	FENCE
[Symbol]	STONE WALL
[Symbol]	WETLAND

Current Town: Antrim	
[Symbol]	SUBSTATION
[Symbol]	DOT ROADS
[Symbol]	NHD FLOWLINE
[Symbol]	PRIMARY
[Symbol]	SECONDARY
[Symbol]	2 FT CONTOURS
[Symbol]	STRAW WATTLE
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Project No.: 04.0190923.05 1 inch = 200 Feet

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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 WITHIN THE RIGHT OF WAY. CONSTRUCTION ACTIVITIES SHALL OCCUR DURING PERIODS OF LOW FLOW.
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. ALL OPERATIONS SHALL BE CONFINED TO THE SPECIFIED ACCESS ROUTES WITHIN THE PROPOSED WETLAND IMPACT AREA. ALL ACCESS ROUTES SHALL NOT EXCEED A 16 FOOT-WIDTH.
7. IMPACT TO VEGETATION WITHIN WETLANDS WILL BE LIMITED TO THE EXTENT NECESSARY TO PLACE THE SWAMP MATS WHERE REQUIRED.
8. ALL 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 EXCAVATIONS IS NEEDED FOR ACCESS.
9. SWAMP MATS WILL BE USED ALONG ALL 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 SWAMP MAT BMP IS NOT SUFFICIENT DUE TO HIGH WATER, ADDITIONAL BMP'S MAY INCLUDE THE PLACEMENT OF GEOTEXTILE FABRIC, 3"-4" STONE, AND GRAVEL TO PROVIDE A SUITABLE ROAD BED. A TEMPORARY CULVERT MAY BE REQUIRED IN AREAS OF HIGH FLOW 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 OR FOUNDATION PLACEMENT OR STABILIZATION. ALL EXCESS MATERIAL TAKEN FROM THE WETLAND WILL BE REMOVED FROM THE SITE.
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.
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. REMOVAL OF THE OLD POLE WILL OCCUR ONCE THE CABLE HAS BEEN INSTALLED ON THE NEW STRUCTURE. THE OLD STRUCTURES WILL BE REMOVED FROM THE SITE. POLES WILL BE CUT AT THE GROUND SURFACE. FOOTINGS WILL BE ABANDONED IN PLACE TO MINIMIZE IMPACTS.
17. ALL SWAMP MATS, MATERIAL, AND DEBRIS WILL BE REMOVED FROM THE WORK AREA UPON THE COMPLETION OF CONSTRUCTION.
18. 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.
19. ALL TEMPORARY WETLAND IMPACTS WILL BE RE-GRADED TO ORIGINAL CONTOURS FOLLOWING CONSTRUCTION. NEW ENGLAND EROSION CONTROL/RESTORATION MIX, AVAILABLE THROUGH NEW ENGLAND WETLAND PLANTS, INC., 820 WEST STREET, AMHERST, MA 01002, 413-548-8000, OR EQUIVALENT SEED MIX SHALL BE APPLIED IN WETLAND AREAS THAT ARE NOT INUNDATED, AS NECESSARY.
20. SEDIMENT AND EROSION CONTROL MEASURES WILL BE EVALUATED AND REMOVED IF NECESSARY UPON THE COMPLETION OF CONSTRUCTION.

WINTER CONSTRUCTION NOTES

1. ALL 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. ALL 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: EVERSOURCE ENERGY  
13 LEGENDS DRIVE  
HOOKSETT, NH 03106

1. BASE PLAN PROVIDED BY EVERSOURCE ENERGY. EVERSOURCE ENERGY PROVIDED THE WETLAND DATA. EVERSOURCE ENERGY PROVIDED THE UTILITY DESIGN.
2. JURISDICTIONAL WETLANDS WERE DELINEATED BY TIGHE AND BOND IN 2018, 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. WETLANDS WERE REVIEWED BY GZA GEOENVIRONMENTAL, INC. IN JANUARY AND FEBRUARY 2019.
3. GZA EVALUATED WETLANDS AS POTENTIAL VERNAL POOLS ON FEBRUARY 6, 12, AND 15, 2019 IN ACCORDANCE WITH "IDENTIFICATION AND DOCUMENTATION OF VERNAL POOLS IN NEW HAMPSHIRE," 1997, NEW HAMPSHIRE FISH AND GAME DEPARTMENT, NONGAME AND ANDANGERED WILDLIFE PROGRAM.
4. GZA PERFORMED A WETLANDS FUNCTION AND VALUES ASSESSMENT IN ACCORDANCE WITH THE ACOE'S "HIGHWAY METHODOLOGY WORKBOOK SUPPLEMENT," SEPTEMBER 1999, IN THE TOWN OF STRAFFORD.
5. SITE PLAN IS FOR PERMITTING PURPOSES ONLY AND DOES NOT REPRESENT A PROPERTY BOUNDARY SURVEY.
6. 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.
7. 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.
8. ALL AREAS SHALL BE STABILIZED WITH 45 DAYS OF INITIAL DISTURBANCE.

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 AGAINST EROSION, AS NECESSARY.
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.

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

L163 TRANSMISSION LINE STRUCTURE REPLACEMENT PROJECT

KEENE, STODDARD, AND ANTRIM  
NEW HAMPSHIRE

NOTES

PREPARED BY:  <b>GZA</b> GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: <b>EVSOURCE</b> ENERGY	
PROJ MGR: AJD	REVIEWED BY: LEW	CHECKED BY: DMZ	SHEET <b>1</b> 1 OF 3
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE:	
DATE: 01/16/2020	PROJECT NO: 04.0190923.05	REVISION NO:	

© 2020 - GZA GeoEnvironmental, Inc. P:\04\jobs\01909023\04\_0190923\_05 - L163 Transmission Line - Structure Replmt Proj\Figures\GIS\2019\_2020\MXD\L163 AOT NOTESHEET 2 - BMPs.mxd, 1/16/2020, 10:58:12 AM, matthew.deane

### Best Management Practices (BMP's) for Straw wattles

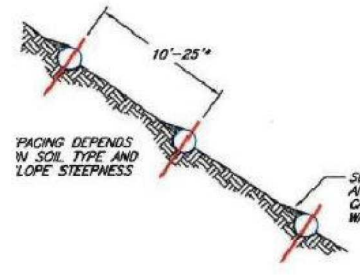
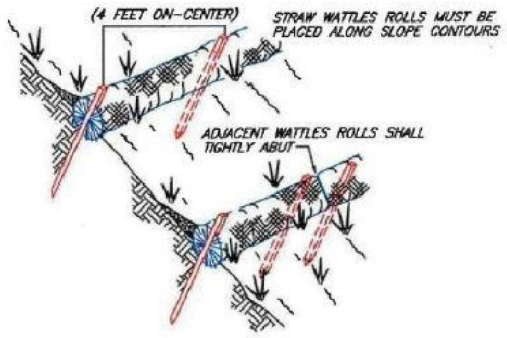
**Definition and purpose:**  
Straw wattles are burlap rolls filled with straw that trap sediment and interrupt water flow by reducing slope lengths.

- Applications:**
- \* Along erodible or unstabilized slopes
  - \* Spread overland waterflow
  - \* Trap sediment
  - \* Around storm drain inlets to slow water and settle out sediment
  - \* Overlap ends approximately 6 inches

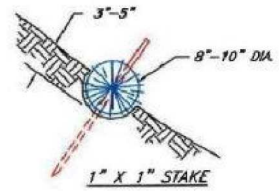
**Installation:**  
Straw wattles are installed parallel to slope contours and perpendicular to sheet flow.

**Spacing\*** - Dependent on slope length, soil steepness and soil type (general range 10 - 25').

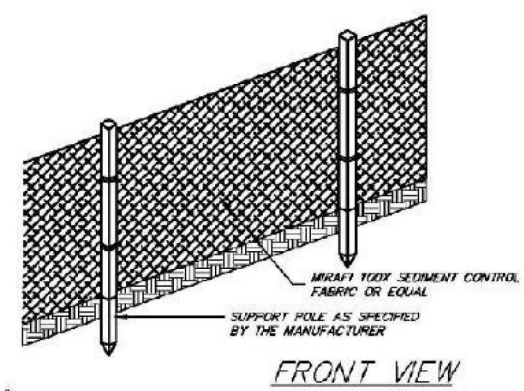
**Trenching** - 2"-5" inch trench  
**Stacking** - at each end and four foot on center (i.e. 25 foot wattle uses 6 stacks)



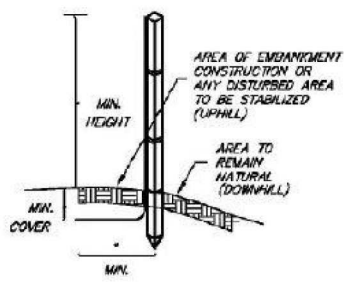
SEDIMENT, ORGANIC MATTER, AND NATIVE SEEDS ARE CAPTURED BEHIND THE WATTLE ROWS.



NOT TO SCALE

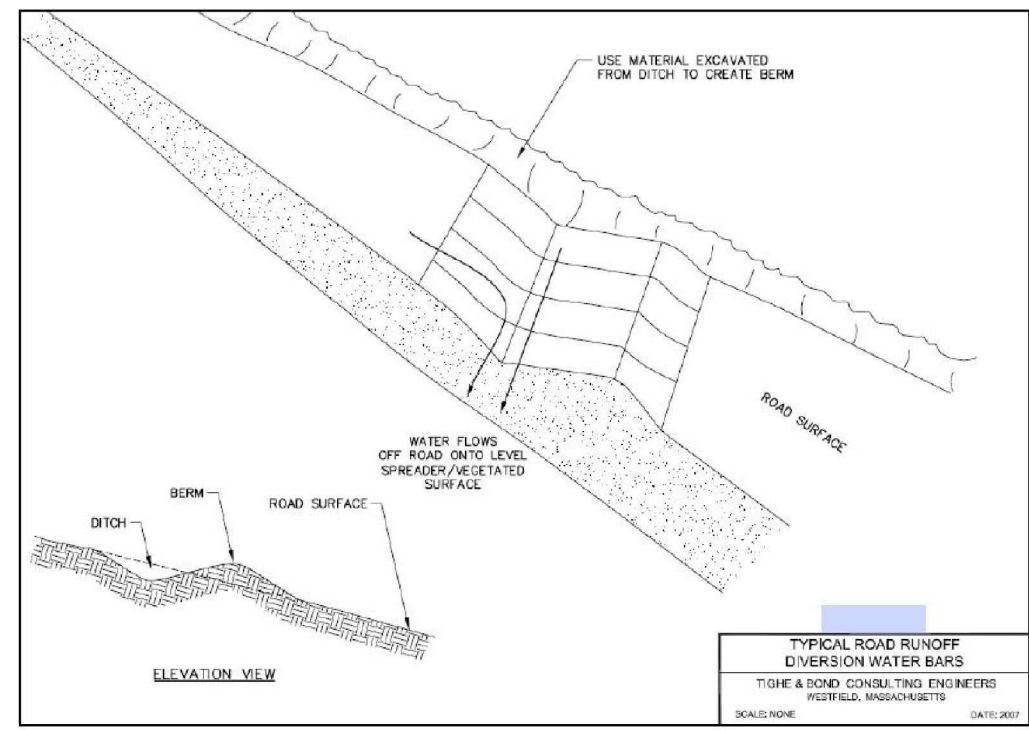


FRONT VIEW

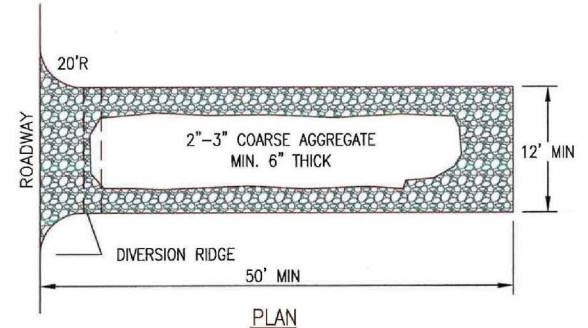


SIDE VIEW

- NOTES (SILT FENCE)**
1. THE HEIGHT OF THE BARRIER SHALL NOT EXCEED 36 INCHES.
  2. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND SECURELY SEALED. SEE MANUFACTURER'S RECOMMENDATIONS.
  3. POSTS SHALL BE PLACED AT A MAXIMUM OF 10 FEET APART AT THE BARRIER LOCATION AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 12 INCHES). WHEN EXTRA STRENGTH FABRIC IS USED WITHOUT THE WIRE SUPPORT FENCE, POST SPACING SHALL BE AS MANUFACTURER RECOMMENDS.
  4. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 6 INCHES WIDE AND 6 INCHES DEEP ALONG THE LINE OF POSTS AND UPSLOPE OF THE BARRIER IN ACCORDANCE WITH RECOMMENDATIONS
  5. THE FABRIC SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE, AND WILL EXTEND A MINIMUM OF 8 INCHES INTO THE TRENCH. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
  6. THE TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE FILTER FABRIC.
  7. FABRIC BARRIERS SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.
  8. FILTER BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST ONCE DAILY DURING PROLONGED RAINFALL AND ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
  9. SHOULD THE FABRIC DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL BE NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.
  10. SEDIMENT DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER.
  11. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE OR FILTER BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.



TYPICAL ROAD RUNOFF DIVERSION WATER BARS  
TIGHE & BOND CONSULTING ENGINEERS  
WESTFIELD, MASSACHUSETTS  
SCALE: NONE DATE: 2007

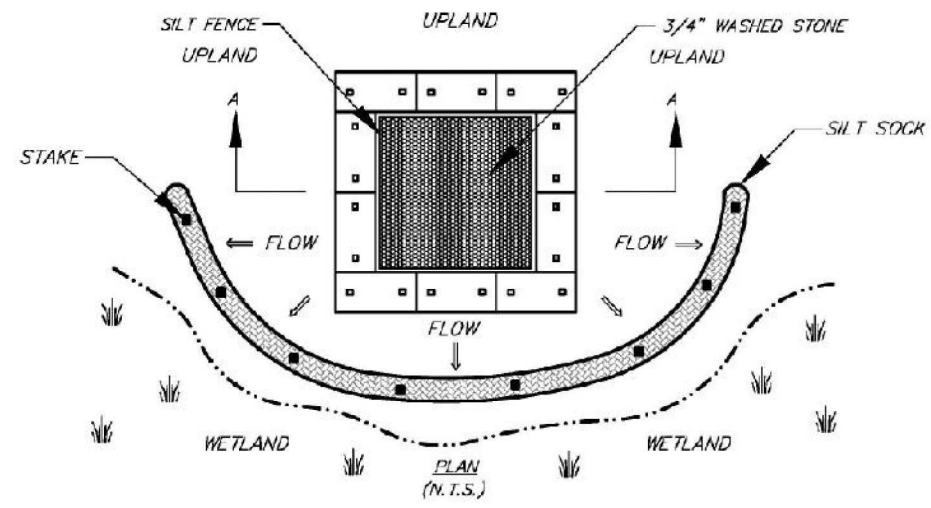


PLAN

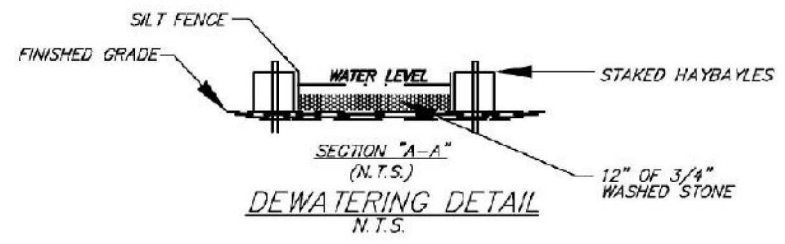
- NOTES:**
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
  2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.

### CONSTRUCTION ENTRANCE

NOT TO SCALE



PLAN (N.T.S.)

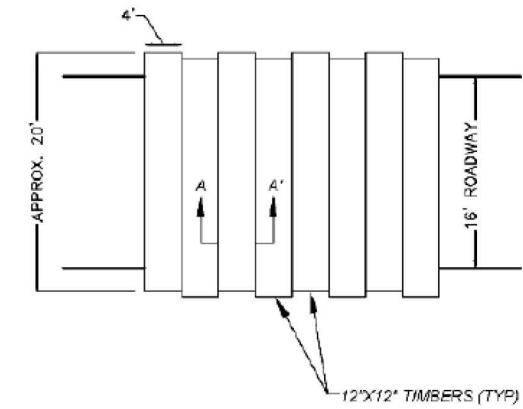
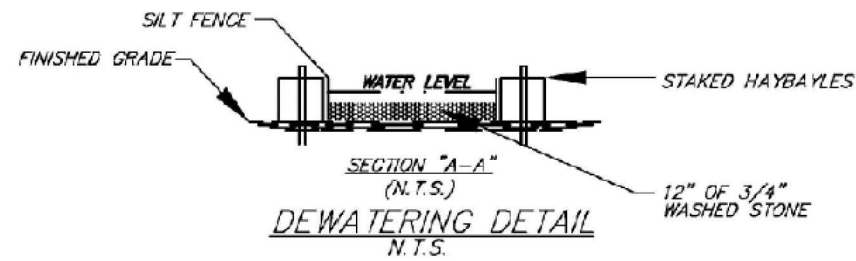
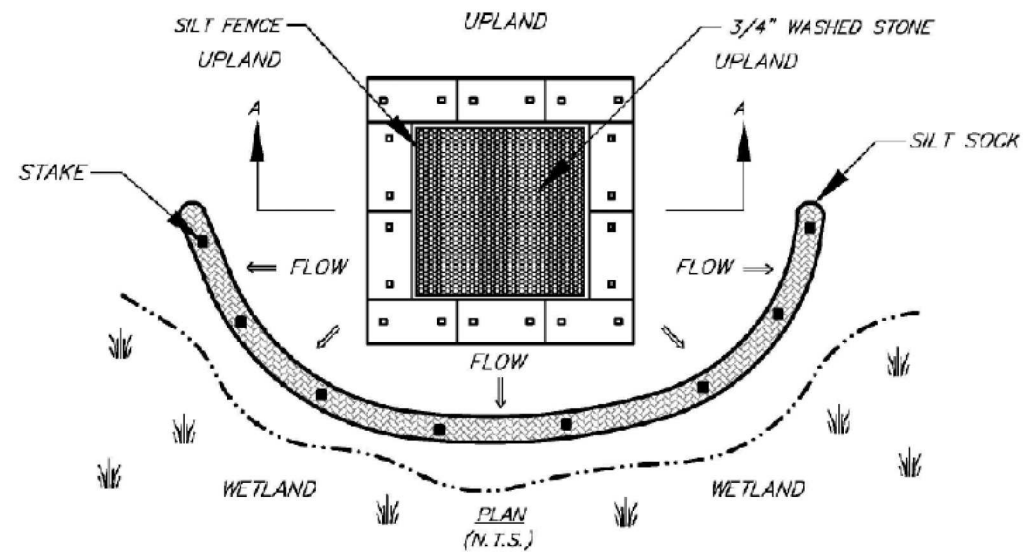


SECTION "A-A" (N.T.S.)  
DEWATERING DETAIL N.T.S.

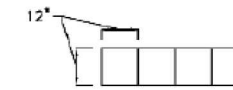
Figure 5

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.			
<b>L163 TRANSMISSION LINE STRUCTURE REPLACEMENT PROJECT</b>			
KEENE, STODDARD, AND ANTRIM NEW HAMPSHIRE			
<b>BMP DETAILS</b>			
PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com	PREPARED FOR: <b>EVERSOURCE ENERGY</b>		
PROJ MGR: AJD	REVIEWED BY: LEW	CHECKED BY: DMZ	SHEET <b>2</b>
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE:	
DATE: 01/16/2020	PROJECT NO: 04.0190923.05	REVISION NO:	

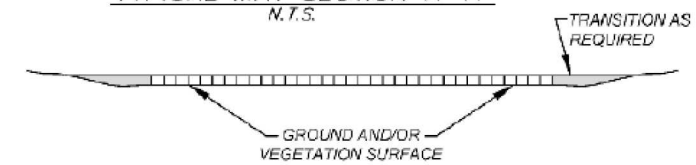
© 2020 - GZA GeoEnvironmental, Inc. P:\04 Jobs\0190923.00 - Eversource MSA\04.0190923.05 - L163 Transmission Line - Structure Replmt Proj\Figures\GIS 2019\_2020\MXD\L163 AOT NOTESHEET 3- BMPs 2.mxd, 1/16/2020, 10:57:09 AM, matthew.deane



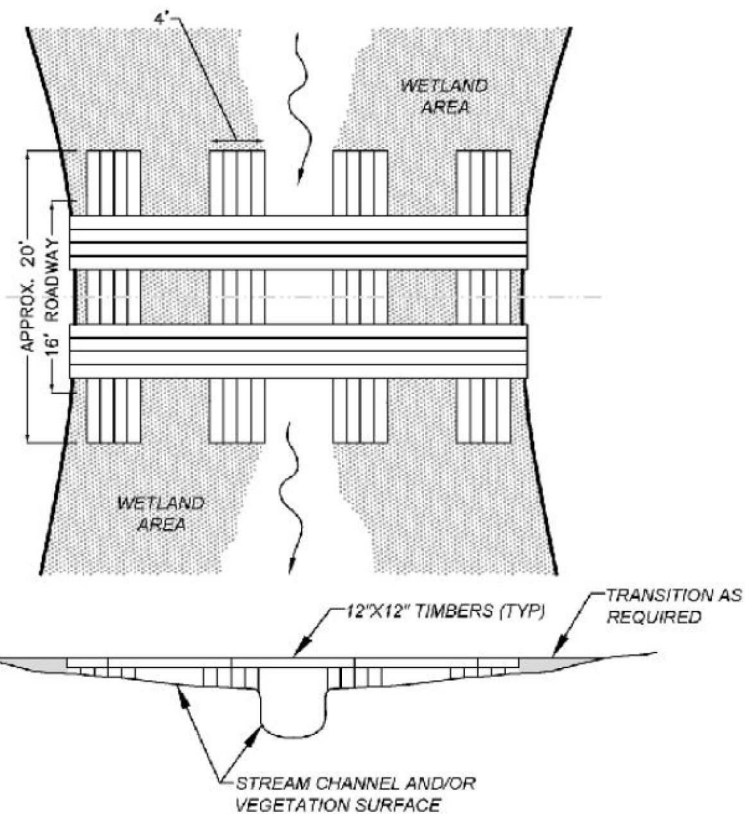
TYPICAL SWAMP MAT PLAN VIEW  
N.T.S.



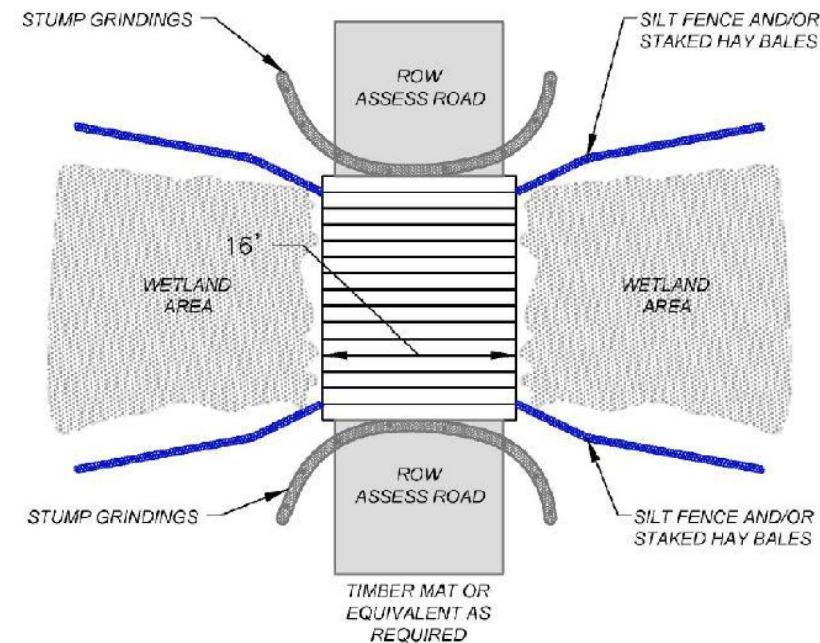
TYPICAL MAT SECTION A-A  
N.T.S.



TYPICAL SWAMP MAT SECTION DETAIL  
N.T.S.



TYPICAL STREAM CROSSING  
N.T.S.



TYPICAL WETLAND CROSSING  
N.T.S.

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L163 TRANSMISSION LINE STRUCTURE REPLACEMENT PROJECT

KEENE, STODDARD, AND ANTRIM  
NEW HAMPSHIRE

BMP DETAILS

PREPARED BY:  
**GZA** GeoEnvironmental, Inc.  
Engineers and Scientists  
www.gza.com

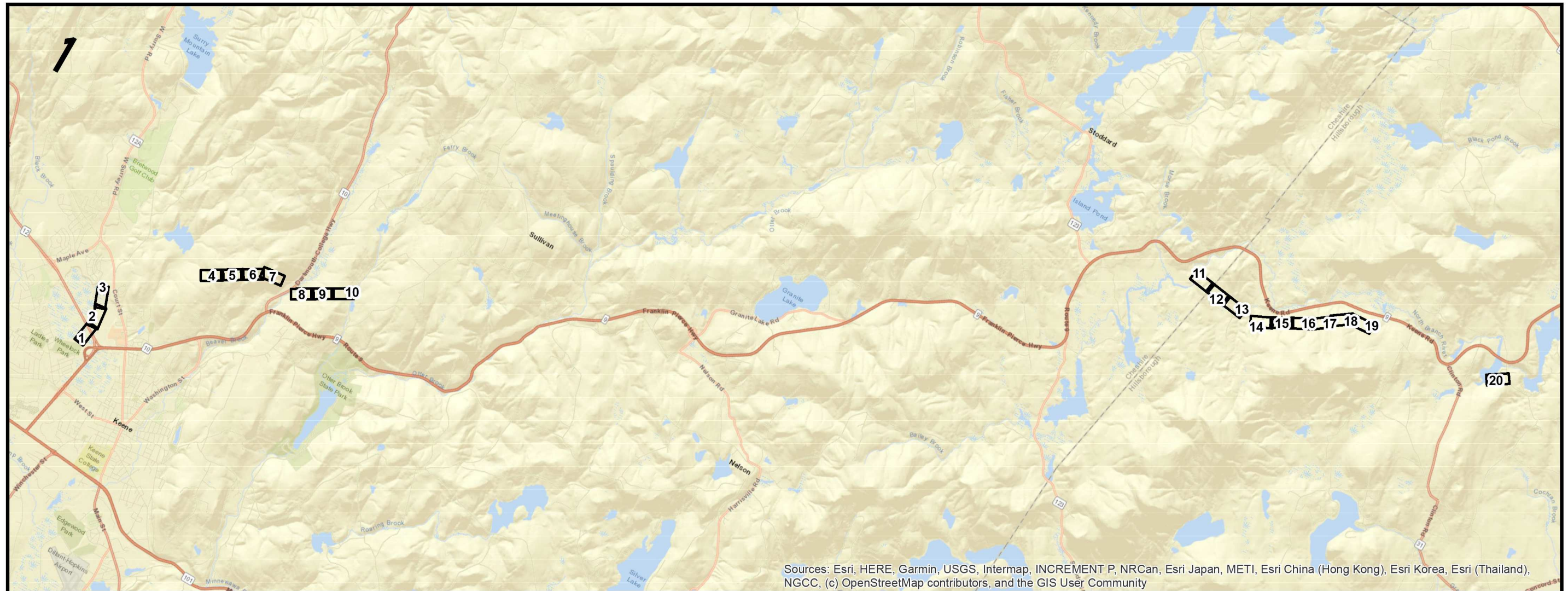
PREPARED FOR:  
**EVERSOURCE**  
ENERGY

PROJ MGR: AJD	REVIEWED BY: LEW	CHECKED BY: DMZ	SHEET <b>3</b>
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE:	
DATE: 01/16/2020	PROJECT NO. 04.0190923.05	REVISION NO.	



**Figure 4 – Alteration of Terrain Permitting Plans**

**L163 TRANSMISSION LINE**  
**2020 STRUCTURE REPLACEMENT PROJECT**  
**KEENE, STODDARD, AND ANTRIM**  
**NEW HAMPSHIRE**  
**1/29/2020**



PREPARED FOR



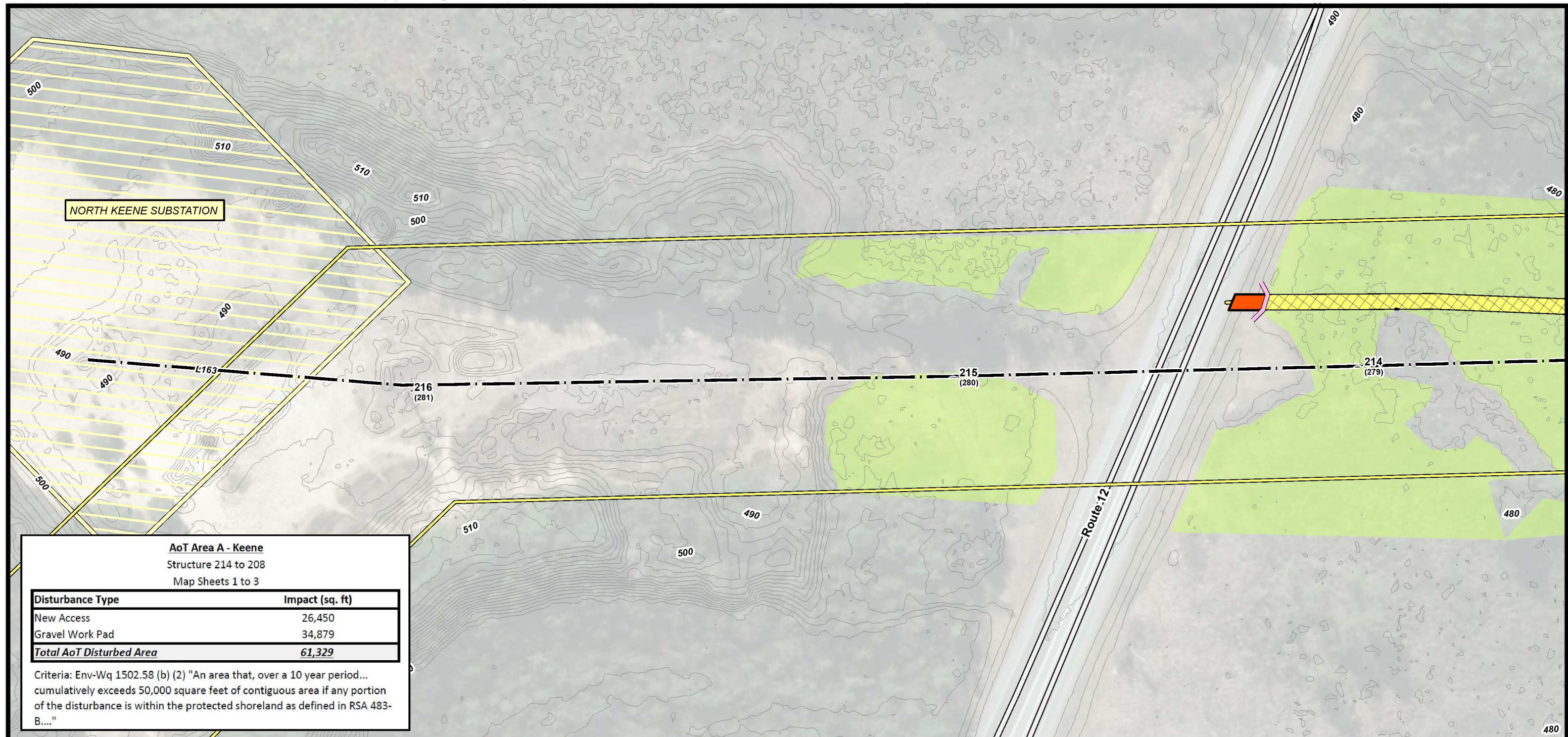
**INDEX OF FIGURES**

1 inch = 7,500 feet

- T1: TITLE SHEET
- 1-20: MAP SHEETS
- S1: NOTES
- S2: DETAILS
- S3: DETAILS (CONT.)

PREPARED BY

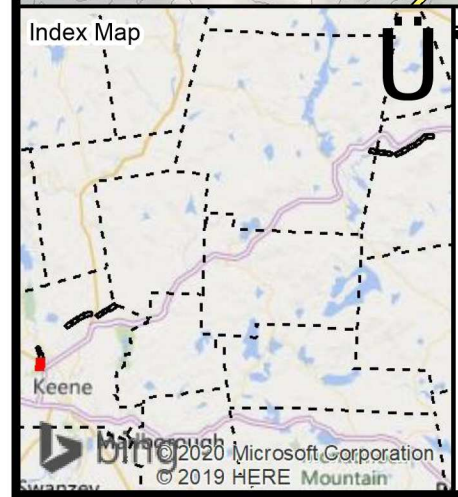




**AoT Area A - Keene**  
Structure 214 to 208  
Map Sheets 1 to 3

Disturbance Type	Impact (sq. ft)
New Access	26,450
Gravel Work Pad	34,879
<b>Total AoT Disturbed Area</b>	<b>61,329</b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period... cumulatively exceeds 50,000 square feet of contiguous area if any portion of the disturbance is within the protected shoreland as defined in RSA 483-B...."



**Keene**      **Current Town: Keene**      **Hillsborough**

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0 50 100 200 Feet

**L163 TRANSMISSION LINE**  
**2020 STRUCTURE**  
**REPLACEMENT PROJECT**

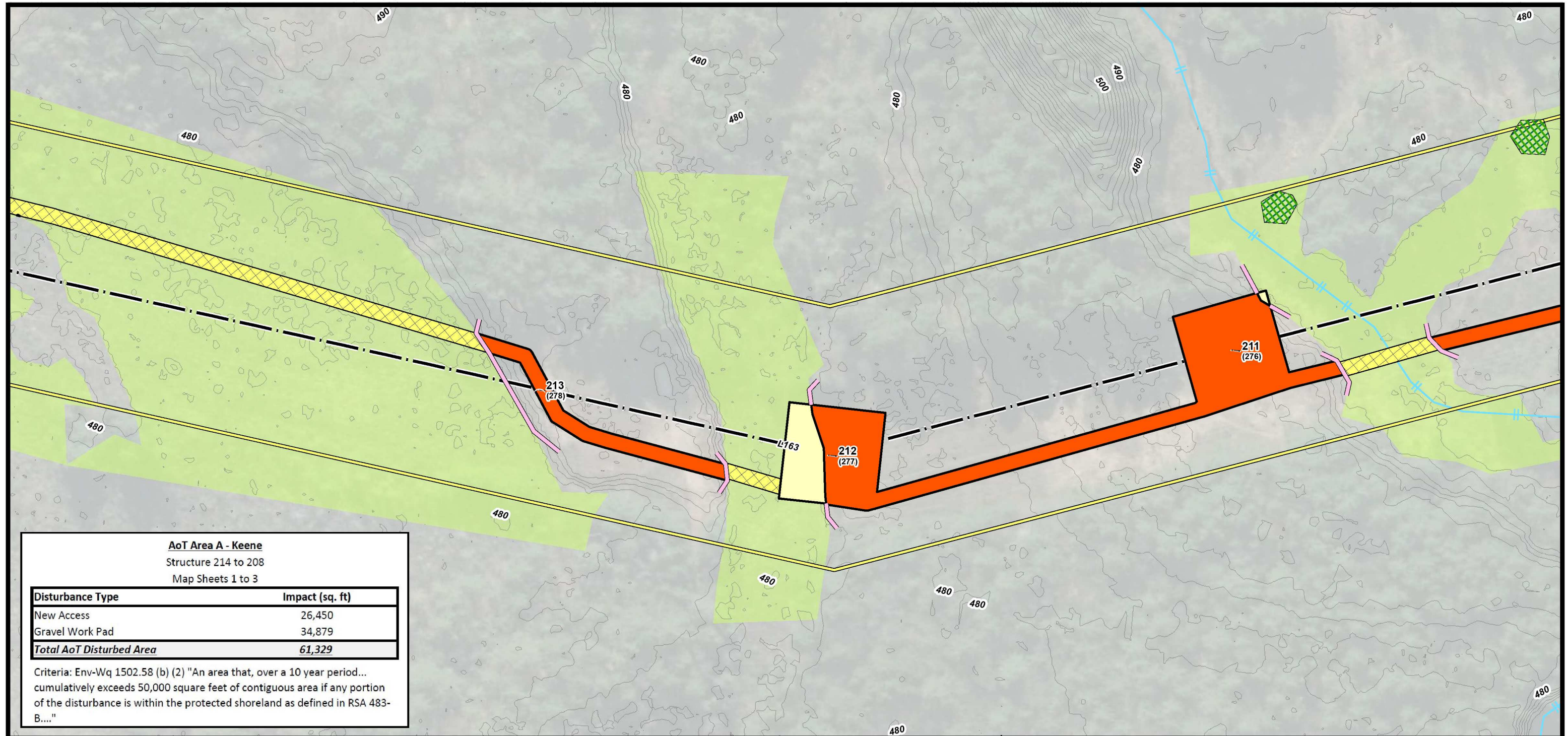
ALTERATION OF TERRAIN  
PERMITTING PLANS  
JANUARY 29, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 1 OF 20

Project No.: 04.0190923.05      1 inch = 100 Feet

**EVERSOURCE ENERGY**

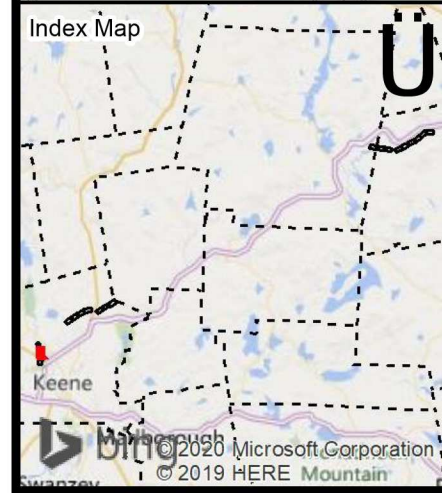
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Engineers and Scientists  
www.gza.com



**AoT Area A - Keene**  
Structure 214 to 208  
Map Sheets 1 to 3

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0 50 100 200 Feet

**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

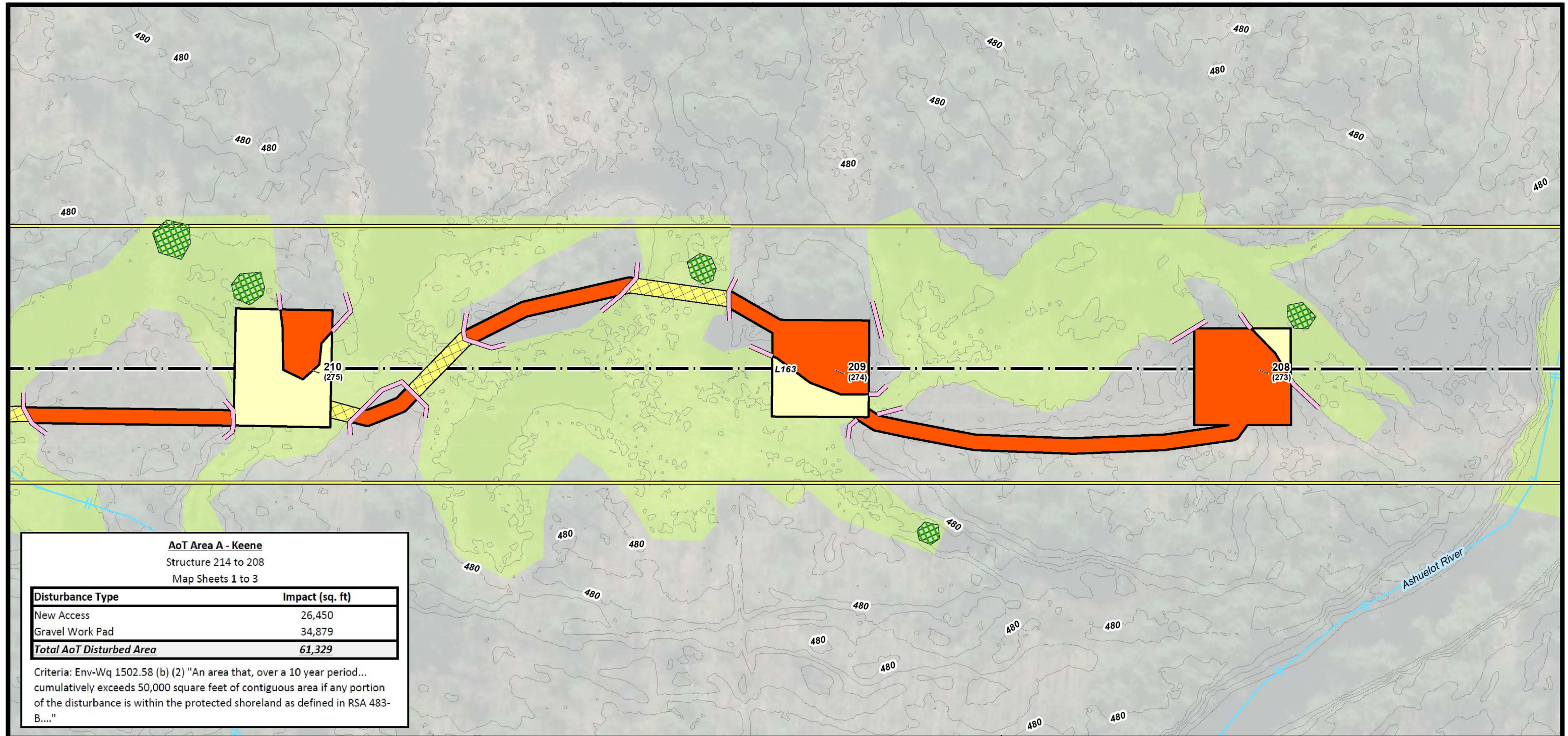
ALTERATION OF TERRAIN  
PERMITTING PLANS  
JANUARY 29, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 2 OF 20

Project No.: 04.0190923.05      1 inch = 100 Feet

**EVERSOURCE ENERGY**

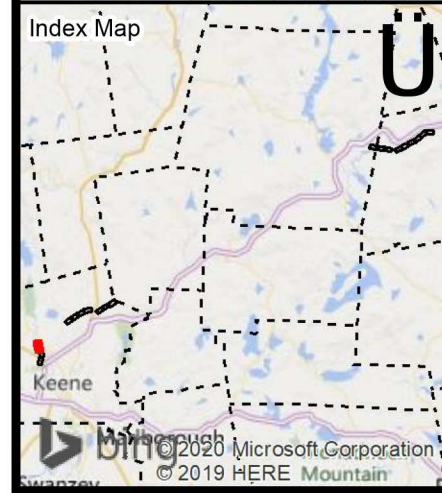
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Engineers and Scientists  
www.gza.com



**AoT Area A - Keene**  
Structure 214 to 208  
Map Sheets 1 to 3

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0 50 100 200 Feet

**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

ALTERATION OF TERRAIN  
PERMITTING PLANS  
JANUARY 29, 2020

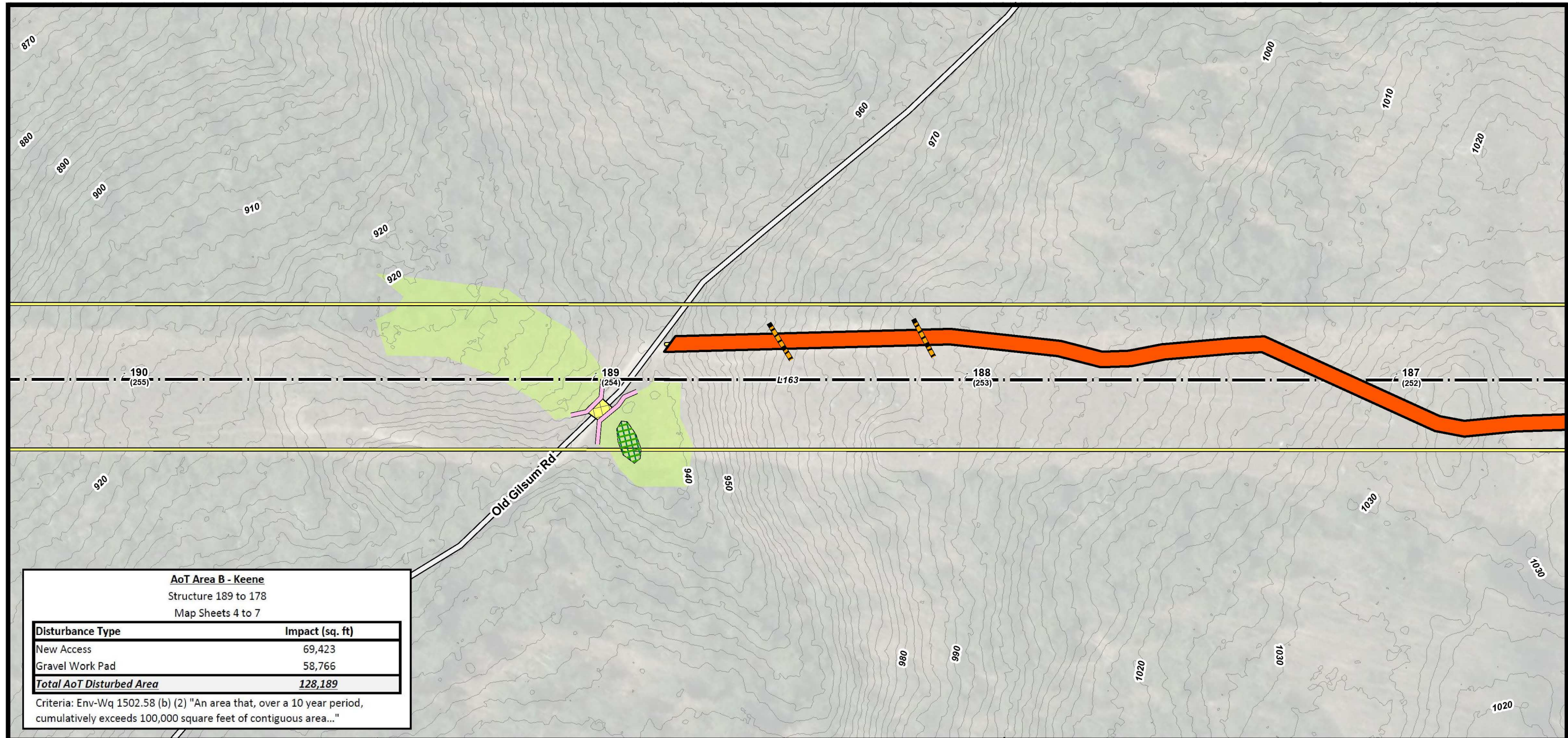
KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 3 OF 20

Project No.: 04.0190923.05

1 inch = 100 Feet



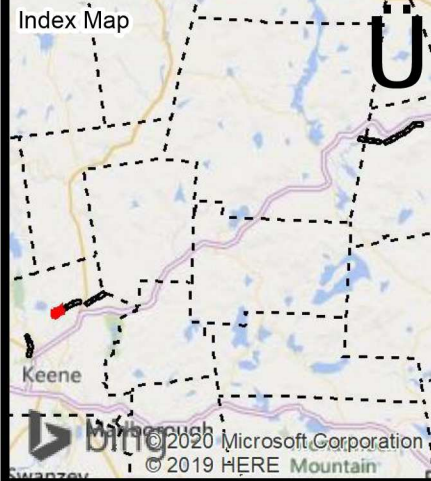




**AoT Area B - Keene**  
Structure 189 to 178  
Map Sheets 4 to 7

Disturbance Type	Impact (sq. ft)
New Access	69,423
Gravel Work Pad	58,766
<b>Total AoT Disturbed Area</b>	<b>128,189</b>

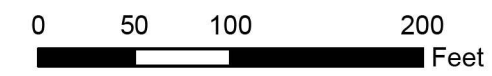
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↓ EXISTING STRUCTURE TO BE REPLACED	WETLAND
! EXISTING STRUCTURE TO BE WRECKED OUT	SUBSTATION
WORK PAD	DOT ROADS
AOT DISTURBANCE AREA	NHD FLOWLINE
TEMPORARY WETLAND IMPACT	PRIMARY ACCESS
GATE	SECONDARY ACCESS
POTENTIAL VERNAL POOL	2 FT CONTOURS
EVERSOURCE TRANSMISSION LINE	STRAW WATTLE
APPROXIMATE ROW	WATER BAR
FENCE	TOWN BOUNDARY

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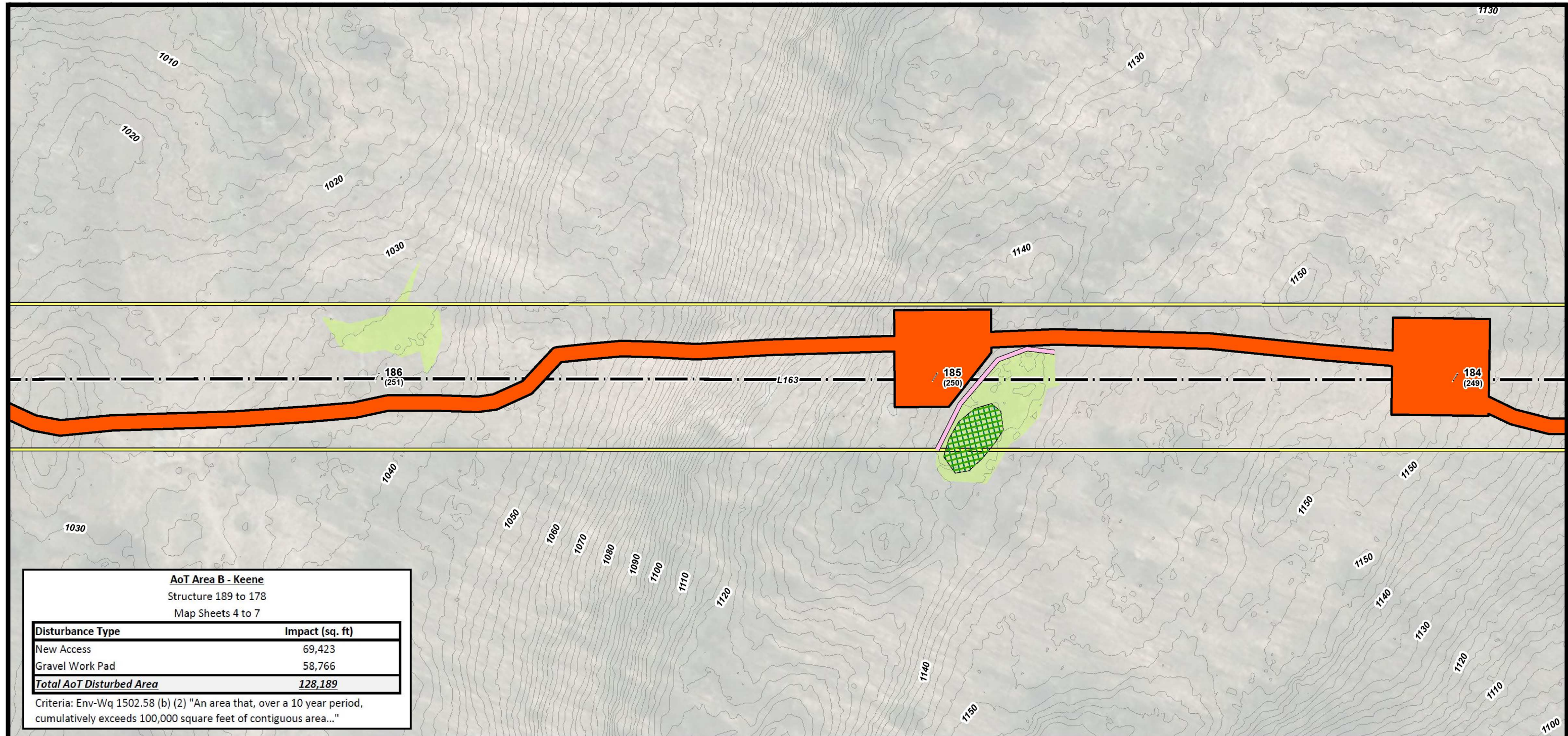
ALTERATION OF TERRAIN  
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KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 4 OF 20

Project No.: 04.0190923.05

1 inch = 100 Feet

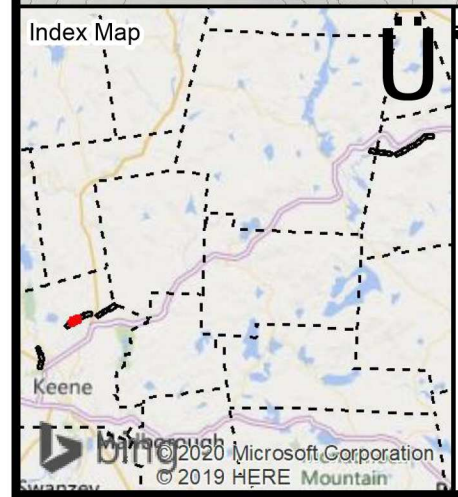




**AoT Area B - Keene**  
Structure 189 to 178  
Map Sheets 4 to 7

Disturbance Type	Impact (sq. ft)
New Access	69,423
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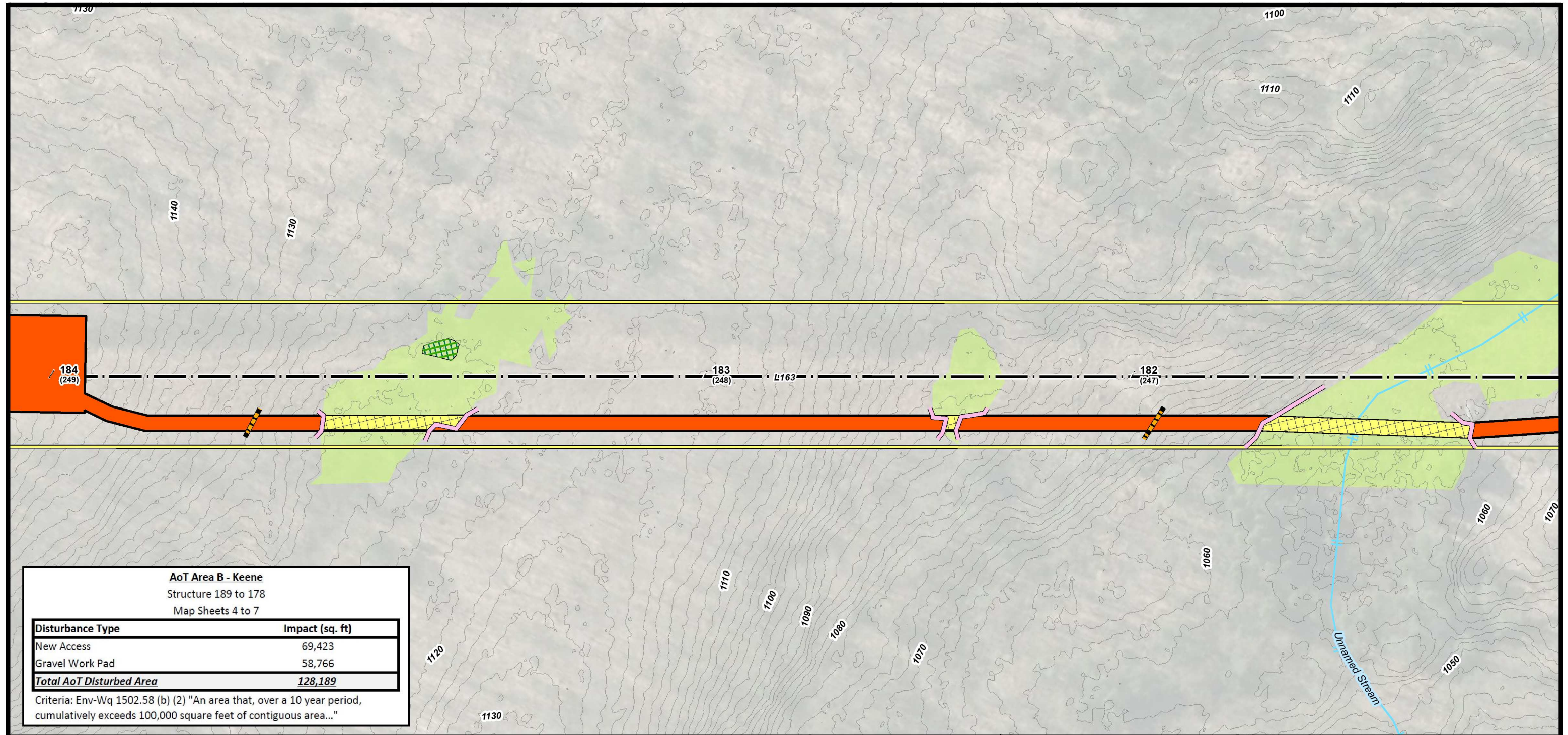
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**L163 TRANSMISSION LINE  
2020 STRUCTURE  
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ALTERATION OF TERRAIN  
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JANUARY 29, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
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**AoT Area B - Keene**

Structure 189 to 178

Map Sheets 4 to 7

Disturbance Type	Impact (sq. ft)
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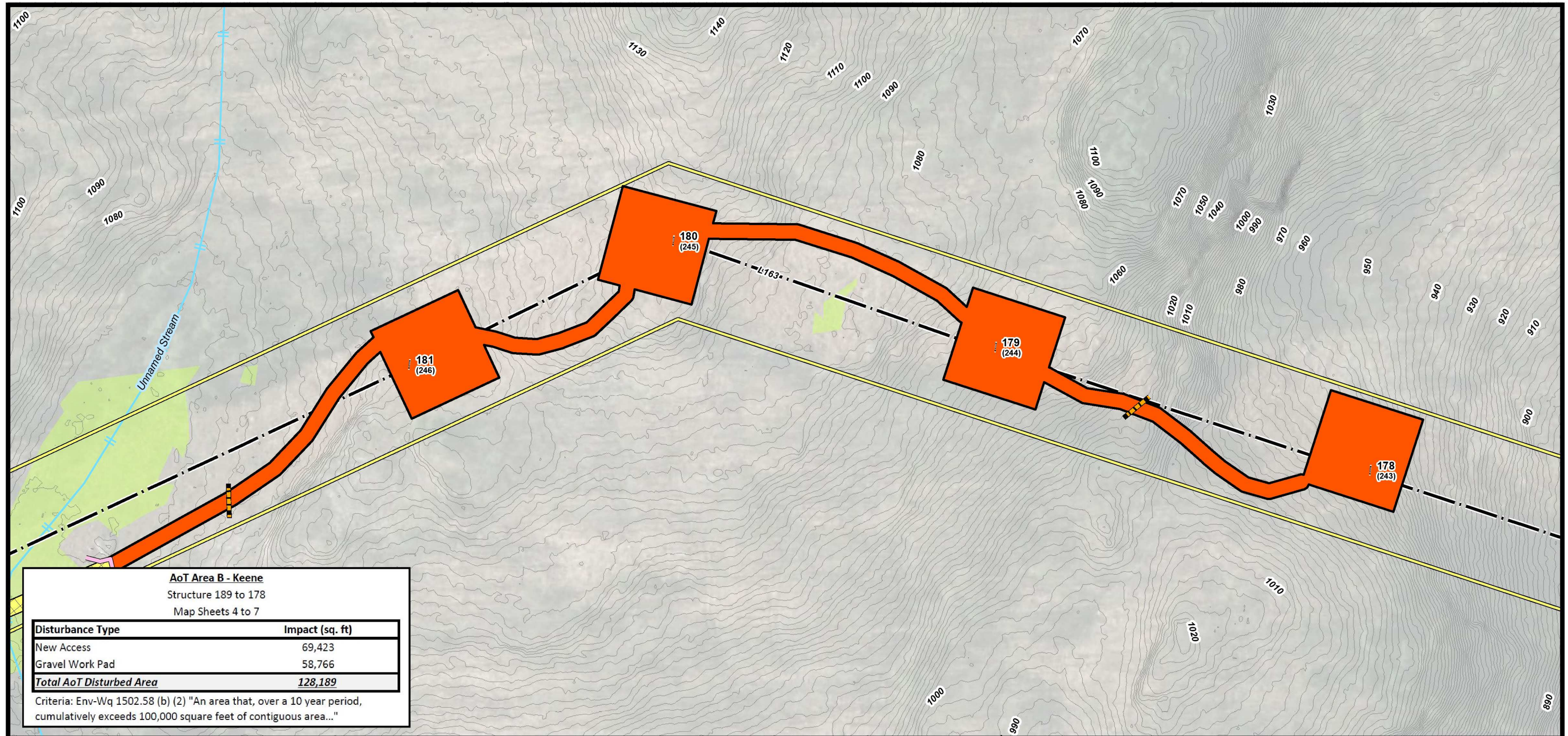
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KEENE, STODDARD & ANTRIM,  
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PAGE 6 OF 20

Project No.: 04.0190923.05

1 inch = 100 Feet





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Gravel Work Pad	58,766
<b>Total AoT Disturbed Area</b>	<b>128,189</b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period, cumulatively exceeds 100,000 square feet of contiguous area..."



**Keene**      **Current Town: Keene**      **Hillsborough**

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0 50 100 200 Feet

**L163 TRANSMISSION LINE**  
**2020 STRUCTURE**  
**REPLACEMENT PROJECT**

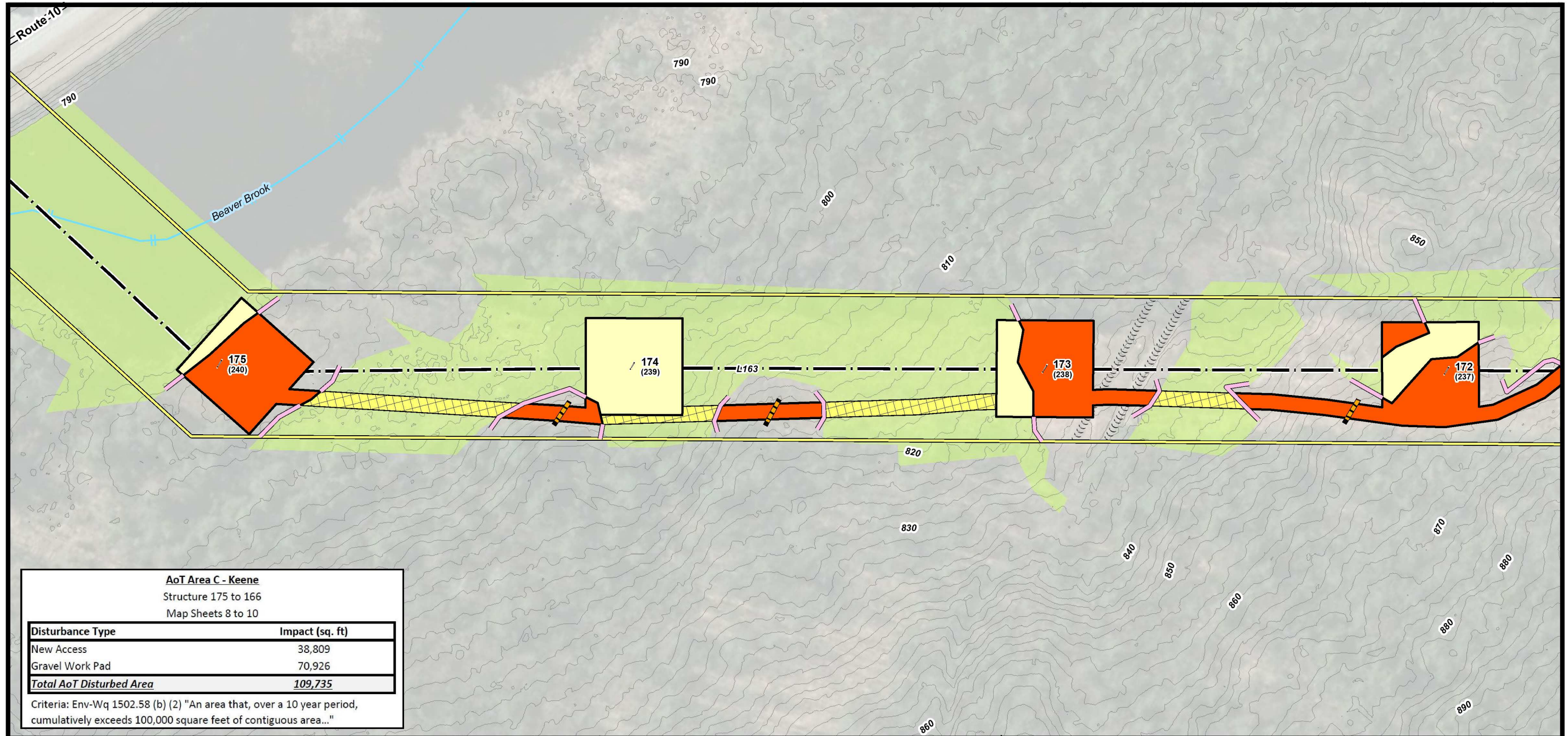
ALTERATION OF TERRAIN  
PERMITTING PLANS  
JANUARY 29, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 7 OF 20

Project No.: 04.0190923.05      1 inch = 100 Feet

**EVERSOURCE ENERGY**

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**AoT Area C - Keene**  
Structure 175 to 166  
Map Sheets 8 to 10

Disturbance Type	Impact (sq. ft)
New Access	38,809
Gravel Work Pad	70,926
<b>Total AoT Disturbed Area</b>	<b>109,735</b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period, cumulatively exceeds 100,000 square feet of contiguous area..."



**Keene**      **Current Town: Keene**      **Hillsborough**

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0 50 100 200 Feet

**L163 TRANSMISSION LINE  
2020 STRUCTURE  
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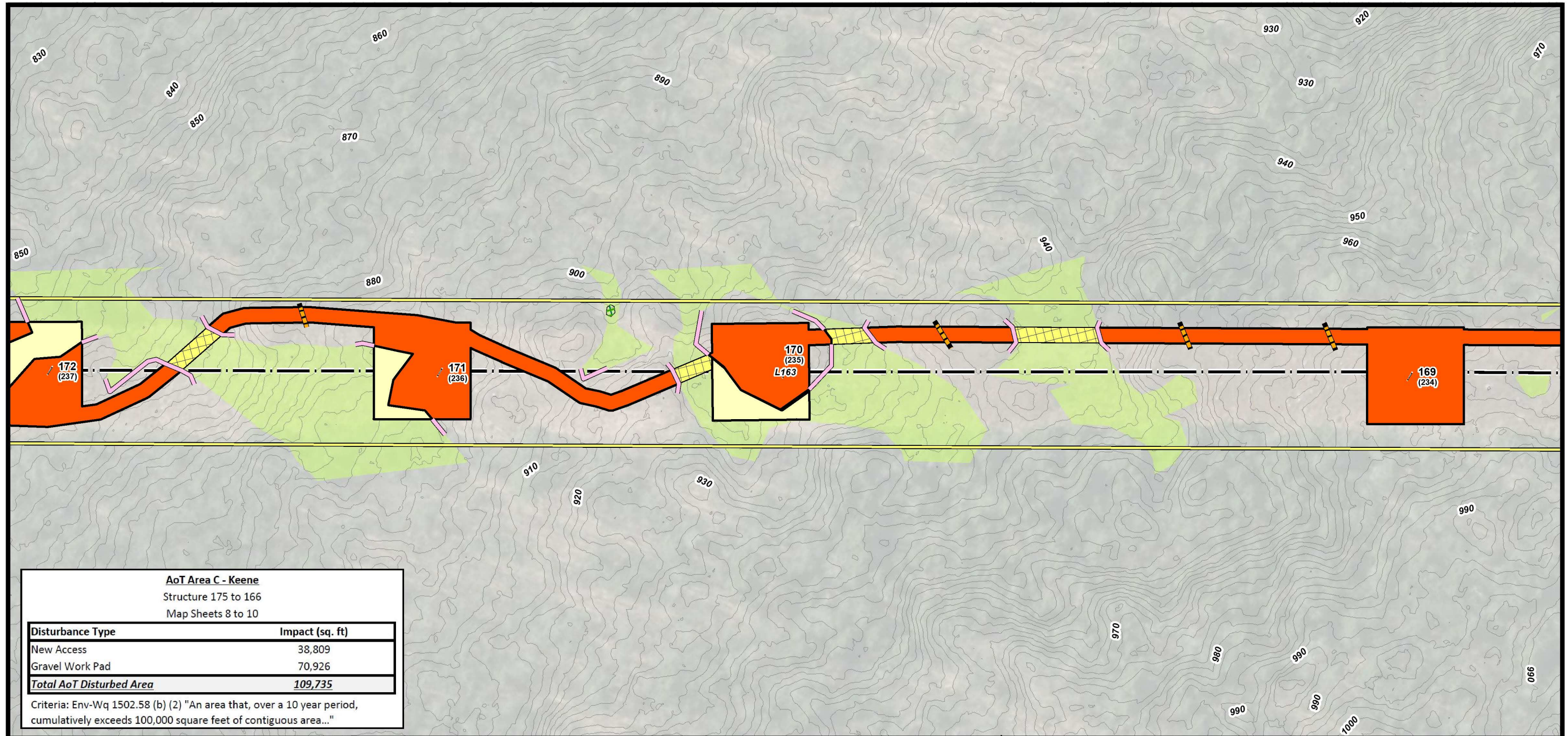
ALTERATION OF TERRAIN  
PERMITTING PLANS  
JANUARY 29, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
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Project No.: 04.0190923.05      1 inch = 100 Feet

**EVERSOURCE ENERGY**

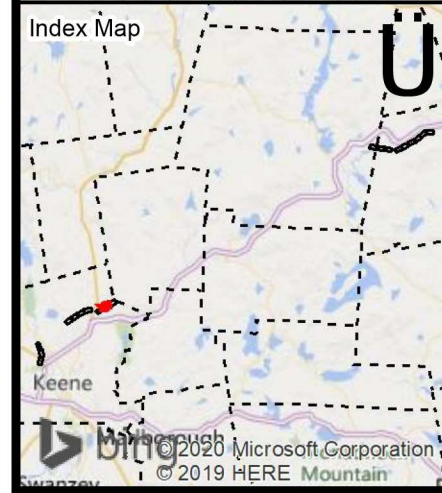
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Engineers and Scientists  
www.gza.com



**AoT Area C - Keene**  
Structure 175 to 166  
Map Sheets 8 to 10

Disturbance Type	Impact (sq. ft)
New Access	38,809
Gravel Work Pad	70,926
<b>Total AoT Disturbed Area</b>	<b>109,735</b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period, cumulatively exceeds 100,000 square feet of contiguous area..."



**Keene**      **Current Town: Keene**      **Hillsborough**

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0 50 100 200 Feet

**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

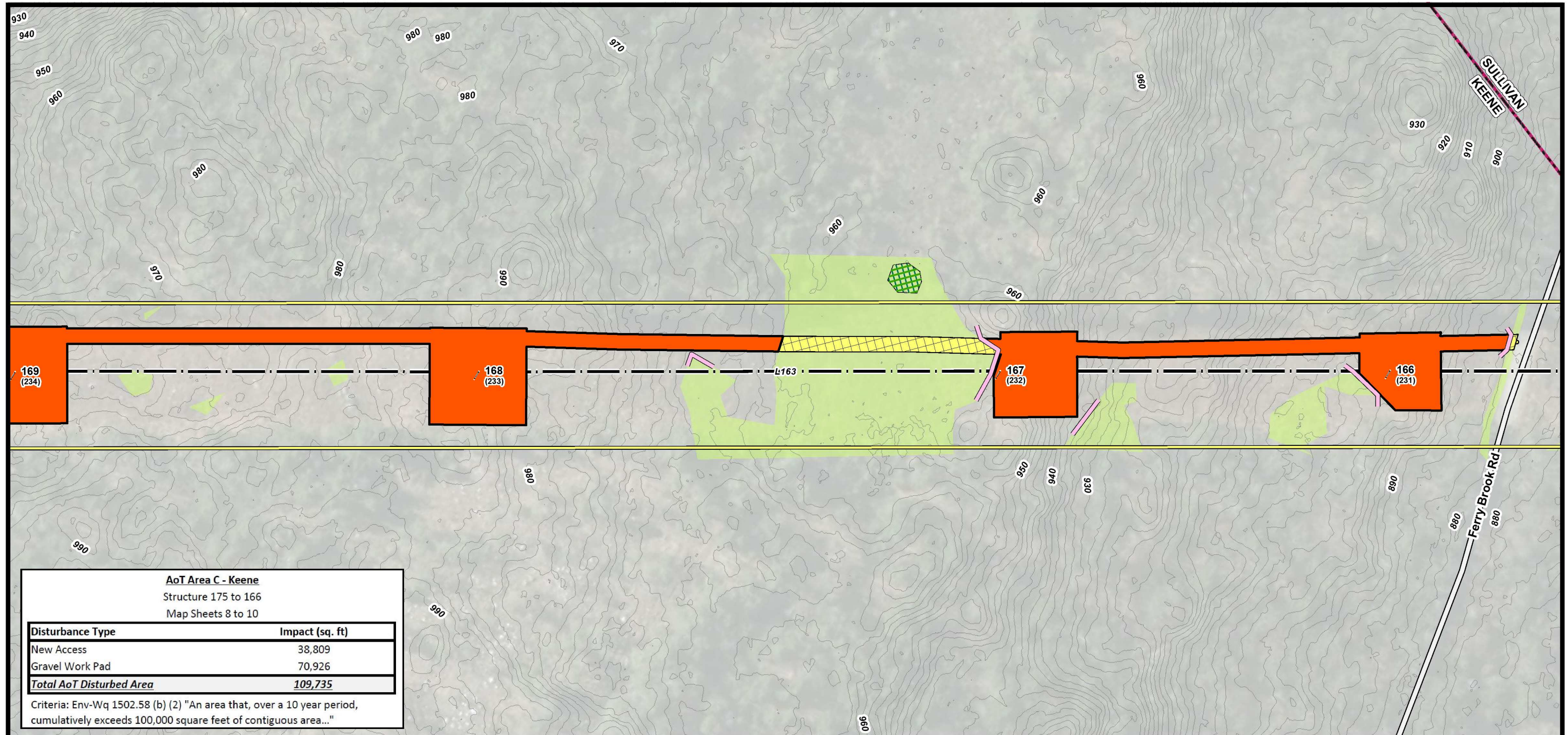
ALTERATION OF TERRAIN  
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JANUARY 29, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 9 OF 20

Project No.: 04.0190923.05      1 inch = 100 Feet

**EVERSOURCE ENERGY**

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**AoT Area C - Keene**  
Structure 175 to 166  
Map Sheets 8 to 10

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0 50 100 200 Feet

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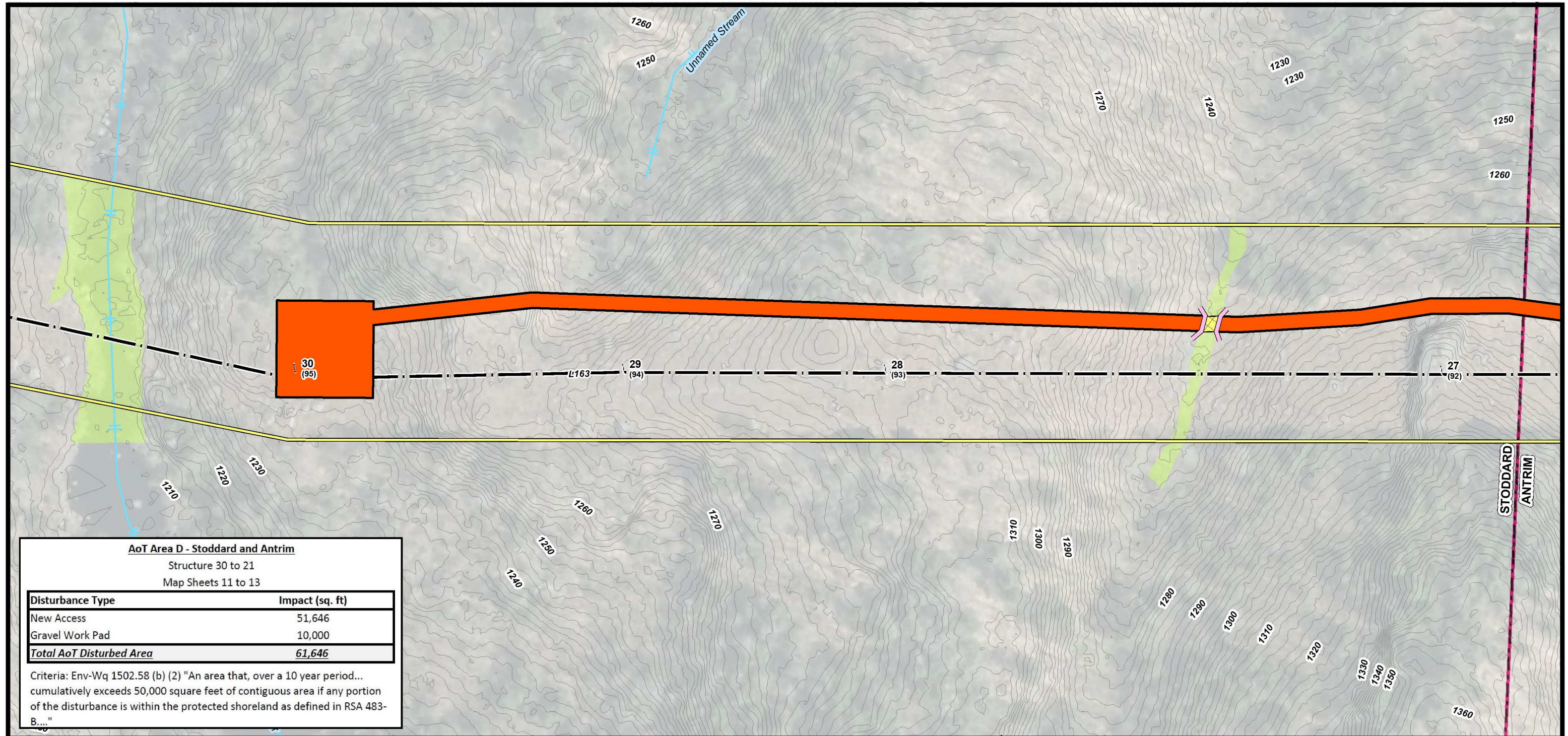
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JANUARY 29, 2020

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NEW HAMPSHIRE  
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Project No.: 04.0190923.05      1 inch = 100 Feet

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**AoT Area D - Stoddard and Antrim**  
Structure 30 to 21  
Map Sheets 11 to 13

Disturbance Type	Impact (sq. ft)
New Access	51,646
Gravel Work Pad	10,000
<b>Total AoT Disturbed Area</b>	<b>61,646</b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period... cumulatively exceeds 50,000 square feet of contiguous area if any portion of the disturbance is within the protected shoreland as defined in RSA 483-B..."

Index Map

Keene Current Town: **Stoddard** Hillsborough

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0 50 100 200 Feet

**L163 TRANSMISSION LINE  
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REPLACEMENT PROJECT**

ALTERATION OF TERRAIN  
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JANUARY 29, 2020

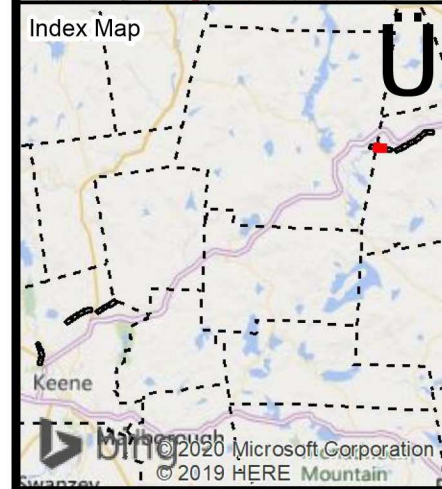
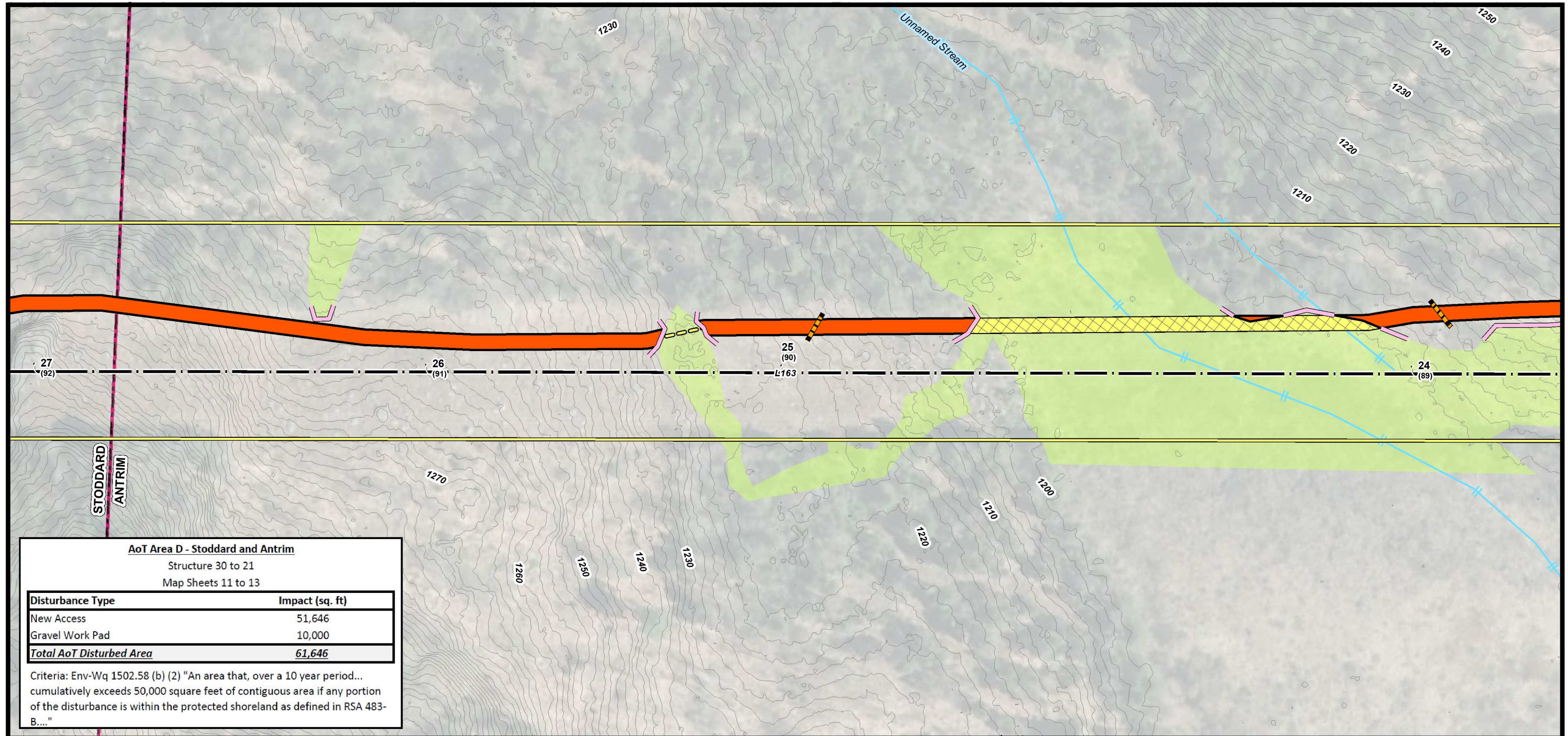
KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
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Project No.: 04.0190923.05 1 inch = 100 Feet

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Keene Current Town: Antrim Hillsborough

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- AOT DISTURBANCE AREA
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0 50 100 200 Feet

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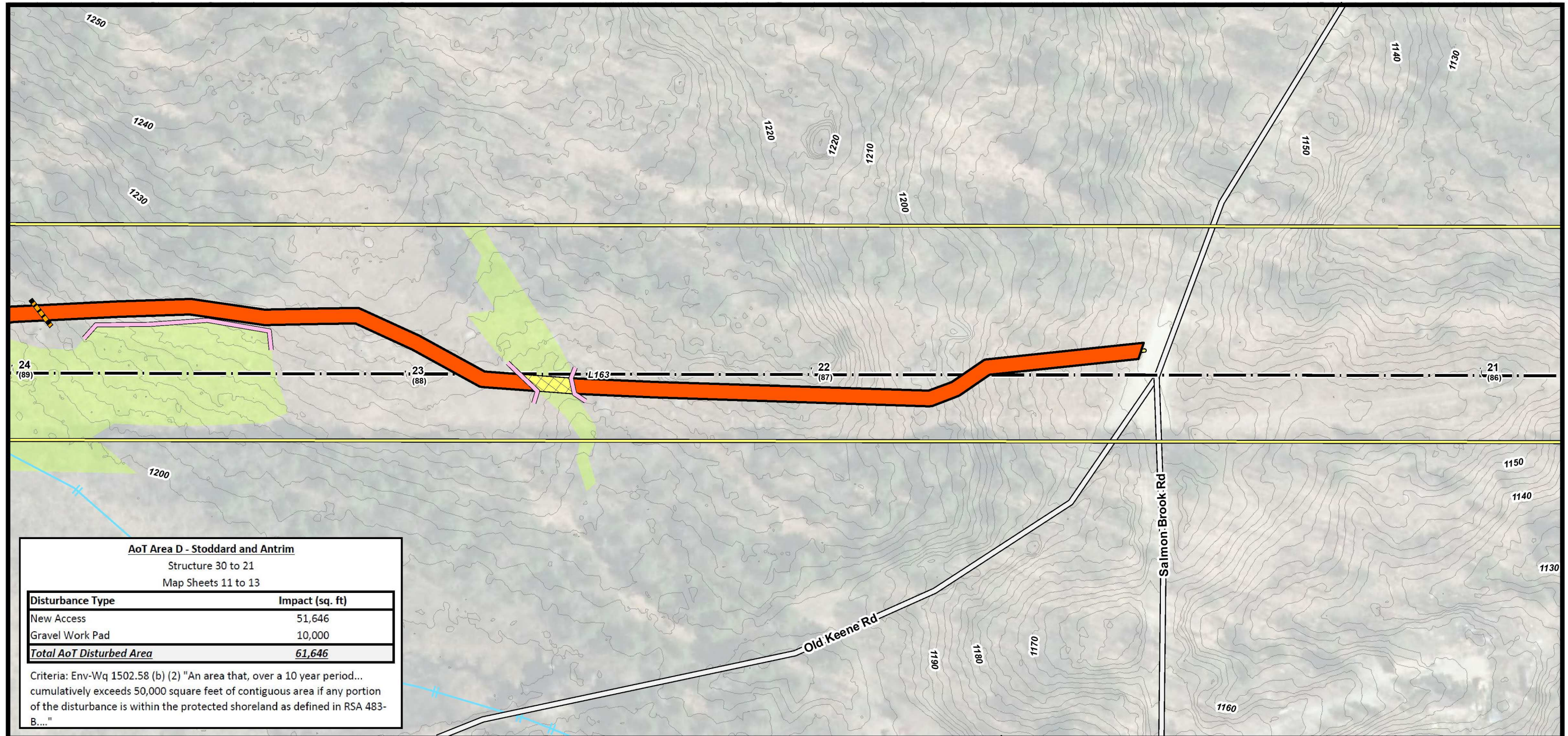
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KEENE, STODDARD & ANTRIM,  
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**EVERSOURCE ENERGY**

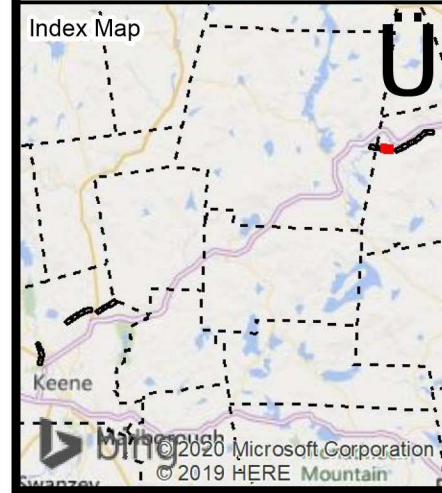
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**AoT Area D - Stoddard and Antrim**  
Structure 30 to 21  
Map Sheets 11 to 13

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New Access	51,646
Gravel Work Pad	10,000
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0 50 100 200 Feet

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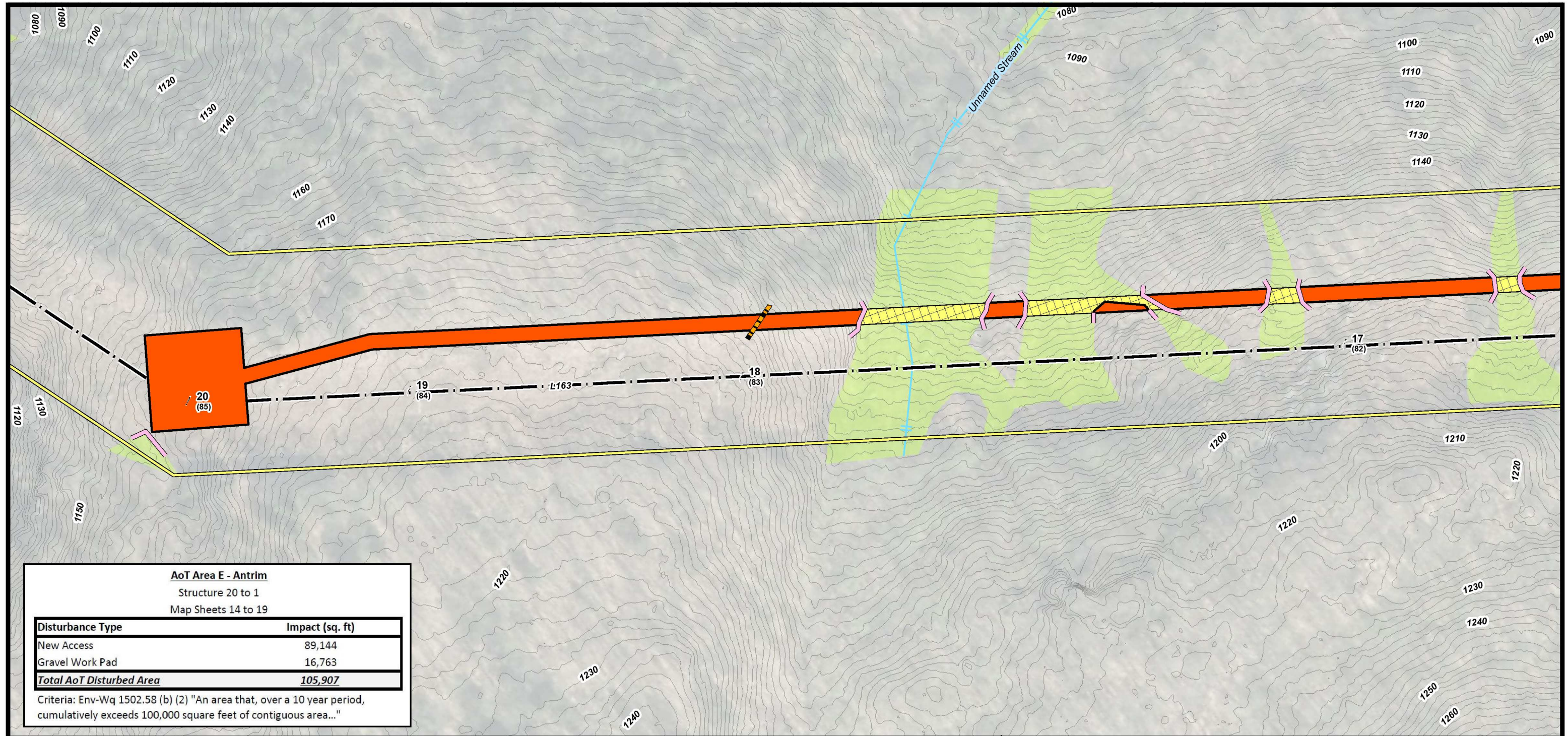
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KEENE, STODDARD & ANTRIM,  
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PAGE 13 OF 20

Project No.: 04.0190923.05      1 inch = 100 Feet

**EVERSOURCE ENERGY**

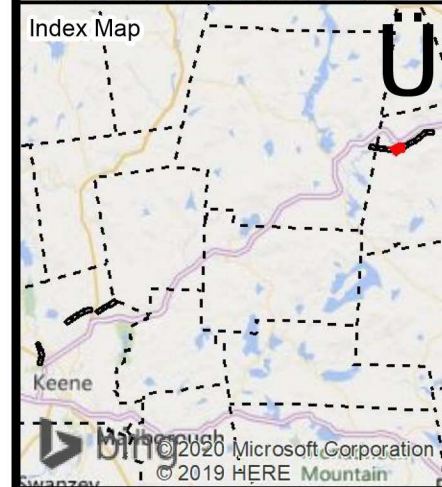
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**AoT Area E - Antrim**  
Structure 20 to 1  
Map Sheets 14 to 19

Disturbance Type	Impact (sq. ft)
New Access	89,144
Gravel Work Pad	16,763
<b>Total AoT Disturbed Area</b>	<b>105,907</b>

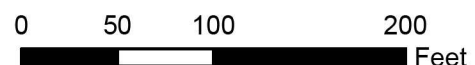
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Keene Current Town: Antrim Hillsborough

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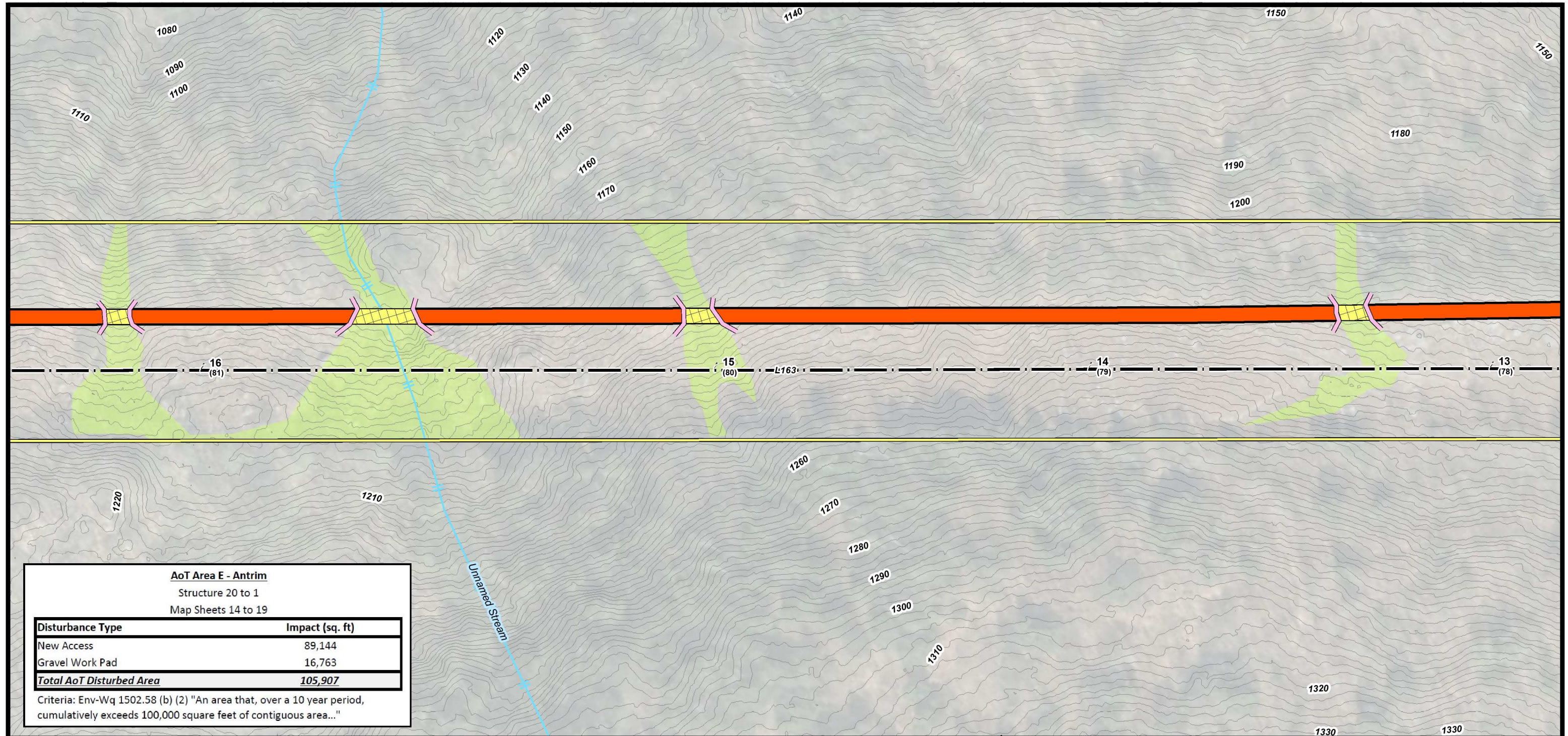
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1 inch = 100 Feet

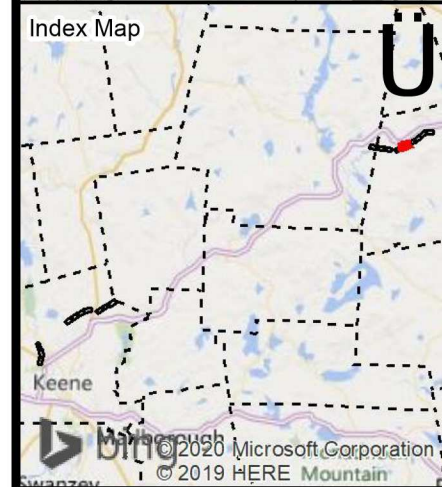




**AoT Area E - Antrim**  
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Map Sheets 14 to 19

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Keene Current Town: Antrim Hillsborough

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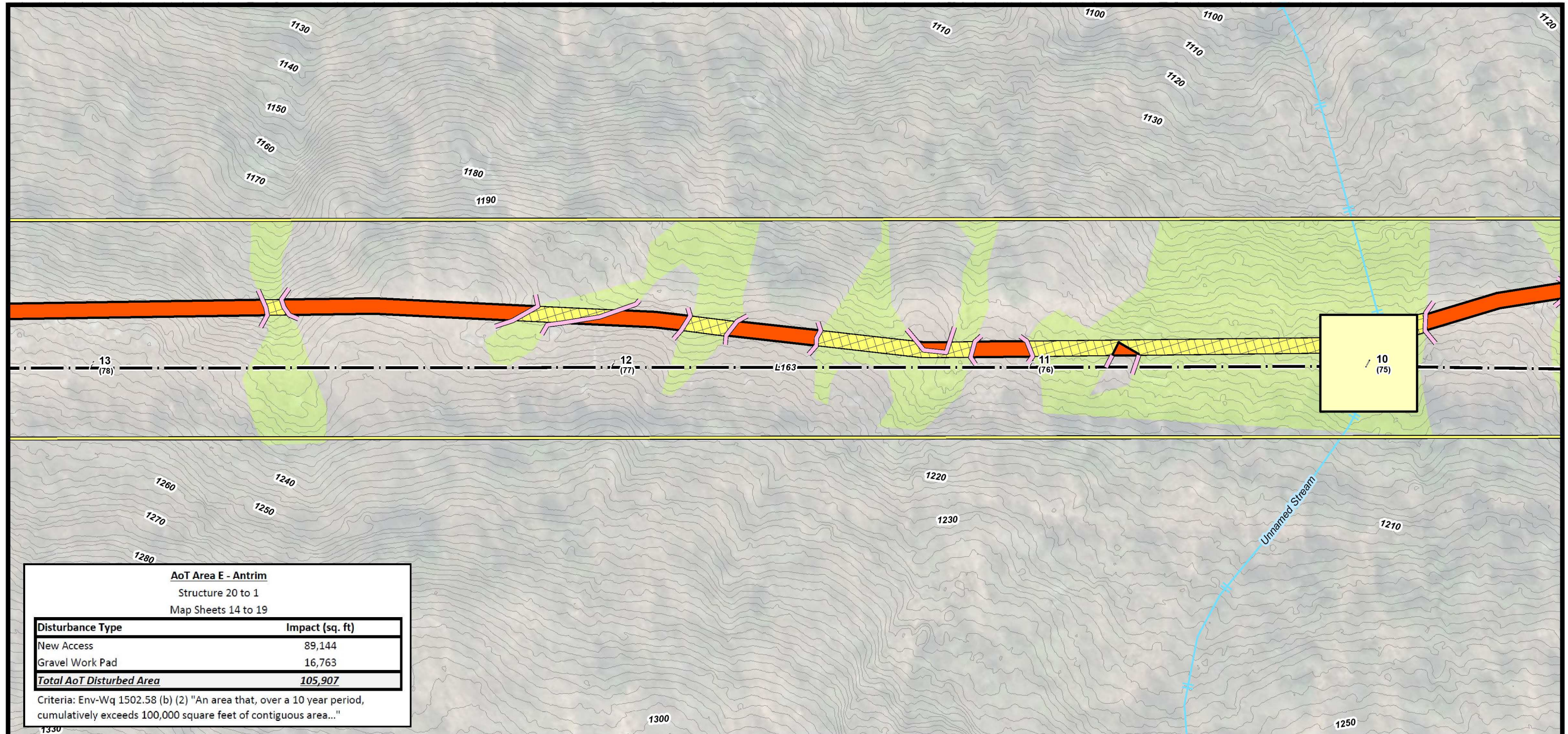
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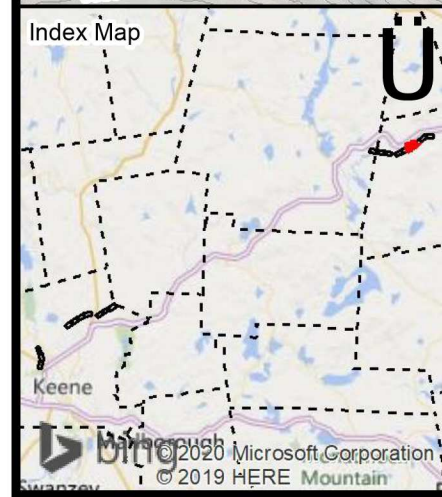
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**AoT Area E - Antrim**  
Structure 20 to 1  
Map Sheets 14 to 19

Disturbance Type	Impact (sq. ft)
New Access	89,144
Gravel Work Pad	16,763
<b>Total AoT Disturbed Area</b>	<b>105,907</b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period, cumulatively exceeds 100,000 square feet of contiguous area..."



Keene Current Town: Antrim Hillsborough

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**NOTES:**

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- L163 STRUCTURE DATA WAS PROVIDED BY EVERSOURCE ENERGY.
- PROPOSED ACCESS ROUTES AND WORK PAD LOCATIONS HAVE NOT BEEN FIELD VERIFIED.
- 2 FOOT GROUND SURFACE ELEVATION CONTOURS WERE OBTAINED FROM UNH GRANIT.

0 50 100 200 Feet

**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

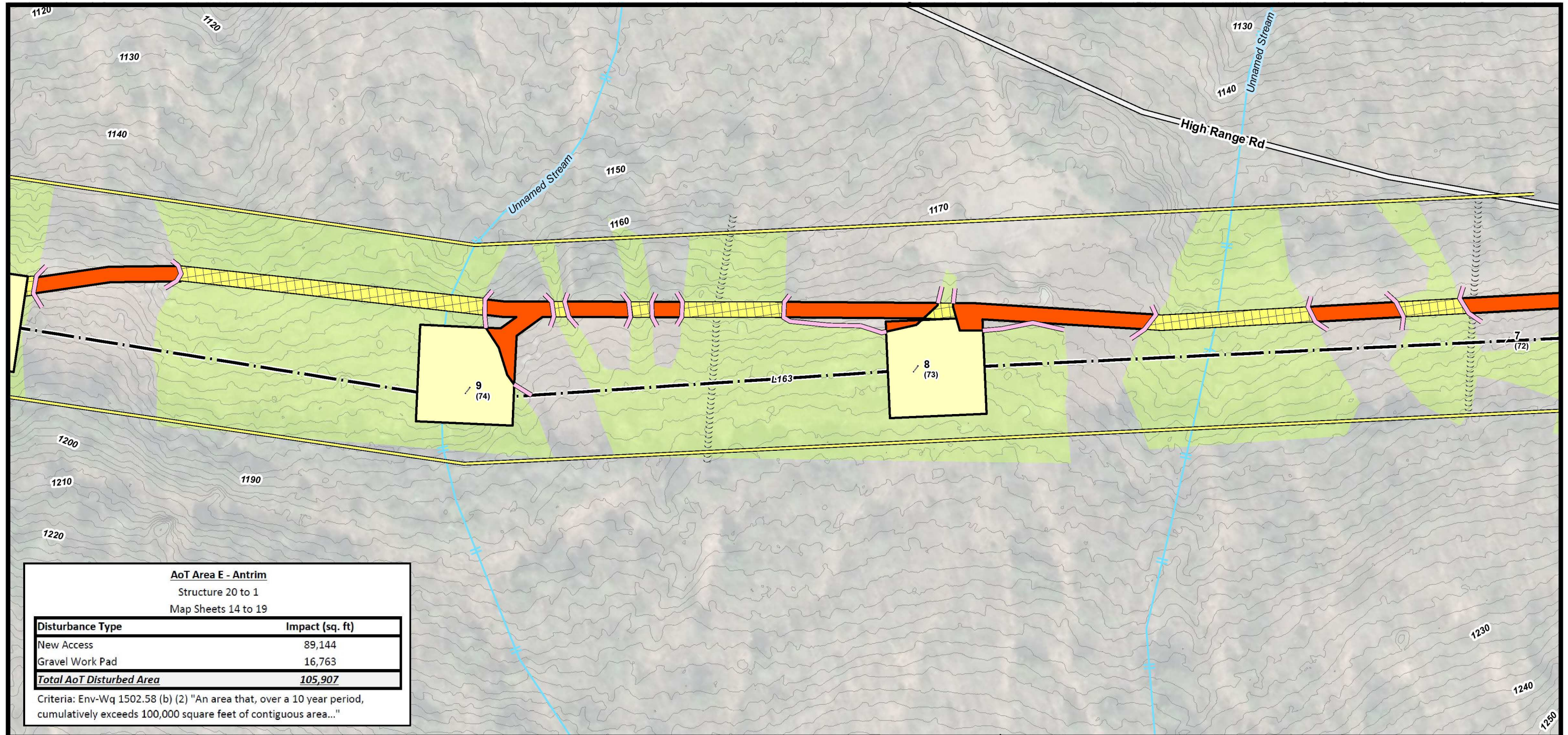
ALTERATION OF TERRAIN  
PERMITTING PLANS  
JANUARY 29, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 16 OF 20

Project No.: 04.0190923.05 1 inch = 100 Feet

**EVERSOURCE ENERGY**

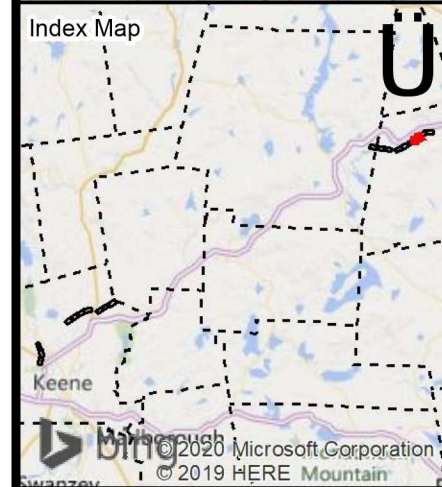
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**AoT Area E - Antrim**  
Structure 20 to 1  
Map Sheets 14 to 19

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Keene Current Town: Antrim Hillsborough

- EXISTING STRUCTURE - NO WORK PROPOSED
- EXISTING STRUCTURE TO BE REPLACED
- EXISTING STRUCTURE TO BE WRECKED OUT
- WORK PAD
- AOT DISTURBANCE AREA
- TEMPORARY WETLAND IMPACT
- GATE
- POTENTIAL VERNAL POOL
- EVERSOURCE TRANSMISSION LINE
- APPROXIMATE ROW
- FENCE
- STONE WALL
- WETLAND
- SUBSTATION
- DOT ROADS
- NHD FLOWLINE
- PRIMARY ACCESS
- SECONDARY ACCESS
- 2 FT CONTOURS
- STRAW WATTLE
- WATER BAR
- TOWN BOUNDARY

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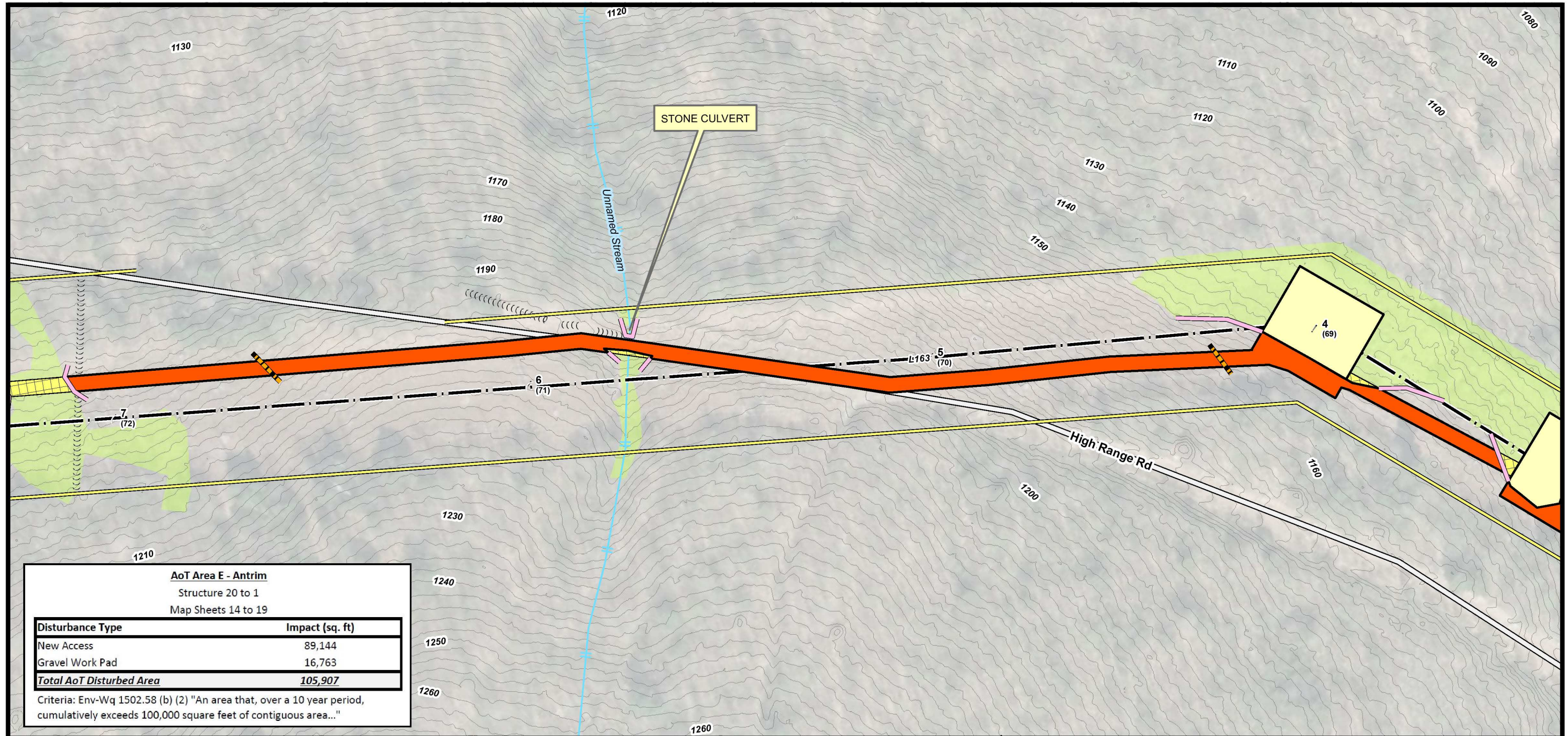
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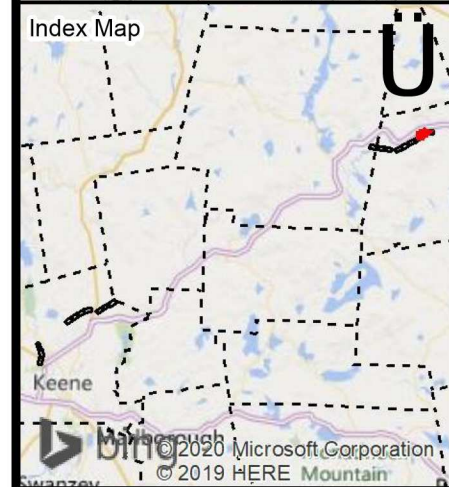
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Structure 20 to 1  
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0 50 100 200 Feet

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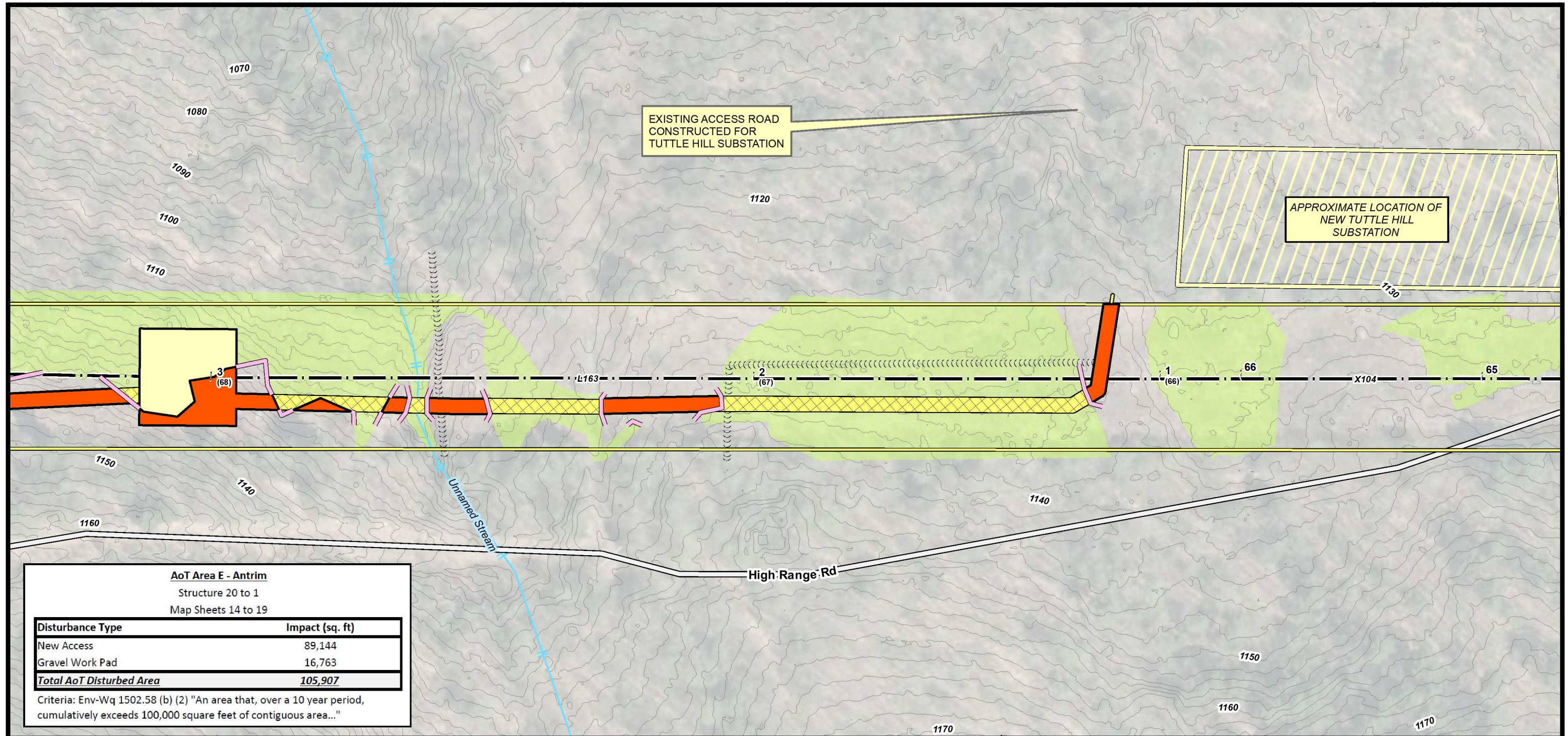
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KEENE, STODDARD & ANTRIM,  
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PAGE 18 OF 20

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**EVERSOURCE ENERGY**

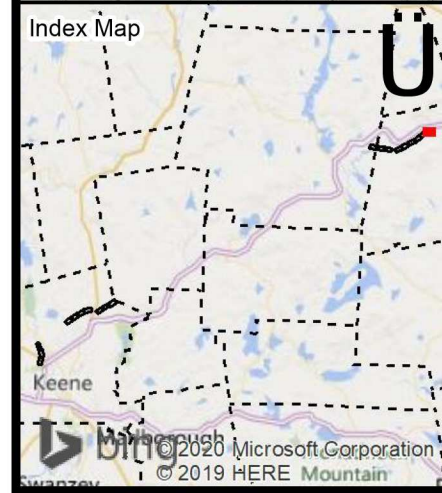
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**AoT Area E - Antrim**  
 Structure 20 to 1  
 Map Sheets 14 to 19

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Keene Current Town: Antrim Hillsborough

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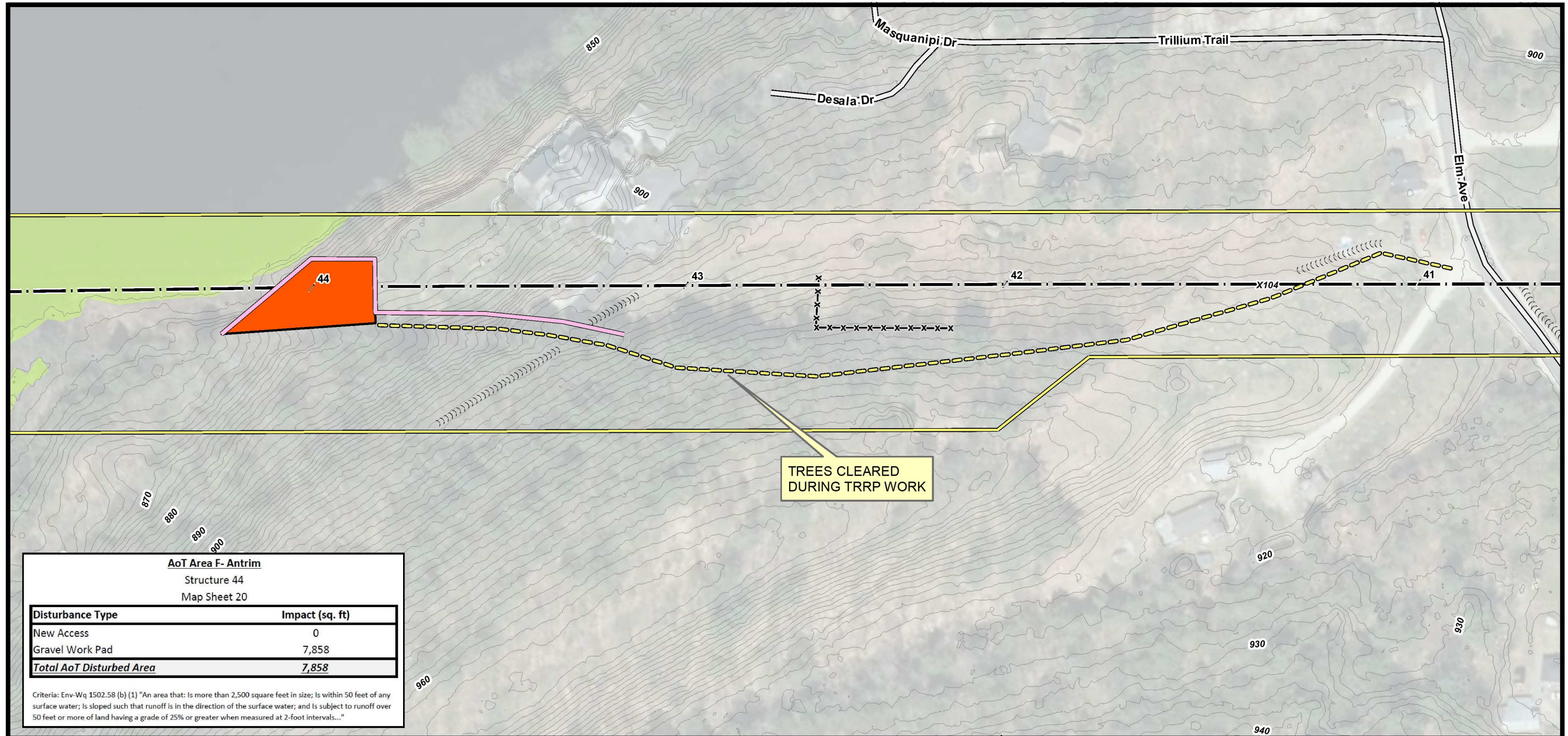
KEENE, STODDARD & ANTRIM,  
 NEW HAMPSHIRE  
 PAGE 19 OF 20

Project No.: 04.0190923.05 1 inch = 100 Feet

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**AoT Area F- Antrim**  
Structure 44  
Map Sheet 20

Disturbance Type	Impact (sq. ft)
New Access	0
Gravel Work Pad	7,858
<b>Total AoT Disturbed Area</b>	<b>7,858</b>

Criteria: Env-Wq 1502.58 (b) (1) "An area that: Is more than 2,500 square feet in size; Is within 50 feet of any surface water; Is sloped such that runoff is in the direction of the surface water; and Is subject to runoff over 50 feet or more of land having a grade of 25% or greater when measured at 2-foot intervals..."



Keene Current Town: Antrim Hillsborough

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KEENE, STODDARD & ANTRIM,  
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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 WITHIN THE RIGHT OF WAY. CONSTRUCTION ACTIVITIES SHALL OCCUR DURING PERIODS OF LOW FLOW.
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. ALL OPERATIONS SHALL BE CONFINED TO THE SPECIFIED ACCESS ROUTES WITHIN THE PROPOSED WETLAND IMPACT AREA. ALL ACCESS ROUTES SHALL NOT EXCEED A 16 FOOT-WIDTH.
7. IMPACT TO VEGETATION WITHIN WETLANDS WILL BE LIMITED TO THE EXTENT NECESSARY TO PLACE THE SWAMP MATS WHERE REQUIRED.
8. ALL 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 EXCAVATIONS IS NEEDED FOR ACCESS.
9. SWAMP MATS WILL BE USED ALONG ALL 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 SWAMP MAT BMP IS NOT SUFFICIENT DUE TO HIGH WATER, ADDITIONAL BMP'S MAY INCLUDE THE PLACEMENT OF GEOTEXTILE FABRIC, 3"-4" STONE, AND GRAVEL TO PROVIDE A SUITABLE ROAD BED. A TEMPORARY CULVERT MAY BE REQUIRED IN AREAS OF HIGH FLOW 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 OR FOUNDATION PLACEMENT OR STABILIZATION. ALL EXCESS MATERIAL TAKEN FROM THE WETLAND WILL BE REMOVED FROM THE SITE.
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.
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. REMOVAL OF THE OLD POLE WILL OCCUR ONCE THE CABLE HAS BEEN INSTALLED ON THE NEW STRUCTURE. THE OLD STRUCTURES WILL BE REMOVED FROM THE SITE. POLES WILL BE CUT AT THE GROUND SURFACE. FOOTINGS WILL BE ABANDONED IN PLACE TO MINIMIZE IMPACTS.
17. ALL SWAMP MATS, MATERIAL, AND DEBRIS WILL BE REMOVED FROM THE WORK AREA UPON THE COMPLETION OF CONSTRUCTION.
18. 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.
19. ALL TEMPORARY WETLAND IMPACTS WILL BE RE-GRADED TO ORIGINAL CONTOURS FOLLOWING CONSTRUCTION. NEW ENGLAND EROSION CONTROL/RESTORATION MIX, AVAILABLE THROUGH NEW ENGLAND WETLAND PLANTS, INC., 820 WEST STREET, AMHERST, MA 01002, 413-548-8000, OR EQUIVALENT SEED MIX SHALL BE APPLIED IN WETLAND AREAS THAT ARE NOT INUNDATED, AS NECESSARY.
20. SEDIMENT AND EROSION CONTROL MEASURES WILL BE EVALUATED AND REMOVED IF NECESSARY UPON THE COMPLETION OF CONSTRUCTION.

WINTER CONSTRUCTION NOTES

1. ALL 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. ALL 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: EVERSOURCE ENERGY  
13 LEGENDS DRIVE  
HOOKSETT, NH 03106

1. BASE PLAN PROVIDED BY EVERSOURCE ENERGY. EVERSOURCE ENERGY PROVIDED THE WETLAND DATA. EVERSOURCE ENERGY PROVIDED THE UTILITY DESIGN.
2. JURISDICTIONAL WETLANDS WERE DELINEATED BY TIGHE AND BOND IN 2018, 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. WETLANDS WERE REVIEWED BY GZA GEOENVIRONMENTAL, INC. IN JANUARY AND FEBRUARY 2019.
3. GZA EVALUATED WETLANDS AS POTENTIAL VERNAL POOLS ON FEBRUARY 6, 12, AND 15, 2019 IN ACCORDANCE WITH "IDENTIFICATION AND DOCUMENTATION OF VERNAL POOLS IN NEW HAMPSHIRE," 1997, NEW HAMPSHIRE FISH AND GAME DEPARTMENT, NONGAME AND ANDANGERED WILDLIFE PROGRAM.
4. GZA PERFORMED A WETLANDS FUNCTION AND VALUES ASSESSMENT IN ACCORDANCE WITH THE ACOE'S "HIGHWAY METHODOLOGY WORKBOOK SUPPLEMENT," SEPTEMBER 1999, IN THE TOWN OF STRAFFORD.
5. SITE PLAN IS FOR PERMITTING PURPOSES ONLY AND DOES NOT REPRESENT A PROPERTY BOUNDARY SURVEY.
6. 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.
7. 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.
8. ALL AREAS SHALL BE STABILIZED WITH 45 DAYS OF INITIAL DISTURBANCE.

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 AGAINST EROSION, AS NECESSARY.
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.

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

L163 TRANSMISSION LINE STRUCTURE REPLACEMENT PROJECT

KEENE, STODDARD, AND ANTRIM  
NEW HAMPSHIRE

NOTES

PREPARED BY:  <b>GZA</b> GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR:  <b>EVSOURCE</b> ENERGY	
PROJ MGR: AJD	REVIEWED BY: LEW	CHECKED BY: DMZ	SHEET <b>1</b> 1 OF 3
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE:	
DATE: 01/16/2020	PROJECT NO: 04.0190923.05	REVISION NO:	

© 2020 - GZA GeoEnvironmental, Inc. P:\04\jobs\01909023\04\_0190923\_05 - L163 Transmission Line - Structure Replmt Proj\Figures\GIS\2019\_2020\MXD\L163 AOT NOTESHEET 2 - BMPs.mxd, 1/16/2020, 10:58:12 AM, matthew.deane

## Best Management Practices (BMP's) for Straw wattles

### Definition and purpose:

Straw wattles are burlap rolls filled with straw that trap sediment and interrupt water flow by reducing slope lengths.

### Applications:

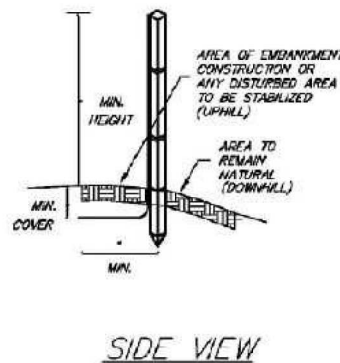
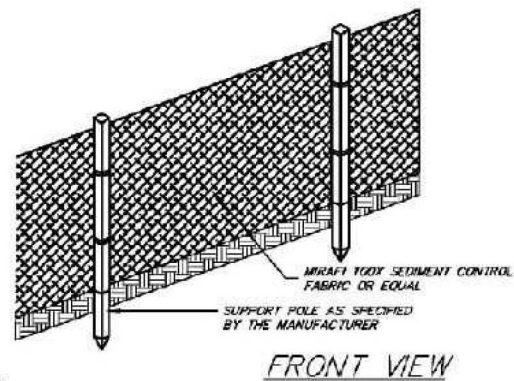
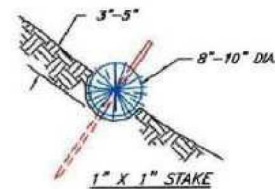
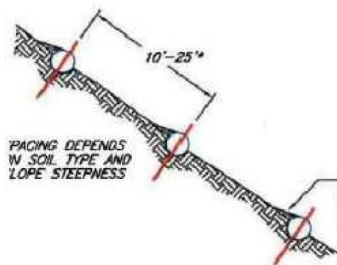
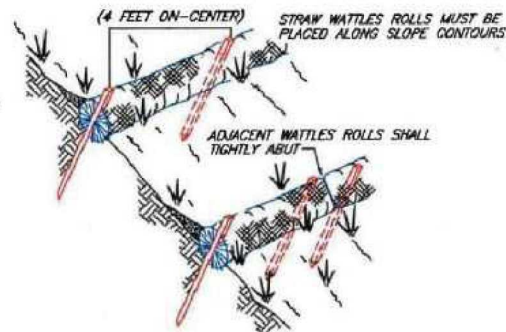
- \* Along erodible or unstabilized slopes
- \* Spread overland waterflow
- \* Trap sediment
- \* Around storm drain inlets to slow water and settle out sediment
- \* Overlap ends approximately 6 inches

### Installation:

Straw wattles are installed parallel to slope contours and perpendicular to sheet flow.

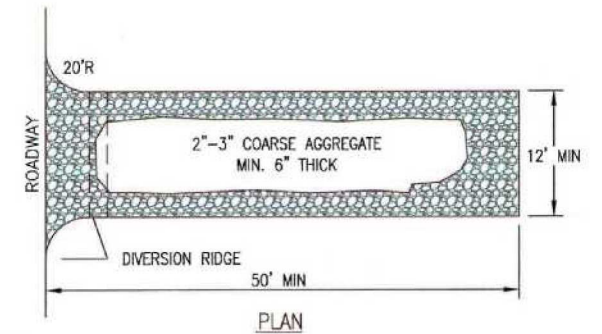
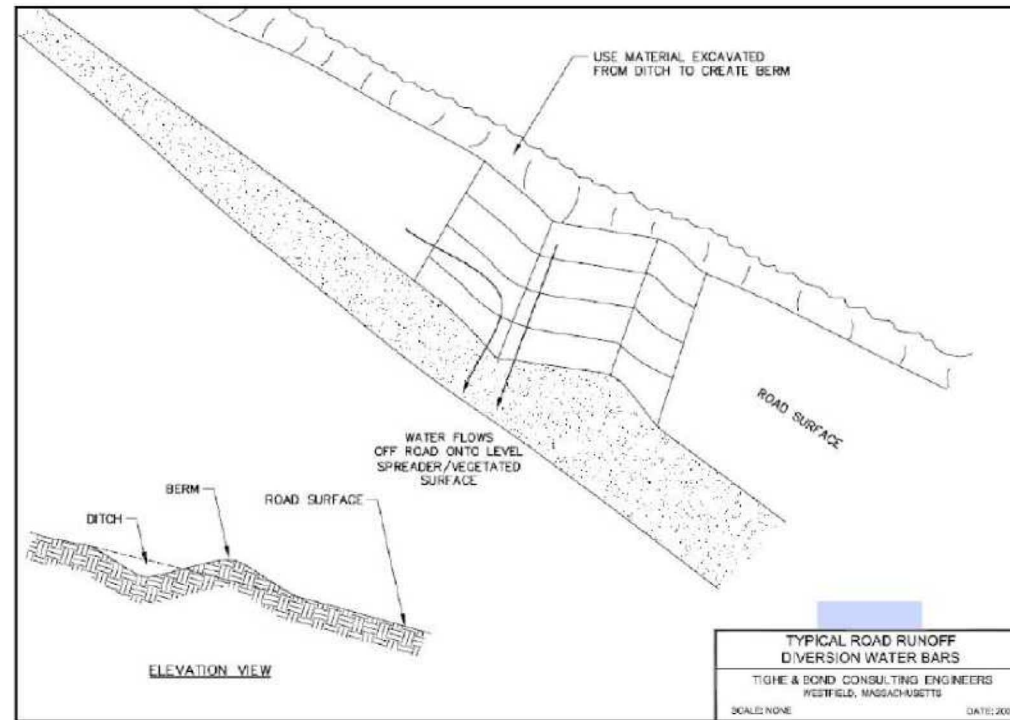
Spacing\* - Dependent on slope length, soil steepness and soil type (general range 10 - 25').

Trenching - 2"-5" inch trench  
Stacking - at each end and four foot on center (i.e. 25 foot wattle uses 6 stacks)



### NOTES (SILT FENCE)

1. THE HEIGHT OF THE BARRIER SHALL NOT EXCEED 36 INCHES.
2. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND SECURELY SEALED. SEE MANUFACTURER'S RECOMMENDATIONS.
3. POSTS SHALL BE PLACED AT A MAXIMUM OF 10 FEET APART AT THE BARRIER LOCATION AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 12 INCHES). WHEN EXTRA STRENGTH FABRIC IS USED WITHOUT THE WIRE SUPPORT FENCE, POST SPACING SHALL BE AS MANUFACTURER RECOMMENDS.
4. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 6 INCHES WIDE AND 6 INCHES DEEP ALONG THE LINE OF POSTS AND UPSLOPE OF THE BARRIER IN ACCORDANCE WITH RECOMMENDATIONS
5. THE FABRIC SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE, AND WILL EXTEND A MINIMUM OF 8 INCHES INTO THE TRENCH. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
6. THE TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE FILTER FABRIC.
7. FABRIC BARRIERS SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.
8. FILTER BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST ONCE DAILY DURING PROLONGED RAINFALL AND ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
9. SHOULD THE FABRIC DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL BE NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.
10. SEDIMENT DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER.
11. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE OR FILTER BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.



- NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
  2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.

## CONSTRUCTION ENTRANCE

NOT TO SCALE

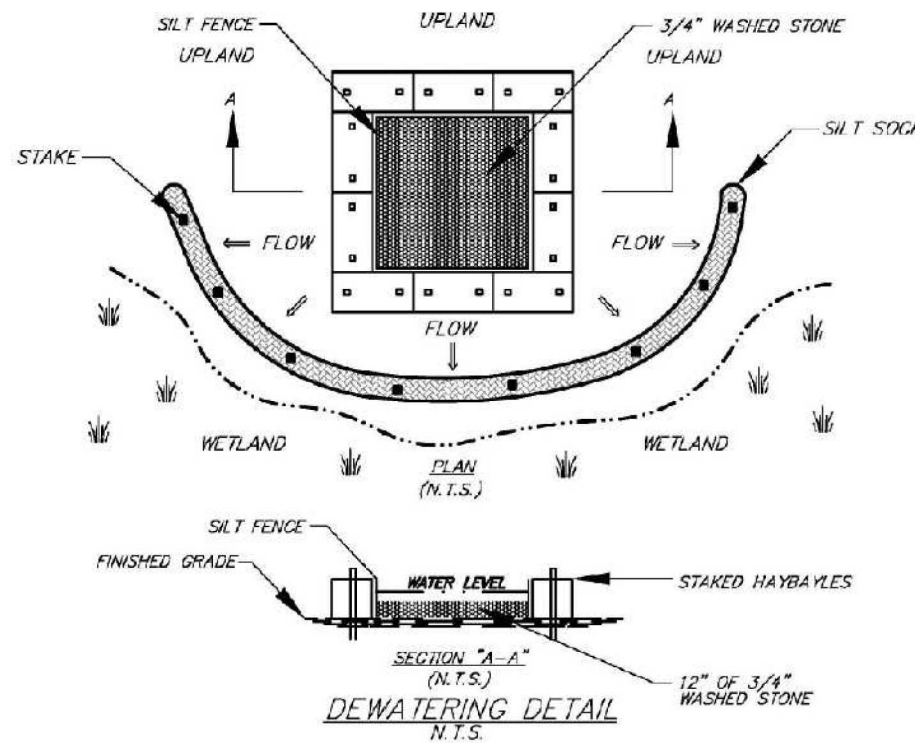


Figure 5

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR THE USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

## L163 TRANSMISSION LINE STRUCTURE REPLACEMENT PROJECT

KEENE, STODDARD, AND ANTRIM  
NEW HAMPSHIRE

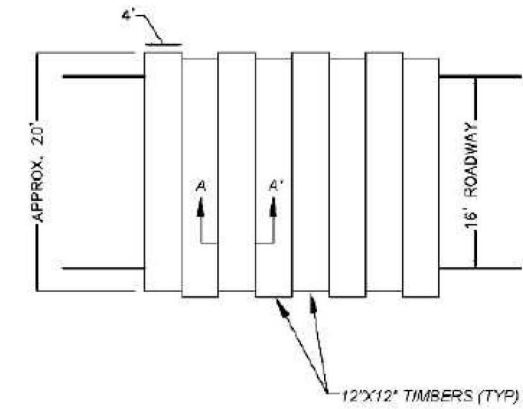
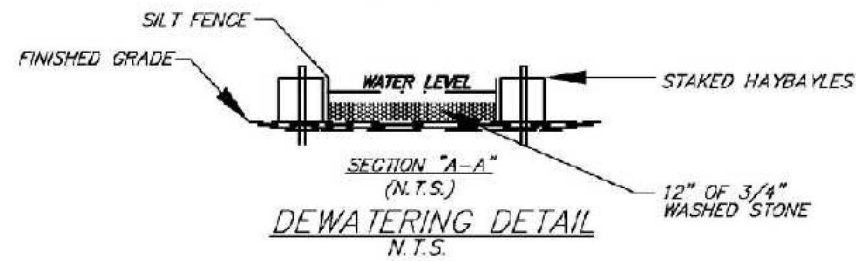
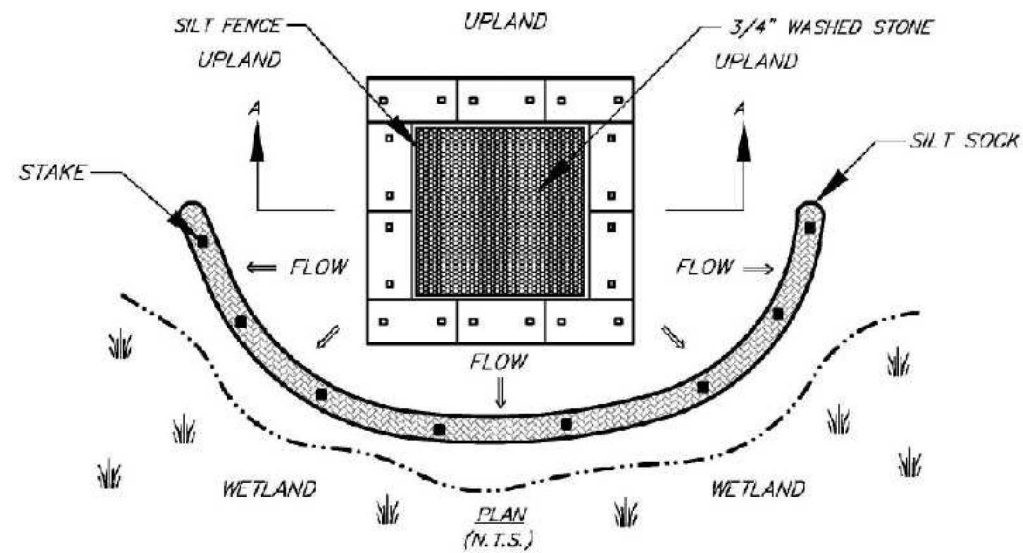
## BMP DETAILS

PREPARED BY:  
**GZA** GeoEnvironmental, Inc.  
Engineers and Scientists  
www.gza.com

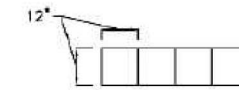
PREPARED FOR:  
**EVERSOURCE**  
ENERGY

PROJ MGR: AJD	REVIEWED BY: LEW	CHECKED BY: DMZ	SHEET <b>2</b>
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE:	
DATE: 01/16/2020	PROJECT NO: 04.0190923.05	REVISION NO:	

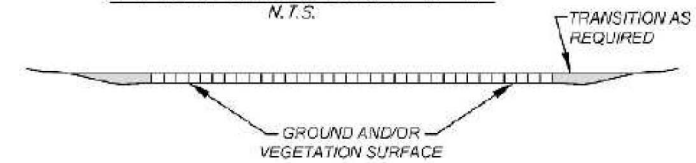
© 2020 - GZA GeoEnvironmental, Inc. P:\04 Jobs\0190923.00 - Eversource\MSA\04.0190923.05 - L163 Transmission Line - Structure Replmt Proj\Figures\CIS 2019\_2020\MXD\L163 AOT NOTESHEET 3- BMPs 2.mxd, 1/16/2020, 10:57:09 AM, matthew.deane



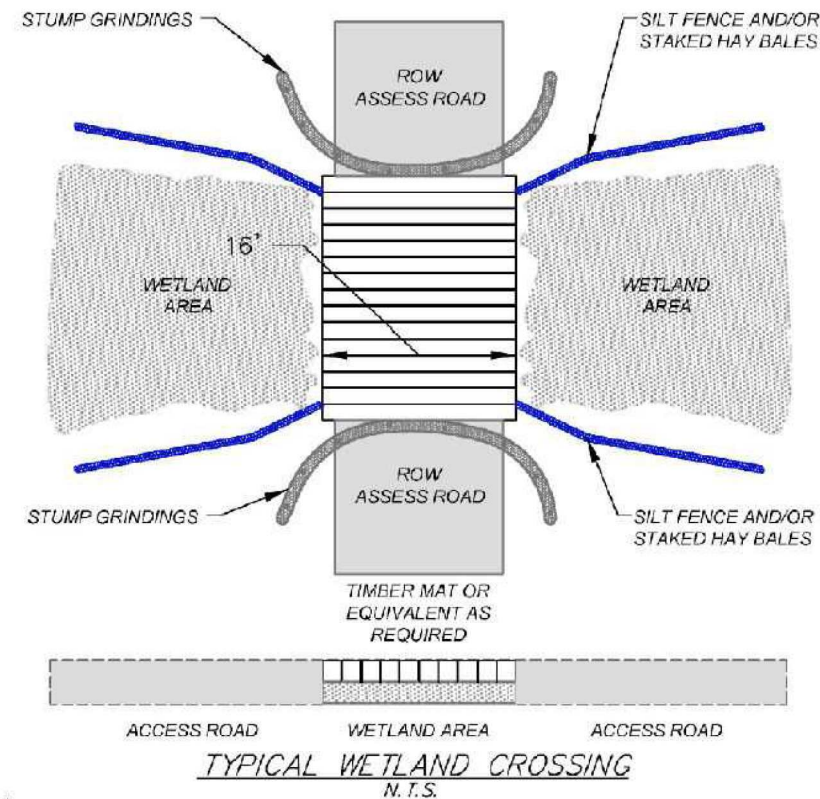
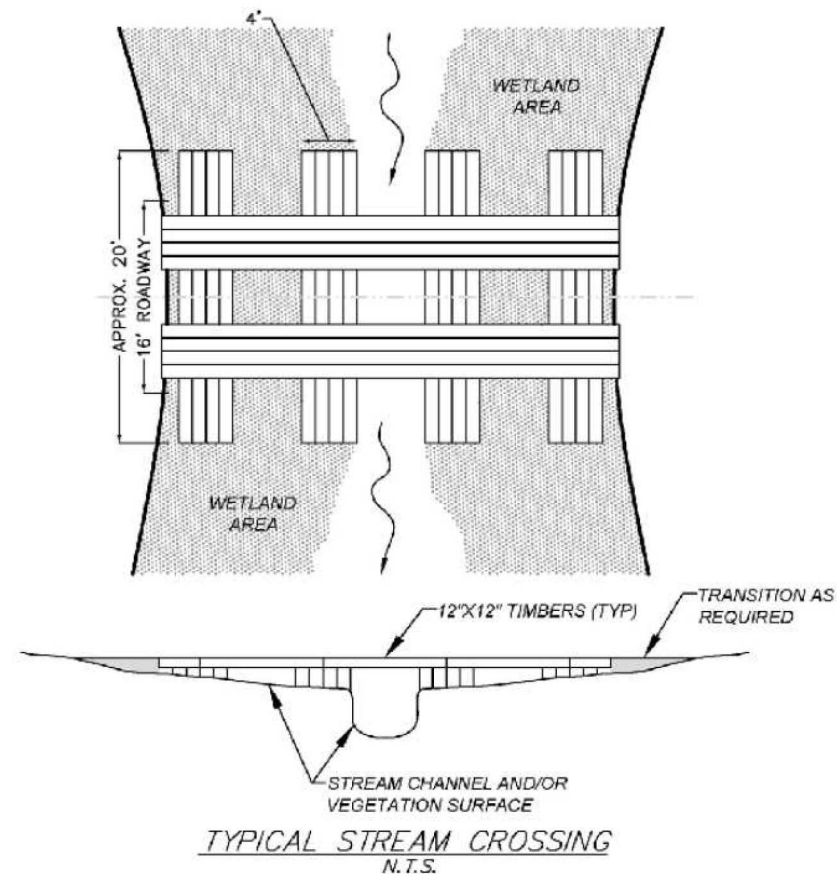
TYPICAL SWAMP MAT PLAN VIEW  
N.T.S.



TYPICAL MAT SECTION A-A  
N.T.S.



TYPICAL SWAMP MAT SECTION DETAIL  
N.T.S.



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L163 TRANSMISSION LINE STRUCTURE REPLACEMENT PROJECT

KEENE, STODDARD, AND ANTRIM  
NEW HAMPSHIRE

BMP DETAILS

PREPARED BY:  
**GZA** GeoEnvironmental, Inc.  
Engineers and Scientists  
www.gza.com

PREPARED FOR:  
**EVERSOURCE**  
ENERGY

PROJ MGR: AJD	REVIEWED BY: LEW	CHECKED BY: DMZ	SHEET <b>3</b>
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE:	
DATE: 01/16/2020	PROJECT NO. 04.0190923.05	REVISION NO.	



## **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](http://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:

<b>1. APPLICANT INFORMATION (INTENDED PERMIT HOLDER)</b>			
Applicant Name: Eversource Energy		Contact Name: Jeremy Fennell	
Email: jeremy.fennell@eversource.com		Daytime Telephone: 603-634-3396	
Mailing Address: 13 Legends Drive			
Town/City: Hooksett		State: NH	Zip Code: 03106
<b>2. APPLICANT'S AGENT INFORMATION</b> If none, check here: <input type="checkbox"/>			
Business Name: GZA GeoEnvironmental		Contact Name: Anthony Damiano	
Email: anthony.damiano@gza.com		Daytime Telephone: 603-213-2682	
Address: 5 Commerce Park North, Suite 201			
Town/City: Bedford		State: NH	Zip Code: 03110
<b>3. PROPERTY OWNER INFORMATION (IF DIFFERENT FROM APPLICANT)</b>			
Applicant Name: ROW consists of existing easements		Contact Name:	
Email:		Daytime Telephone:	
Mailing Address:			
Town/City:		State:	Zip Code:
<b>4. PROPERTY OWNER'S AGENT INFORMATION</b> If none, check here: <input checked="" type="checkbox"/>			
Business Name:		Contact Name:	
Email:		Daytime Telephone:	
Address:			
Town/City:		State:	Zip Code:
<b>5. CONSULTANT INFORMATION</b> If none, check here: <input type="checkbox"/>			
Engineering Firm: GZA GeoEnvironmental, Inc.		Contact Name: Attn: Anthony Damiano	
Email: anthony.damiano@gza.com		Daytime Telephone: 603-213-2682	
Address: 5 Commerce Park North, Suite 201			
Town/City: Bedford		State: NH	Zip Code: 03110

<b>6. PROJECT TYPE</b>					
<input type="checkbox"/> Excavation Only	<input type="checkbox"/> Residential	<input type="checkbox"/> Commercial	<input type="checkbox"/> Golf Course	<input type="checkbox"/> School	<input type="checkbox"/> Municipal
<input type="checkbox"/> Agricultural	<input type="checkbox"/> Land Conversion	<input checked="" type="checkbox"/> Other: Utility			
<b>7. PROJECT LOCATION INFORMATION</b>					
Project Name: L163/X104 Transmission Line Structure Replacement Project					
Street/Road Address: Existing Utility Right-of-Way					
Town/City: Multiple			County:		
Tax Map: See attached		Block:		Lot Number:	
Unit:		Location Coordinates: 208157N, 891289E			
		<input type="checkbox"/> Latitude/Longitude	<input type="checkbox"/> UTM	<input checked="" 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 type="checkbox"/> Withdrawal	<input type="checkbox"/> Discharge	
		<input checked="" type="checkbox"/> No			
2. Man-made pond created by impounding a stream or wetland Purpose:		<input type="checkbox"/> Yes	<input type="checkbox"/> Withdrawal	<input type="checkbox"/> Discharge	
		<input checked="" type="checkbox"/> No			
3. Unlined pond dug into the water table Purpose:		<input type="checkbox"/> Yes	<input type="checkbox"/> Withdrawal	<input type="checkbox"/> Discharge	
		<input checked="" type="checkbox"/> No			
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 " <a href="#">Using NHDES's OneStop WebGIS to Locate Protection Areas</a> " 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>N/A</u> cubic feet within the 100-year floodplain					
Fill volume: <u>N/A</u> cubic feet within the 100-year floodplain					
<input checked="" type="checkbox"/> Project <b>IS</b> within ¼ mile of a designated river Name of River: Ashuelot, N.Branch					
<input type="checkbox"/> Project is <b>NOT</b> within ¼ mile of a designated river					
<input type="checkbox"/> Project <b>IS</b> within a Coastal/Great Bay Region community - include info required by Env-Wq 1503.08(I) if applicable					
<input checked="" type="checkbox"/> Project is <b>NOT</b> within a Coastal/Great Bay Region community					
<b>8. BRIEF PROJECT DESCRIPTION (PLEASE DO NOT REPLY "SEE ATTACHED")</b>					
The proposed project includes the replacement of 54 utility structures along the existing L163/X104 Transmission Line, which crosses through portions of Antrim, Stoddard and Keene, New Hampshire. Access road improvements and work pad grading are proposed as part of this project for continued maintenance of the existing transmission lines.					
<b>9. IF APPLICABLE, DESCRIBE ANY WORK STARTED PRIOR TO RECEIVING PERMIT</b>					

N/A

**10. ADDITIONAL REQUIRED INFORMATION**

A. Date a copy of the application was sent to the municipality as required by Env-Wq 1503.05(e)<sup>1</sup>:   /  /  .  
**(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)<sup>2</sup>:   /  /  .  
**(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: 514,770 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 checked="" type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/>	Permit number:
2. Wetlands Permit	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/>	Permit number: Multiple
3. Shoreland Permit	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/>	Permit number:
4. UIC Registration	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/>	Registration date:
5. Large/Small Community Well Approval	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/>	Approval letter date:
6. Large Groundwater Withdrawal Permit	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input 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: N/A

M. Using NHDES's Web GIS OneStop program ([www2.des.state.nh.us/gis/onestop/](http://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.” NORTH BRANCH ASHUELOT:PH

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

<sup>1</sup> 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.

<sup>2</sup> 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.



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.

## 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](http://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](http://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](http://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.nhdfi.org/about-forests-and-lands/bureaus/natural-heritage-bureau/](http://www.nhdfi.org/about-forests-and-lands/bureaus/natural-heritage-bureau/)
- The Web Soil Survey Map with project's watershed outlined – [websoilsurvey.nrcs.usda.gov](http://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](http://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](http://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/dwssp/gw\\_discharge](http://des.nh.gov/organization/divisions/water/dwgb/dwssp/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.**

[ridge.mauck@des.nh.gov](mailto:ridge.mauck@des.nh.gov) (603) 271-2147

NHDES Alteration of Terrain Bureau, PO Box 95, Concord, NH 03303-0095

[www.des.nh.gov](http://www.des.nh.gov)

**12. REQUIRED SIGNATURES**

JF 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: 1/30/20

Name (print or type): Jeremy Fennell

Title: Environmental Permitting Coordinator

**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

[ridge.mauck@des.nh.gov](mailto:ridge.mauck@des.nh.gov) (603) 271-2147

NHDES Alteration of Terrain Bureau, PO Box 95, Concord, NH 03303-0095

[www.des.nh.gov](http://www.des.nh.gov)

**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:

[ridge.mauck@des.nh.gov](mailto:ridge.mauck@des.nh.gov) (603) 271-2147

NHDES Alteration of Terrain Bureau, PO Box 95, Concord, NH 03303-0095

[www.des.nh.gov](http://www.des.nh.gov)

- 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” x 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.



## **Appendix B – Abutters List**



Eversource L163 Transmission Line Structure Replacement Project  
 Keene, Stoddard, and Antrim  
 New Hampshire

**Table 1. Parcels Intersecting Project Area**

<b>Keene</b>	<b>Stoddard</b>	<b>Antrim</b>
<b>Tax Map-Lot</b>	<b>Tax Map-Lot</b>	<b>Tax Map-Lot</b>
214-001	413-7	213-044
214-015		212-027
214-007		211-004
214-003		210-001
218-039		222-005
214-005		222-007
213-006		223-001
217-003		212-027-001
214-010		
228-002		
214-014		
214-009		
214-020		
228-003		
219-001		
233-002		





**Appendix C – New Hampshire Natural Heritage Bureau Report and E-Mail Review from  
NHB and New Hampshire Fish and Game**

CONFIDENTIAL DNCR

CONFIDENTIAL DNCR









NEW HAMPSHIRE NATURAL HERITAGE BUREAU  
NHB DATACHECK RESULTS LETTER

---

**To:** Conor Madison, GZA Geoenvironmental  
5 Commerce Park N #201  
  
Bedford, NH 03110

**From:** NH Natural Heritage Bureau

**Date:** 4/23/2019 (valid for one year from this date)

**Re:** Review by NH Natural Heritage Bureau of request submitted 4/16/2019

**NHB File ID:** NHB19-1164

**Applicant:** Tracy Tarr

**Location:** Antrim  
Tax Maps: Eversource ROW

**Project Description:** Maintain and replace utility structures in the right-of-way.

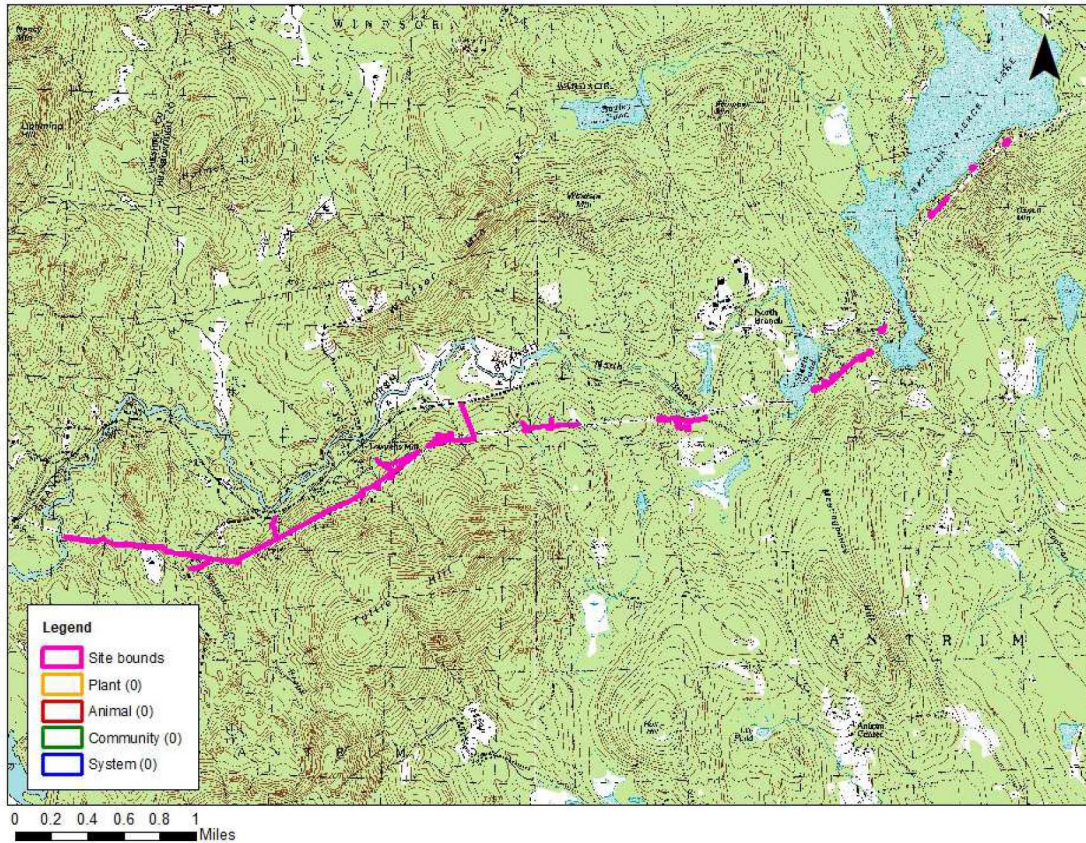
The NH Natural Heritage database has been checked by staff of the NH Natural Heritage Bureau and/or the NH Nongame and Endangered Species Program for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government.

It was determined that, although there was a NHB record (e.g., rare wildlife, plant, and/or natural community) present in the vicinity, we do not expect that it will be impacted by the proposed project. This determination was made based on the project information submitted via the NHB Datacheck Tool on 4/16/2019, and cannot be used for any other project.



MAP OF PROJECT BOUNDARIES FOR: **NHB19-1164**

**NHB19-1164**







NEW HAMPSHIRE NATURAL HERITAGE BUREAU  
NHB DATACHECK RESULTS LETTER

---

**To:** Conor Madison, GZA Geoenvironmental  
5 Commerce Park N #201  
Bedford, NH 03110

**From:** NH Natural Heritage Bureau

**Date:** 3/14/2019 (valid for one year from this date)

**Re:** Review by NH Natural Heritage Bureau of request submitted 3/8/2019

VALID ONLY FOR NOTIFICATION OR MINIMUM EXPEDITED  
APPLICATIONS SUBMITTED TO THE NHDES WETLANDS BUREAU

**NHB File ID:** NHB19-0773

**Applicant:** Jennifer Grawin

**Location:** Stoddard  
Tax Maps: Eversource ROW

**Project  
Description:** Maintain and replace current transmission line structures

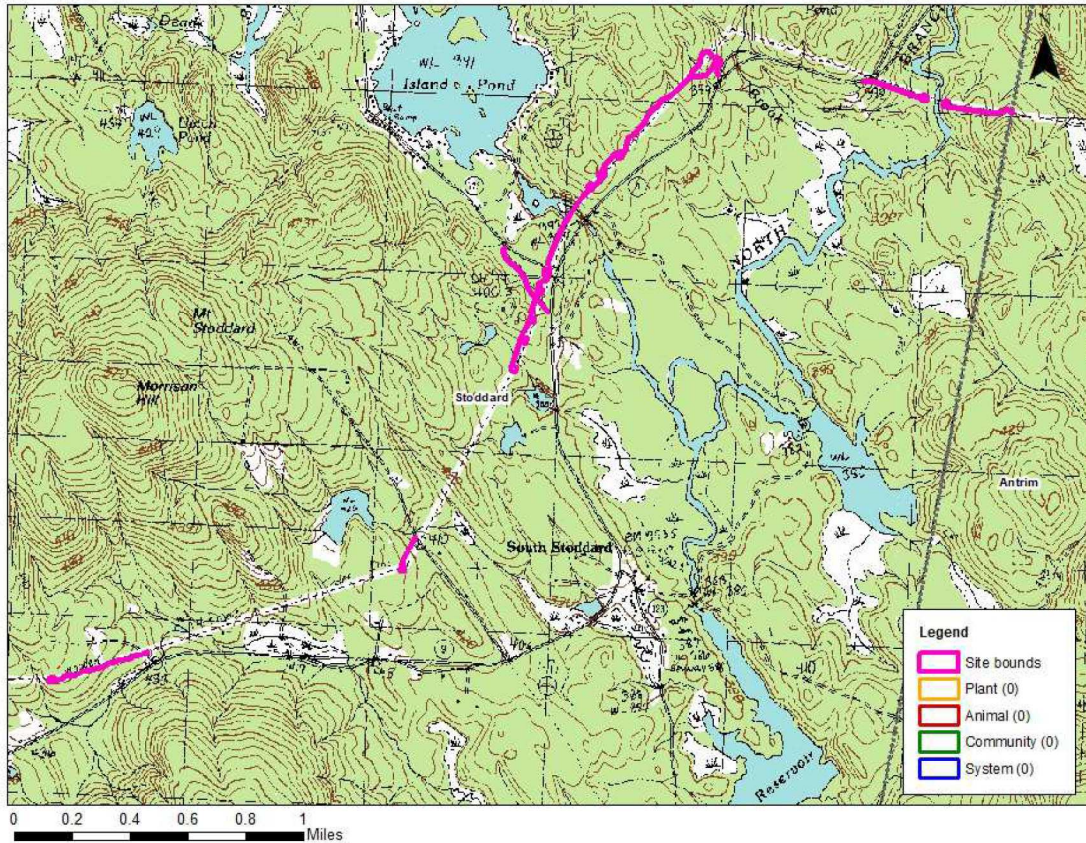
The NH Natural Heritage database has been checked by staff of the NH Natural Heritage Bureau and/or the NH Nongame and Endangered Species Program for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government.

It was determined that, although there was a NHB record (e.g., rare wildlife, plant, and/or natural community) present in the vicinity, we do not expect that it will be impacted by the proposed project. This determination was made based on the project information submitted via the NHB Datacheck Tool on 3/8/2019, and cannot be used for any other project.



MAP OF PROJECT BOUNDARIES FOR: NHB19-0773

NHB19-0773



## Anthony Damiano

---

**From:** Tuttle, Kim <Kim.Tuttle@wildlife.nh.gov>  
**Sent:** Wednesday, September 18, 2019 1:57 PM  
**To:** Anthony Damiano  
**Subject:** RE: NHB19-1167 L163 Transmission Line Maintenance Project - Keene NH

Okay. Sounds good.

Kim Tuttle  
Wildlife Biologist  
NH Fish and Game  
11 Hazen Drive  
Concord, NH 03301  
603-271-6544

---

**From:** Anthony Damiano [mailto:Anthony.Damiano@gza.com]  
**Sent:** Wednesday, September 18, 2019 1:46 PM  
**To:** Tuttle, Kim  
**Subject:** RE: NHB19-1167 L163 Transmission Line Maintenance Project - Keene NH

**EXTERNAL:** Do not open attachments or click on links unless you recognize and trust the sender.

---

Hi Kim,

Construction will likely begin in June of 2020. A vernal pool assessment has been completed and vernal pools have been labeled on the plans. There will be no impacts to vernal pools during the proposed project.

Thanks for your quick response!

Let me know if you have any additional comments.

Anthony

**Anthony Damiano**  
**Assistant Project Manager**  
GZA | 5 Commerce Park North, Suite 201 | Bedford, NH 03301-6984  
o: 603.232.8796 | c: 603.213.2682 | [anthony.damiano@gza.com](mailto:anthony.damiano@gza.com) | [www.gza.com](http://www.gza.com) | [LinkedIn](#)

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**From:** Tuttle, Kim <Kim.Tuttle@wildlife.nh.gov>  
**Sent:** Wednesday, September 18, 2019 1:19 PM  
**To:** Anthony Damiano <Anthony.Damiano@gza.com>  
**Subject:** RE: NHB19-1167 L163 Transmission Line Maintenance Project - Keene NH

Hello Anthony,

Do you have more specific timing for this project? It will be important not to cross vernal pools, even temporarily, especially April through the beginning of August, as wood and spotted turtles are drawn to vernal pools to feed on amphibian eggs and larvae which are a significant part of their diet. If construction is planned for those months, it may be a good idea to document vernal pools that may be impacted so that they can be avoided. We agree that impacts to dwarf wedge mussel are not anticipated if there will be no impacts to the bed or banks of the Ashuelot River.

Thanks,

Kim Tuttle  
Wildlife Biologist  
NH Fish and Game  
11 Hazen Drive  
Concord, NH 03301  
603-271-6544

---

**From:** Anthony Damiano [<mailto:Anthony.Damiano@gza.com>]  
**Sent:** Wednesday, September 18, 2019 10:58 AM  
**To:** Tuttle, Kim  
**Subject:** NHB19-1167 L163 Transmission Line Maintenance Project - Keene NH

**EXTERNAL:** Do not open attachments or click on links unless you recognize and trust the sender.

---

Hi Kim,

Attached is the NHB report for the L163 Transmission Line Maintenance Project in Keene, New Hampshire. We will be filing a Standard Dredge and Fill Permit in the town of Keene for proposed structure replacements in 2020.

The proposed project involves approximately 85,019 sq. ft. of temporary wetland impact for access and work pad placement and 175 sq. ft. of permanent wetland impact for the replacement of 22 existing utility structures in the town of Keene, NH.

According to the attached NHB report, Dwarf Wedge Mussel, spotted turtle and wood turtle were identified adjacent to the project area. The proposed project involves temporary and permanent impact within an existing right-of-way only. The project does not involve any river crossings so therefore there are no anticipated impacts to the Dwarf Wedge Mussel.

Eversource intends to incorporate reptile construction BMPs including the following;

1. Prior to daily construction activities, timber matting will be reviewed for snakes and turtles. GZA will provide an environmental addendum to the daily tailboards by the contracts to include guidance on protocols for turtles for identification of wood turtle.
2. Observed snakes and turtles will be moved off of construction access roads to limit and prevent mortality to turtles during construction.
3. Erosion control matting, if utilized, will consist of jute matting. Matting with plastic mesh will be avoided to limit unintentional mortality to snakes.
4. At the conclusion of the project, a summary report of any rare species observations will be provided to the NHFG Nongame Program.

Eversource will report on any rare species observations as typically requested, including immediate contact with Melissa Doperalski or Josh Megyesy if wood, Blanding's or spotted turtles are found laying eggs in the work area.

Let me know if you have any questions or comments,

Thanks!

Anthony

**Anthony Damiano**

**Assistant Project Manager**

GZA | 5 Commerce Park North, Suite 201 | Bedford, NH 03301-6984

o: 603.232.8796 | c: 603.213.2682 | [anthony.damiano@gza.com](mailto:anthony.damiano@gza.com) | [www.gza.com](http://www.gza.com) | [LinkedIn](#)

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## **Appendix D – Natural Resources Conservation Service Web Soil Survey**



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 Cheshire County, New Hampshire; and Hillsborough County, New Hampshire, Western Part



# 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](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

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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

## Custom Soil Resource Report

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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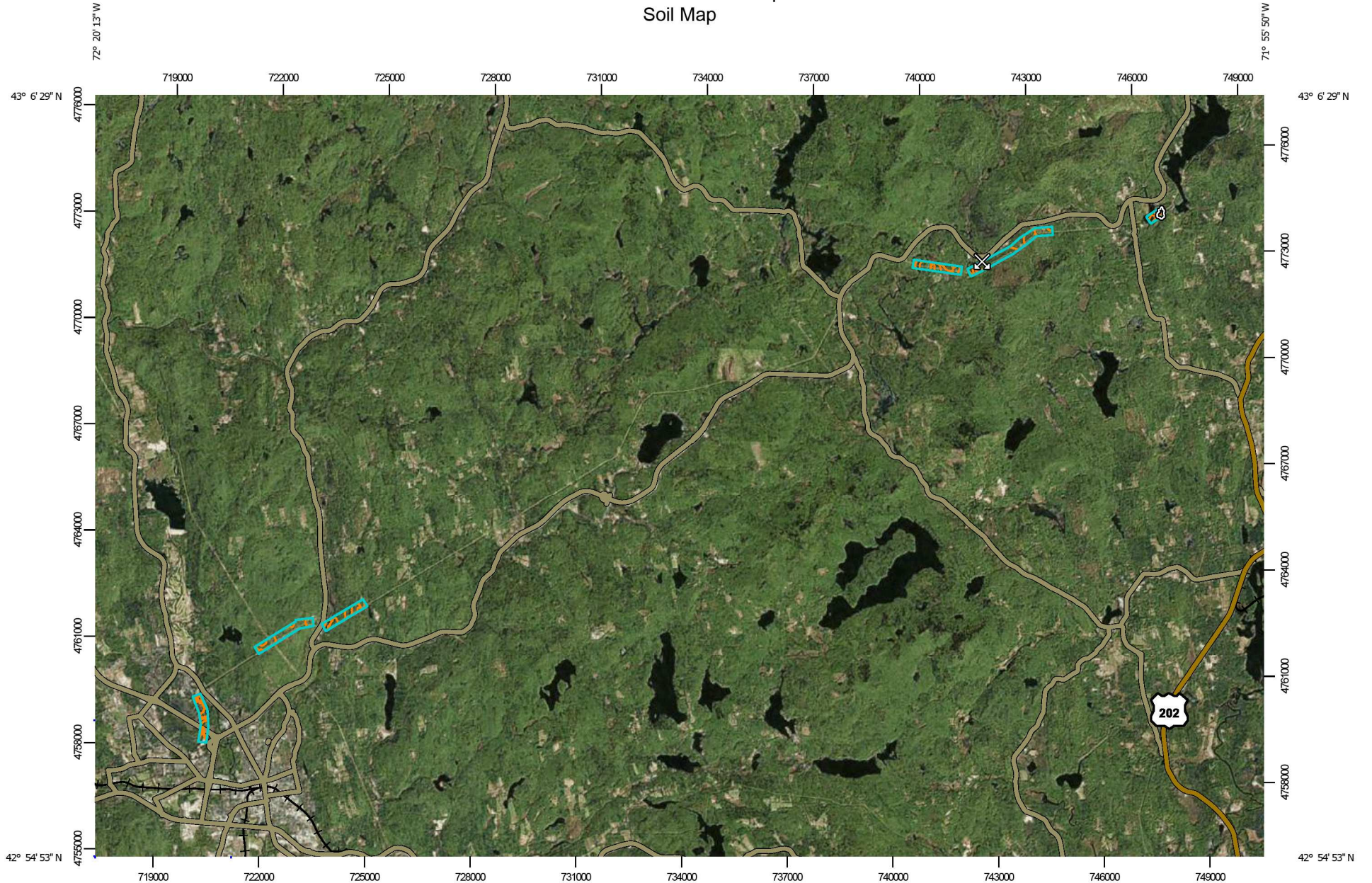
identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

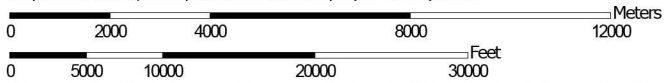
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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report Soil Map



Map Scale: 1:151,000 if printed on A landscape (11" x 8.5") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N 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 1:20,000.

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: Cheshire County, New Hampshire

Survey Area Data: Version 22, Sep 16, 2019

Soil Survey Area: Hillsborough County, New Hampshire, Western Part

Survey Area Data: Version 20, Sep 16, 2019

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

**MAP LEGEND**

**MAP INFORMATION**

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
15	Searsport mucky peat	10.1	1.9%
22C	Colton gravelly sandy loam, 8 to 15 percent slopes	0.2	0.0%
26A	Windsor loamy sand, 0 to 3 percent slopes	6.8	1.3%
26B	Windsor loamy sand, 3 to 8 percent slopes	14.4	2.7%
61C	Tunbridge-Lyman-Rock outcrop complex, 8 to 15 percent slopes	12.9	2.5%
61D	Tunbridge-Lyman-Rock outcrop complex, 15 to 25 percent slopes	72.0	13.7%
73D	Berkshire fine sandy loam, 15 to 25 percent slopes, very stony	0.2	0.0%
77C	Marlow fine sandy loam, 8 to 15 percent slopes, very stony	0.7	0.1%
107	Rippowam-Saco complex	4.9	0.9%
143C	Monadnock fine sandy loam, 8 to 15 percent slopes, very stony	20.1	3.8%
143D	Monadnock fine sandy loam, 15 to 25 percent slopes, very stony	51.0	9.7%
161E	Lyman-Tunbridge-Rock outcrop complex, 25 to 60 percent slopes	30.5	5.8%
197	Borohemists, ponded	2.3	0.4%
214	Naumburg loamy fine sand	2.3	0.4%
401	Occum fine sandy loam	0.7	0.1%
495	Ossipee mucky peat	37.5	7.2%
526A	Caesar loamy sand, 0 to 3 percent slopes	9.3	1.8%
526E	Caesar loamy sand, 15 to 50 percent slopes	4.0	0.8%
771C	Monadnock and Berkshire soils, 8 to 15 percent slopes, extremely bouldery	1.6	0.3%
771D	Monadnock and Berkshire soils, 15 to 35 percent slopes, extremely bouldery	7.8	1.5%
W	Water	1.6	0.3%
<b>Subtotals for Soil Survey Area</b>		<b>290.9</b>	<b>55.5%</b>

## Custom Soil Resource Report

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
<b>Totals for Area of Interest</b>		<b>523.8</b>	<b>100.0%</b>

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
22C	Colton gravelly sandy loam, 8 to 15 percent slopes	2.3	0.4%
36B	Adams loamy sand, 3 to 8 percent slopes	9.0	1.7%
76C	Marlow fine sandy loam, 8 to 15 percent slopes	0.2	0.0%
77C	Marlow fine sandy loam, 8 to 15 percent slopes, very stony	59.5	11.4%
77D	Marlow fine sandy loam, 15 to 35 percent slopes, very stony	106.9	20.4%
143C	Monadnock fine sandy loam, 8 to 15 percent slopes, very stony	8.6	1.7%
143D	Monadnock fine sandy loam, 15 to 35 percent slopes, very stony	3.7	0.7%
145C	Monadnock fine sandy loam, 0 to 15 percent slopes, extremely bouldery	19.0	3.6%
160B	Tunbridge-Lyman-Monadnock complex, stony, 3 to 8 percent slopes	3.1	0.6%
161C	Lyman-Tunbridge-Rock outcrop complex, 3 to 15 percent slopes	0.1	0.0%
161D	Lyman-Tunbridge-Rock outcrop complex, 15 to 35 percent slopes	5.7	1.1%
247B	Lyme fine sandy loam, 0 to 8 percent slopes, very stony	0.2	0.0%
295	Greenwood mucky peat	8.6	1.7%
559C	Skerry fine sandy loam, 8 to 15 percent slopes, very stony	0.6	0.1%
647B	Pillsbury fine sandy loam, 0 to 8 percent slopes, very stony	2.4	0.5%
W	Water	2.8	0.5%
<b>Subtotals for Soil Survey Area</b>		<b>232.8</b>	<b>44.5%</b>
<b>Totals for Area of Interest</b>		<b>523.8</b>	<b>100.0%</b>

## Map Unit Descriptions

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.

## Custom Soil Resource Report

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 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.

## Custom Soil Resource Report

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.

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.

## Cheshire County, New Hampshire

### 15—Searsport mucky peat

#### Map Unit Setting

*National map unit symbol:* 9cyp  
*Elevation:* 10 to 2,800 feet  
*Mean annual precipitation:* 30 to 50 inches  
*Mean annual air temperature:* 37 to 46 degrees F  
*Frost-free period:* 80 to 160 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Searsport and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Searsport

##### Setting

*Landform:* Outwash terraces

##### Typical profile

*O - 0 to 12 inches:* mucky peat  
*H1 - 12 to 34 inches:* loamy fine sand  
*H2 - 34 to 60 inches:* loamy fine sand

##### Properties and qualities

*Slope:* 0 to 3 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural 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 to 12 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* Frequent  
*Available water storage in profile:* Moderate (about 6.7 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 5w  
*Hydrologic Soil Group:* A/D  
*Hydric soil rating:* Yes

#### Minor Components

##### Naumburg

*Percent of map unit:* 5 percent  
*Landform:* Outwash terraces  
*Hydric soil rating:* Yes

##### Croghan

*Percent of map unit:* 4 percent  
*Hydric soil rating:* No

**Not named**

*Percent of map unit:* 3 percent  
*Hydric soil rating:* No

**Chocorua**

*Percent of map unit:* 3 percent  
*Landform:* Bogs  
*Hydric soil rating:* Yes

**22C—Colton gravelly sandy loam, 8 to 15 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 2yfn  
*Elevation:* 10 to 2,000 feet  
*Mean annual precipitation:* 31 to 65 inches  
*Mean annual air temperature:* 36 to 52 degrees F  
*Frost-free period:* 90 to 160 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Colton and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Colton**

**Setting**

*Landform:* Outwash terraces  
*Landform position (two-dimensional):* Summit, backslope  
*Landform position (three-dimensional):* Base slope, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Sandy-skeletal glaciofluvial deposits

**Typical profile**

*Ap - 0 to 7 inches:* gravelly sandy loam  
*Bs - 7 to 14 inches:* gravelly loamy sand  
*BC - 14 to 24 inches:* very gravelly coarse sand  
*C - 24 to 65 inches:* extremely gravelly coarse sand

**Properties and qualities**

*Slope:* 8 to 15 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Excessively drained  
*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:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None



## Custom Soil Resource Report

*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water storage in profile:* Very low (about 2.5 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4e

*Hydrologic Soil Group:* A

*Hydric soil rating:* No

### Minor Components

#### Adams

*Percent of map unit:* 10 percent

*Landform:* Outwash terraces

*Landform position (two-dimensional):* Backslope, summit

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Hydric soil rating:* No

#### Sheepscot

*Percent of map unit:* 3 percent

*Landform:* Outwash terraces

*Landform position (two-dimensional):* Footslope

*Landform position (three-dimensional):* Base slope

*Down-slope shape:* Concave

*Across-slope shape:* Linear

*Hydric soil rating:* No

#### Croghan

*Percent of map unit:* 2 percent

*Landform:* Outwash terraces

*Landform position (two-dimensional):* Footslope

*Landform position (three-dimensional):* Base slope

*Down-slope shape:* Linear

*Across-slope shape:* Concave

*Hydric soil rating:* No

## 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

## Custom Soil Resource Report

*Minor components: 15 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Windsor, Loamy Sand

#### Setting

*Landform: Outwash plains, deltas, outwash terraces, 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*

*Natural 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*

*Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)*

*Available water storage in profile: Low (about 3.6 inches)*

#### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 2s*

*Hydrologic Soil Group: A*

*Hydric soil rating: No*

### Minor Components

#### Deerfield, loamy sand

*Percent of map unit: 10 percent*

*Landform: Outwash plains, terraces, deltas*

*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: Kames, outwash plains, eskers, deltas*

*Landform position (two-dimensional): Summit, shoulder, backslope*

*Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise*

*Down-slope shape: Convex*

## Custom Soil Resource Report

*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:* 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:* 3 to 8 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural 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  
*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water storage in profile:* Low (about 4.5 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 2s

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*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

### Minor Components

#### **Hinckley, loamy sand**

*Percent of map unit:* 10 percent  
*Landform:* Outwash plains, eskers, deltas, kames  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Nose slope, side slope, crest, head slope, rise  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear, convex  
*Hydric soil rating:* No

#### **Deerfield, loamy sand**

*Percent of map unit:* 5 percent  
*Landform:* Terraces, deltas, 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

## 61C—Tunbridge-Lyman-Rock outcrop complex, 8 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* 2trpj  
*Elevation:* 160 to 3,480 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 52 degrees F  
*Frost-free period:* 60 to 160 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Tunbridge, very stony, and similar soils:* 39 percent  
*Lyman, very stony, and similar soils:* 30 percent  
*Rock outcrop:* 19 percent  
*Minor components:* 12 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Tunbridge, Very Stony

#### **Setting**

*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Shoulder, summit, backslope  
*Landform position (three-dimensional):* Mountaintop, mountainflank, mountainbase, side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex

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*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

### Typical profile

*Oe - 0 to 3 inches:* moderately decomposed plant material  
*Oa - 3 to 5 inches:* highly decomposed plant material  
*E - 5 to 8 inches:* fine sandy loam  
*Bhs - 8 to 11 inches:* fine sandy loam  
*Bs - 11 to 26 inches:* fine sandy loam  
*BC - 26 to 28 inches:* fine sandy loam  
*R - 28 to 38 inches:* bedrock

### Properties and qualities

*Slope:* 8 to 15 percent  
*Percent of area covered with surface fragments:* 1.5 percent  
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock  
*Natural drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Moderate (about 6.1 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* C  
*Hydric soil rating:* No

## Description of Lyman, Very Stony

### Setting

*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountaintop, mountainflank, mountainbase, crest, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*A - 1 to 3 inches:* loam  
*E - 3 to 5 inches:* fine sandy loam  
*Bhs - 5 to 7 inches:* loam  
*Bs1 - 7 to 11 inches:* loam  
*Bs2 - 11 to 18 inches:* channery loam  
*R - 18 to 28 inches:* bedrock

### Properties and qualities

*Slope:* 8 to 15 percent  
*Percent of area covered with surface fragments:* 1.5 percent  
*Depth to restrictive feature:* 11 to 24 inches to lithic bedrock

## Custom Soil Resource Report

*Natural drainage class:* Somewhat excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Low (about 3.4 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

### Description of Rock Outcrop

#### Setting

*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope, shoulder, summit  
*Landform position (three-dimensional):* Mountaintop, mountainflank, mountainbase, crest, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Igneous and metamorphic rock

#### Typical profile

*R - 0 to 10 inches:* bedrock

#### Properties and qualities

*Slope:* 8 to 15 percent  
*Depth to restrictive feature:* 0 inches to lithic bedrock  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to very high (0.00 to 14.17 in/hr)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 8s  
*Hydric soil rating:* Unranked

### Minor Components

#### Peru, very stony

*Percent of map unit:* 5 percent  
*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope, footslope  
*Landform position (three-dimensional):* Mountaintop, mountainflank, mountainbase, side slope, crest  
*Microfeatures of landform position:* Closed depressions, closed depressions, open depressions, open depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

#### Moosilauke, very stony

*Percent of map unit:* 4 percent  
*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Footslope, toeslope

## Custom Soil Resource Report

*Landform position (three-dimensional):* Mountaintop, mountainflank, mountainbase, side slope, crest  
*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

### **Monadnock, very stony**

*Percent of map unit:* 3 percent  
*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Shoulder, summit, backslope  
*Landform position (three-dimensional):* Mountaintop, mountainflank, mountainbase, side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

## **61D—Tunbridge-Lyman-Rock outcrop complex, 15 to 25 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 2trpk  
*Elevation:* 520 to 1,970 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 52 degrees F  
*Frost-free period:* 60 to 160 days  
*Farmland classification:* Not prime farmland

### **Map Unit Composition**

*Tunbridge, very stony, and similar soils:* 40 percent  
*Lyman, very stony, and similar soils:* 29 percent  
*Rock outcrop:* 18 percent  
*Minor components:* 13 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Tunbridge, Very Stony**

#### **Setting**

*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Shoulder, summit, backslope  
*Landform position (three-dimensional):* Mountaintop, mountainflank, side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

## Custom Soil Resource Report

### Typical profile

*Oe - 0 to 3 inches:* moderately decomposed plant material  
*Oa - 3 to 5 inches:* highly decomposed plant material  
*E - 5 to 8 inches:* fine sandy loam  
*Bhs - 8 to 11 inches:* fine sandy loam  
*Bs - 11 to 26 inches:* fine sandy loam  
*BC - 26 to 28 inches:* fine sandy loam  
*R - 28 to 38 inches:* bedrock

### Properties and qualities

*Slope:* 15 to 25 percent  
*Percent of area covered with surface fragments:* 1.5 percent  
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock  
*Natural drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Moderate (about 6.1 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* C  
*Hydric soil rating:* No

### Description of Lyman, Very Stony

#### Setting

*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountaintop, mountainflank, crest, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*A - 1 to 3 inches:* loam  
*E - 3 to 5 inches:* fine sandy loam  
*Bhs - 5 to 7 inches:* loam  
*Bs1 - 7 to 11 inches:* loam  
*Bs2 - 11 to 18 inches:* channery loam  
*R - 18 to 28 inches:* bedrock

### Properties and qualities

*Slope:* 15 to 25 percent  
*Percent of area covered with surface fragments:* 1.5 percent  
*Depth to restrictive feature:* 11 to 24 inches to lithic bedrock  
*Natural drainage class:* Somewhat excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)



## Custom Soil Resource Report

*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Low (about 3.4 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

### Description of Rock Outcrop

#### Setting

*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope, shoulder, summit  
*Landform position (three-dimensional):* Mountaintop, mountainflank, crest, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Igneous and metamorphic rock

#### Typical profile

*R - 0 to 10 inches:* bedrock

#### Properties and qualities

*Slope:* 15 to 25 percent  
*Depth to restrictive feature:* 0 inches to lithic bedrock  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to very high (0.00 to 14.17 in/hr)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 8s  
*Hydric soil rating:* Unranked

### Minor Components

#### Peru, very stony

*Percent of map unit:* 6 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, footslope  
*Landform position (three-dimensional):* Mountainflank, mountaintop, side slope, crest  
*Microfeatures of landform position:* Open depressions, open depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

#### Moosilauke, very stony

*Percent of map unit:* 4 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Mountaintop, mountainflank, side slope, crest  
*Microfeatures of landform position:* Open depressions, open depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave

## Custom Soil Resource Report

*Hydric soil rating:* Yes

### **Monadnock, very stony**

*Percent of map unit:* 3 percent

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Shoulder, summit, backslope

*Landform position (three-dimensional):* Mountaintop, mountainflank, side slope, crest

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

## **73D—Berkshire fine sandy loam, 15 to 25 percent slopes, very stony**

### **Map Unit Setting**

*National map unit symbol:* 2wllx

*Elevation:* 460 to 1,840 feet

*Mean annual precipitation:* 31 to 95 inches

*Mean annual air temperature:* 27 to 55 degrees F

*Frost-free period:* 90 to 160 days

*Farmland classification:* Not prime farmland

### **Map Unit Composition**

*Berkshire, very stony, and similar soils:* 88 percent

*Minor components:* 12 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Berkshire, Very Stony**

#### **Setting**

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, summit, shoulder

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Loamy supraglacial meltout till derived from phyllite and/or loamy supraglacial meltout till derived from granite and gneiss and/or loamy supraglacial meltout till derived from mica schist

#### **Typical profile**

*O<sub>i</sub> - 0 to 2 inches:* slightly decomposed plant material

*A - 2 to 4 inches:* fine sandy loam

*E - 4 to 5 inches:* fine sandy loam

*Bs<sub>1</sub> - 5 to 7 inches:* fine sandy loam

*Bs<sub>2</sub> - 7 to 13 inches:* fine sandy loam

*Bs<sub>3</sub> - 13 to 21 inches:* fine sandy loam

*BC<sub>1</sub> - 21 to 28 inches:* fine sandy loam

*BC<sub>2</sub> - 28 to 33 inches:* fine sandy loam

## Custom Soil Resource Report

C - 33 to 65 inches: fine sandy loam

### Properties and qualities

*Slope:* 15 to 25 percent

*Percent of area covered with surface fragments:* 1.1 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*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

*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water storage in profile:* High (about 10.0 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6s

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

### Minor Components

#### Peru, very stony

*Percent of map unit:* 5 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, footslope

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Microfeatures of landform position:* Open depressions, open depressions

*Down-slope shape:* Convex, concave

*Across-slope shape:* Convex, concave

*Hydric soil rating:* No

#### Lyman, very stony

*Percent of map unit:* 4 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Shoulder, summit, backslope

*Landform position (three-dimensional):* Mountainflank, nose slope, side slope

*Microfeatures of landform position:* Rises, rises

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### Lyme, very stony

*Percent of map unit:* 2 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Footslope, toeslope

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Microfeatures of landform position:* Closed depressions, open depressions, closed depressions, open depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

#### Marlow, very stony

*Percent of map unit:* 1 percent

*Landform:* Hills, mountains

## Custom Soil Resource Report

*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Mountainflank, side slope, nose slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

### **77C—Marlow fine sandy loam, 8 to 15 percent slopes, very stony**

#### **Map Unit Setting**

*National map unit symbol:* 2ty5p  
*Elevation:* 520 to 1,900 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 55 degrees F  
*Frost-free period:* 90 to 160 days  
*Farmland classification:* Farmland of local importance

#### **Map Unit Composition**

*Marlow, very stony, and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### **Description of Marlow, Very Stony**

##### **Setting**

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy lodgment till derived from granite and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from phyllite

##### **Typical profile**

*O<sub>i</sub> - 0 to 2 inches:* slightly decomposed plant material  
*A - 2 to 5 inches:* fine sandy loam  
*E - 5 to 8 inches:* fine sandy loam  
*B<sub>s1</sub> - 8 to 15 inches:* fine sandy loam  
*B<sub>s2</sub> - 15 to 19 inches:* fine sandy loam  
*BC - 19 to 33 inches:* gravelly fine sandy loam  
*Cd - 33 to 65 inches:* fine sandy loam

##### **Properties and qualities**

*Slope:* 8 to 15 percent  
*Percent of area covered with surface fragments:* 1.1 percent  
*Depth to restrictive feature:* 20 to 41 inches to densic material  
*Natural drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (K<sub>sat</sub>):* Moderately low to moderately high (0.01 to 1.42 in/hr)  
*Depth to water table:* More than 80 inches

## Custom Soil Resource Report

*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water storage in profile:* Low (about 5.1 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* C  
*Hydric soil rating:* No

### **Minor Components**

#### **Peru, very stony**

*Percent of map unit:* 6 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Footslope, backslope  
*Landform position (three-dimensional):* Mountainbase, mountainflank, interfluve, side slope, nose slope  
*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

#### **Berkshire, very stony**

*Percent of map unit:* 4 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

#### **Tunbridge, very stony**

*Percent of map unit:* 3 percent  
*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

#### **Pillsbury, very stony**

*Percent of map unit:* 2 percent  
*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve  
*Microfeatures of landform position:* Closed depressions, closed depressions, open depressions, open depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

## 107—Rippowam-Saco complex

### Map Unit Setting

*National map unit symbol:* 9cyb  
*Elevation:* 50 to 500 feet  
*Mean annual precipitation:* 30 to 50 inches  
*Mean annual air temperature:* 45 to 52 degrees F  
*Frost-free period:* 105 to 180 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Rippowam and similar soils:* 40 percent  
*Saco and similar soils:* 35 percent  
*Minor components:* 25 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Rippowam

#### Setting

*Landform:* Flood plains  
*Parent material:* Sandy and/or coarse-loamy alluvium derived from granite, gneiss or schist

#### Typical profile

*H1 - 0 to 9 inches:* fine sandy loam  
*H2 - 9 to 30 inches:* fine sandy loam  
*H3 - 30 to 60 inches:* stratified loamy fine sand to very gravelly coarse sand

#### Properties and qualities

*Slope:* 0 to 3 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural 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:* Frequent  
*Frequency of ponding:* None  
*Available water storage in profile:* Moderate (about 6.2 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4w  
*Hydrologic Soil Group:* A/D  
*Hydric soil rating:* Yes

### Description of Saco

#### Setting

*Landform:* Flood plains

## Custom Soil Resource Report

*Parent material:* Sandy and/or coarse-loamy alluvium derived from granite, gneiss or schist

### Typical profile

*H1 - 0 to 5 inches:* mucky silt loam

*H2 - 5 to 12 inches:* silt loam

*H3 - 12 to 60 inches:* silt loam

### Properties and qualities

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Very poorly 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 0 to 6 inches

*Frequency of flooding:* Frequent

*Frequency of ponding:* None

*Available water storage in profile:* Very high (about 13.0 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6w

*Hydrologic Soil Group:* B/D

*Hydric soil rating:* Yes

### Minor Components

#### Pootatuck

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

#### Limerick

*Percent of map unit:* 5 percent

*Landform:* Flood plains

*Hydric soil rating:* Yes

#### Occum

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

#### Suncook

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

#### Chocorua

*Percent of map unit:* 3 percent

*Landform:* Swamps

*Hydric soil rating:* Yes

#### Ossipee

*Percent of map unit:* 2 percent

*Landform:* Swamps

*Hydric soil rating:* Yes

## 143C—Monadnock fine sandy loam, 8 to 15 percent slopes, very stony

### Map Unit Setting

*National map unit symbol:* 2wlm7

*Elevation:* 360 to 1,670 feet

*Mean annual precipitation:* 31 to 95 inches

*Mean annual air temperature:* 27 to 55 degrees F

*Frost-free period:* 90 to 150 days

*Farmland classification:* Farmland of local importance

### Map Unit Composition

*Monadnock, very stony, and similar soils:* 79 percent

*Minor components:* 21 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Monadnock, Very Stony

#### Setting

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Backslope, summit, shoulder

*Landform position (three-dimensional):* Mountainflank, mountainbase, side slope, nose slope, interfluve

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist over sandy and gravelly supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

#### Typical profile

*Oe - 0 to 3 inches:* moderately decomposed plant material

*E - 3 to 8 inches:* fine sandy loam

*Bs1 - 8 to 10 inches:* fine sandy loam

*Bs2 - 10 to 12 inches:* fine sandy loam

*Bs3 - 12 to 22 inches:* gravelly fine sandy loam

*BC - 22 to 25 inches:* gravelly fine sandy loam

*2C1 - 25 to 45 inches:* gravelly loamy sand

*2C2 - 45 to 65 inches:* gravelly loamy sand

#### Properties and qualities

*Slope:* 8 to 15 percent

*Percent of area covered with surface fragments:* 1.1 percent

*Depth to restrictive feature:* 18 to 36 inches to strongly contrasting textural stratification

*Natural drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high (0.14 to 14.03 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None



## Custom Soil Resource Report

*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water storage in profile:* Low (about 4.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* B  
*Hydric soil rating:* No

### Minor Components

#### Becket, very stony

*Percent of map unit:* 11 percent  
*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

#### Skerry, very stony

*Percent of map unit:* 5 percent  
*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope, footslope  
*Landform position (three-dimensional):* Mountainflank, mountainbase, interfluve, side slope, nose slope  
*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions  
*Down-slope shape:* Convex, concave  
*Across-slope shape:* Linear, concave  
*Hydric soil rating:* No

#### Tunbridge, very stony

*Percent of map unit:* 4 percent  
*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

#### Lyme, very stony

*Percent of map unit:* 1 percent  
*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Mountainflank, mountainbase, nose slope, interfluve, side slope  
*Microfeatures of landform position:* Closed depressions, open depressions, closed depressions, open depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

## 143D—Monadnock fine sandy loam, 15 to 25 percent slopes, very stony

### Map Unit Setting

*National map unit symbol:* 2wlm8  
*Elevation:* 390 to 1,840 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 55 degrees F  
*Frost-free period:* 90 to 150 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Monadnock, very stony, and similar soils:* 80 percent  
*Minor components:* 20 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Monadnock, Very Stony

#### Setting

*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainflank, side slope, nose slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist over sandy and gravelly supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

#### Typical profile

*Oe - 0 to 3 inches:* moderately decomposed plant material  
*E - 3 to 8 inches:* fine sandy loam  
*Bs1 - 8 to 10 inches:* fine sandy loam  
*Bs2 - 10 to 12 inches:* fine sandy loam  
*Bs3 - 12 to 22 inches:* gravelly fine sandy loam  
*BC - 22 to 25 inches:* gravelly fine sandy loam  
*2C1 - 25 to 45 inches:* gravelly loamy sand  
*2C2 - 45 to 65 inches:* gravelly loamy sand

#### Properties and qualities

*Slope:* 15 to 25 percent  
*Percent of area covered with surface fragments:* 1.1 percent  
*Depth to restrictive feature:* 18 to 36 inches to strongly contrasting textural stratification  
*Natural drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high (0.14 to 14.03 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)

## Custom Soil Resource Report

*Available water storage in profile:* Low (about 4.3 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6s

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

### **Minor Components**

#### **Berkshire, very stony**

*Percent of map unit:* 10 percent

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Backslope, summit, shoulder

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### **Tunbridge, very stony**

*Percent of map unit:* 5 percent

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Backslope, summit, shoulder

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### **Sunapee, very stony**

*Percent of map unit:* 3 percent

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Backslope, footslope

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Microfeatures of landform position:* Open depressions, open depressions

*Down-slope shape:* Convex, concave

*Across-slope shape:* Convex, concave

*Hydric soil rating:* No

#### **Cabot, very stony**

*Percent of map unit:* 2 percent

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Toeslope, footslope

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Microfeatures of landform position:* Open depressions, open depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

## 161E—Lyman-Tunbridge-Rock outcrop complex, 25 to 60 percent slopes

### Map Unit Setting

*National map unit symbol:* 2trpr  
*Elevation:* 460 to 2,490 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 55 degrees F  
*Frost-free period:* 60 to 160 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Lyman, very stony, and similar soils:* 50 percent  
*Tunbridge, very stony, and similar soils:* 26 percent  
*Rock outcrop:* 12 percent  
*Minor components:* 12 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Lyman, Very Stony

#### Setting

*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Mountainflank, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

#### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*A - 1 to 3 inches:* loam  
*E - 3 to 5 inches:* fine sandy loam  
*Bhs - 5 to 7 inches:* loam  
*Bs1 - 7 to 11 inches:* loam  
*Bs2 - 11 to 18 inches:* channery loam  
*R - 18 to 28 inches:* bedrock

#### Properties and qualities

*Slope:* 25 to 60 percent  
*Percent of area covered with surface fragments:* 1.5 percent  
*Depth to restrictive feature:* 11 to 24 inches to lithic bedrock  
*Natural drainage class:* Somewhat excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Low (about 3.4 inches)

## Custom Soil Resource Report

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7s

*Hydrologic Soil Group:* D

*Hydric soil rating:* No

### Description of Tunbridge, Very Stony

#### Setting

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank, side slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

#### Typical profile

*Oe - 0 to 3 inches:* moderately decomposed plant material

*Oa - 3 to 5 inches:* highly decomposed plant material

*E - 5 to 8 inches:* fine sandy loam

*Bhs - 8 to 11 inches:* fine sandy loam

*Bs - 11 to 26 inches:* fine sandy loam

*BC - 26 to 28 inches:* fine sandy loam

*R - 28 to 38 inches:* bedrock

#### Properties and qualities

*Slope:* 25 to 60 percent

*Percent of area covered with surface fragments:* 1.5 percent

*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock

*Natural drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Moderate (about 6.1 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7s

*Hydrologic Soil Group:* C

*Hydric soil rating:* No

### Description of Rock Outcrop

#### Setting

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank, free face, side slope, free face

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Igneous and metamorphic rock

## Custom Soil Resource Report

### Typical profile

*R - 0 to 10 inches:* bedrock

### Properties and qualities

*Slope:* 25 to 60 percent

*Depth to restrictive feature:* 0 inches to lithic bedrock

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to very high  
(0.00 to 14.17 in/hr)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8s

*Hydric soil rating:* Unranked

### Minor Components

#### Monadnock, very stony

*Percent of map unit:* 7 percent

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank, side slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### Marlow, very stony

*Percent of map unit:* 3 percent

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank, side slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### Cabot, very stony

*Percent of map unit:* 2 percent

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Toeslope, footslope

*Landform position (three-dimensional):* Mountainflank, side slope

*Microfeatures of landform position:* Open depressions, open depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

## 197—Borohemists, ponded

### Map Unit Setting

*National map unit symbol:* 9cyv

## Custom Soil Resource Report

*Elevation:* 10 to 2,800 feet  
*Mean annual precipitation:* 28 to 48 inches  
*Mean annual air temperature:* 37 to 50 degrees F  
*Frost-free period:* 80 to 170 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Borochemists and similar soils:* 90 percent  
*Minor components:* 10 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Borochemists

#### Setting

*Landform:* Bogs

#### Typical profile

*O - 0 to 65 inches:* mucky peat

#### Properties and qualities

*Slope:* 0 to 1 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural 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 storage in profile:* Very high (about 31.7 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 8w  
*Hydrologic Soil Group:* A/D  
*Hydric soil rating:* Yes

### Minor Components

#### Raynham

*Percent of map unit:* 3 percent  
*Landform:* Lake terraces  
*Hydric soil rating:* Yes

#### Searsport

*Percent of map unit:* 3 percent  
*Landform:* Bogs  
*Hydric soil rating:* Yes

#### Saco

*Percent of map unit:* 2 percent  
*Landform:* Flood plains  
*Hydric soil rating:* Yes

#### Lyme

*Percent of map unit:* 2 percent  
*Landform:* Depressions  
*Hydric soil rating:* Yes

## 214—Naumburg loamy fine sand

### Map Unit Setting

*National map unit symbol:* 9cyx  
*Elevation:* 10 to 2,800 feet  
*Mean annual precipitation:* 30 to 50 inches  
*Mean annual air temperature:* 37 to 46 degrees F  
*Frost-free period:* 70 to 160 days  
*Farmland classification:* Farmland of local importance

### Map Unit Composition

*Naumburg and similar soils:* 75 percent  
*Minor components:* 25 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Naumburg

#### Setting

*Landform:* Outwash terraces  
*Parent material:* Sandy outwash derived mainly from granite, gneiss and schist

#### Typical profile

*H1 - 0 to 3 inches:* loamy fine sand  
*H2 - 3 to 24 inches:* loamy fine sand  
*H3 - 24 to 60 inches:* coarse sand

#### Properties and qualities

*Slope:* 0 to 3 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Poorly drained  
*Runoff class:* Very low  
*Capacity of the most limiting layer to transmit water (Ksat):* High (2.00 to 6.00 in/hr)  
*Depth to water table:* About 0 to 18 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Low (about 3.5 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4w  
*Hydrologic Soil Group:* A/D  
*Hydric soil rating:* Yes

### Minor Components

#### Not named wet

*Percent of map unit:* 10 percent  
*Landform:* Depressions  
*Hydric soil rating:* Yes



## Custom Soil Resource Report

### **Moosilauke**

*Percent of map unit:* 3 percent

*Landform:* Depressions

*Hydric soil rating:* Yes

### **Wareham**

*Percent of map unit:* 3 percent

*Landform:* Depressions

*Hydric soil rating:* Yes

### **Adams**

*Percent of map unit:* 3 percent

*Hydric soil rating:* No

### **Croghan**

*Percent of map unit:* 3 percent

*Hydric soil rating:* No

### **Searsport**

*Percent of map unit:* 3 percent

*Landform:* Depressions

*Hydric soil rating:* Yes

## **401—Occum fine sandy loam**

### **Map Unit Composition**

*Occum and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Occum**

#### **Setting**

*Parent material:* Sandy and/or coarse-loamy alluvium derived from granite, gneiss or schist

#### **Typical profile**

*H1 - 0 to 8 inches:* fine sandy loam

*H2 - 8 to 29 inches:* sandy loam

*H3 - 29 to 60 inches:* stratified loamy fine sand to very gravelly coarse sand

#### **Properties and qualities**

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Runoff class:* 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 48 to 72 inches

*Frequency of flooding:* Occasional

*Frequency of ponding:* None

*Available water storage in profile:* Moderate (about 6.2 inches)

## Custom Soil Resource Report

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 1

*Hydrologic Soil Group:* A

*Hydric soil rating:* No

### Minor Components

#### Pootatuck

*Percent of map unit:* 4 percent

*Hydric soil rating:* No

#### Not named

*Percent of map unit:* 4 percent

*Hydric soil rating:* No

#### Suncook

*Percent of map unit:* 4 percent

*Hydric soil rating:* No

#### Rippowam

*Percent of map unit:* 3 percent

*Landform:* Flood plains

*Hydric soil rating:* Yes

## 495—Ossipee mucky peat

### Map Unit Setting

*National map unit symbol:* 9d0v

*Elevation:* 600 to 1,600 feet

*Mean annual precipitation:* 28 to 32 inches

*Mean annual air temperature:* 39 to 45 degrees F

*Frost-free period:* 60 to 140 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Ossipee and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Ossipee

#### Setting

*Landform:* Bogs

*Parent material:* Organic material over till

#### Typical profile

*O1 - 0 to 11 inches:* mucky peat

*O2 - 11 to 30 inches:* mucky peat

*H - 30 to 60 inches:* silt loam

#### Properties and qualities

*Slope:* 0 to 2 percent

## Custom Soil Resource Report

*Depth to restrictive feature:* More than 80 inches  
*Natural 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 2.00 in/hr)  
*Depth to water table:* About 0 to 6 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* Frequent  
*Available water storage in profile:* Very high (about 20.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 8w  
*Hydrologic Soil Group:* B/D  
*Hydric soil rating:* Yes

### Minor Components

#### Greenwood

*Percent of map unit:* 5 percent  
*Landform:* Bogs  
*Hydric soil rating:* Yes

#### Saco

*Percent of map unit:* 5 percent  
*Landform:* Flood plains  
*Hydric soil rating:* Yes

#### Chocorua

*Percent of map unit:* 5 percent  
*Landform:* Bogs  
*Hydric soil rating:* Yes

## 526A—Caesar loamy sand, 0 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* 9d12  
*Elevation:* 150 to 1,200 feet  
*Mean annual precipitation:* 30 to 50 inches  
*Mean annual air temperature:* 37 to 45 degrees F  
*Frost-free period:* 90 to 160 days  
*Farmland classification:* Farmland of local importance

### Map Unit Composition

*Caesar and similar soils:* 90 percent  
*Minor components:* 10 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Caesar**

**Setting**

*Parent material:* Outwash

**Typical profile**

*H1 - 0 to 5 inches:* loamy sand

*H2 - 5 to 18 inches:* loamy sand

*H3 - 18 to 60 inches:* coarse sand

**Properties and qualities**

*Slope:* 0 to 3 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Excessively drained

*Runoff class:* Negligible

*Capacity of the most limiting layer to transmit water (Ksat):* Very high (20.00 to 99.90 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Very low (about 2.7 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4s

*Hydrologic Soil Group:* A

*Hydric soil rating:* No

**Minor Components**

**Croghan**

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

**Windsor**

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

**526E—Caesar loamy sand, 15 to 50 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 9d15

*Elevation:* 150 to 1,800 feet

*Mean annual precipitation:* 30 to 50 inches

*Mean annual air temperature:* 37 to 45 degrees F

*Frost-free period:* 90 to 160 days

*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Caesar and similar soils:* 90 percent

*Minor components:* 10 percent

## Custom Soil Resource Report

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Caesar

#### Setting

*Parent material:* Outwash

#### Typical profile

*H1 - 0 to 5 inches:* loamy sand

*H2 - 5 to 18 inches:* loamy sand

*H3 - 18 to 60 inches:* coarse sand

#### Properties and qualities

*Slope:* 15 to 50 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Excessively drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* Very high (20.00 to 99.90 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Very low (about 2.7 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6s

*Hydrologic Soil Group:* A

*Hydric soil rating:* No

### Minor Components

#### Windsor

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

#### Croghan

*Percent of map unit:* 3 percent

*Hydric soil rating:* No

#### Naumburg

*Percent of map unit:* 2 percent

*Landform:* Depressions

*Hydric soil rating:* Yes

## 771C—Monadnock and Berkshire soils, 8 to 15 percent slopes, extremely bouldery

### Map Unit Setting

*National map unit symbol:* 2wln6

*Elevation:* 750 to 1,610 feet

*Mean annual precipitation:* 36 to 65 inches

## Custom Soil Resource Report

*Mean annual air temperature:* 36 to 52 degrees F

*Frost-free period:* 90 to 150 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Berkshire, extremely bouldery, and similar soils:* 45 percent

*Monadnock, extremely bouldery, and similar soils:* 45 percent

*Minor components:* 10 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Berkshire, Extremely Bouldery

#### Setting

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Backslope, summit, shoulder

*Landform position (three-dimensional):* Mountainflank, mountainbase, side slope, nose slope, interflue

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

#### Typical profile

*O<sub>i</sub> - 0 to 2 inches:* slightly decomposed plant material

*A - 2 to 4 inches:* fine sandy loam

*E - 4 to 5 inches:* fine sandy loam

*B<sub>s1</sub> - 5 to 7 inches:* fine sandy loam

*B<sub>s2</sub> - 7 to 13 inches:* fine sandy loam

*B<sub>s3</sub> - 13 to 21 inches:* fine sandy loam

*BC<sub>1</sub> - 21 to 28 inches:* fine sandy loam

*BC<sub>2</sub> - 28 to 33 inches:* fine sandy loam

*C - 33 to 65 inches:* fine sandy loam

#### Properties and qualities

*Slope:* 8 to 15 percent

*Percent of area covered with surface fragments:* 6.0 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (K<sub>sat</sub>):* 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

*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water storage in profile:* High (about 10.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7s

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

### Description of Monadnock, Extremely Bouldery

#### Setting

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, summit, shoulder

## Custom Soil Resource Report

*Landform position (three-dimensional):* Mountainflank, mountainbase, side slope, nose slope, interfluve

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist over sandy and gravelly supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

### Typical profile

*Oe - 0 to 3 inches:* moderately decomposed plant material

*E - 3 to 8 inches:* fine sandy loam

*Bs1 - 8 to 10 inches:* fine sandy loam

*Bs2 - 10 to 12 inches:* fine sandy loam

*Bs3 - 12 to 22 inches:* gravelly fine sandy loam

*BC - 22 to 25 inches:* gravelly fine sandy loam

*2C1 - 25 to 45 inches:* gravelly loamy sand

*2C2 - 45 to 65 inches:* gravelly loamy sand

### Properties and qualities

*Slope:* 8 to 15 percent

*Percent of area covered with surface fragments:* 6.0 percent

*Depth to restrictive feature:* 18 to 36 inches to strongly contrasting textural stratification

*Natural drainage class:* Well drained

*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

*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water storage in profile:* Low (about 4.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7s

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

### Minor Components

#### Skerry, extremely bouldery

*Percent of map unit:* 5 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, footslope

*Landform position (three-dimensional):* Mountainflank, mountainbase, interfluve, side slope, nose slope

*Microfeatures of landform position:* Closed depressions, closed depressions, open depressions, open depressions

*Down-slope shape:* Convex, concave

*Across-slope shape:* Linear, concave

*Hydric soil rating:* No

#### Lyman, extremely bouldery

*Percent of map unit:* 3 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Shoulder, summit, backslope

## Custom Soil Resource Report

*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve

*Microfeatures of landform position:* Rises, rises

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

### **Becket, extremely bouldery**

*Percent of map unit:* 1 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Shoulder, backslope, summit

*Landform position (three-dimensional):* Mountainflank, mountainbase, side slope, nose slope, interfluve

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

### **Lyme, extremely bouldery**

*Percent of map unit:* 1 percent

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Footslope, toeslope

*Landform position (three-dimensional):* Mountainbase, mountainflank, interfluve, side slope, nose slope

*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

## **771D—Monadnock and Berkshire soils, 15 to 35 percent slopes, extremely bouldery**

### **Map Unit Setting**

*National map unit symbol:* 2wln7

*Elevation:* 590 to 1,840 feet

*Mean annual precipitation:* 36 to 65 inches

*Mean annual air temperature:* 36 to 52 degrees F

*Frost-free period:* 90 to 150 days

*Farmland classification:* Not prime farmland

### **Map Unit Composition**

*Monadnock, extremely bouldery, and similar soils:* 45 percent

*Berkshire, extremely bouldery, and similar soils:* 45 percent

*Minor components:* 10 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*



## Description of Monadnock, Extremely Bouldery

### Setting

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Shoulder, backslope, summit

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist over sandy and gravelly supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

### Typical profile

*Oe - 0 to 3 inches:* moderately decomposed plant material

*E - 3 to 8 inches:* fine sandy loam

*Bs1 - 8 to 10 inches:* fine sandy loam

*Bs2 - 10 to 12 inches:* fine sandy loam

*Bs3 - 12 to 22 inches:* gravelly fine sandy loam

*BC - 22 to 25 inches:* gravelly fine sandy loam

*2C1 - 25 to 45 inches:* gravelly loamy sand

*2C2 - 45 to 65 inches:* gravelly loamy sand

### Properties and qualities

*Slope:* 15 to 35 percent

*Percent of area covered with surface fragments:* 6.0 percent

*Depth to restrictive feature:* 18 to 36 inches to strongly contrasting textural stratification

*Natural drainage class:* Well drained

*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

*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water storage in profile:* Low (about 4.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7s

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

## Description of Berkshire, Extremely Bouldery

### Setting

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, summit, shoulder

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

### Typical profile

*Oi - 0 to 2 inches:* slightly decomposed plant material

*A - 2 to 4 inches:* fine sandy loam

## Custom Soil Resource Report

*E - 4 to 5 inches: fine sandy loam*  
*Bs1 - 5 to 7 inches: fine sandy loam*  
*Bs2 - 7 to 13 inches: fine sandy loam*  
*Bs3 - 13 to 21 inches: fine sandy loam*  
*BC1 - 21 to 28 inches: fine sandy loam*  
*BC2 - 28 to 33 inches: fine sandy loam*  
*C - 33 to 65 inches: fine sandy loam*

### Properties and qualities

*Slope: 15 to 35 percent*  
*Percent of area covered with surface fragments: 6.0 percent*  
*Depth to restrictive feature: More than 80 inches*  
*Natural drainage class: Well drained*  
*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*  
*Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)*  
*Available water storage in profile: High (about 10.0 inches)*

### Interpretive groups

*Land capability classification (irrigated): None specified*  
*Land capability classification (nonirrigated): 7s*  
*Hydrologic Soil Group: B*  
*Hydric soil rating: No*

### Minor Components

#### Lyman, extremely bouldery

*Percent of map unit: 3 percent*  
*Landform: Hills, mountains*  
*Landform position (two-dimensional): Shoulder, summit, backslope*  
*Landform position (three-dimensional): Mountainflank, nose slope, side slope*  
*Microfeatures of landform position: Rises, rises*  
*Down-slope shape: Convex*  
*Across-slope shape: Convex*  
*Hydric soil rating: No*

#### Becket, extremely bouldery

*Percent of map unit: 3 percent*  
*Landform: Mountains, hills*  
*Landform position (two-dimensional): Backslope, summit, shoulder*  
*Landform position (three-dimensional): Mountainflank, side slope, nose slope*  
*Down-slope shape: Convex*  
*Across-slope shape: Convex*  
*Hydric soil rating: No*

#### Sunapee, extremely bouldery

*Percent of map unit: 3 percent*  
*Landform: Hills, mountains*  
*Landform position (two-dimensional): Backslope, footslope*  
*Landform position (three-dimensional): Mountainflank, nose slope, side slope*  
*Microfeatures of landform position: Open depressions, open depressions*  
*Down-slope shape: Convex, concave*  
*Across-slope shape: Convex, concave*  
*Hydric soil rating: No*

## Custom Soil Resource Report

### **Moosilauke, extremely bouldery**

*Percent of map unit:* 1 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Toeslope, footslope

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Microfeatures of landform position:* Open depressions, open depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

## **W—Water**

### **Map Unit Composition**

*Water:* 100 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

## Hillsborough County, New Hampshire, Western Part

### 22C—Colton gravelly sandy loam, 8 to 15 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2yjf  
*Elevation:* 10 to 2,000 feet  
*Mean annual precipitation:* 31 to 65 inches  
*Mean annual air temperature:* 36 to 52 degrees F  
*Frost-free period:* 90 to 160 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Colton and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Colton

##### Setting

*Landform:* Outwash terraces  
*Landform position (two-dimensional):* Summit, backslope  
*Landform position (three-dimensional):* Base slope, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Sandy-skeletal glaciofluvial deposits

##### Typical profile

*Ap - 0 to 7 inches:* gravelly sandy loam  
*Bs - 7 to 14 inches:* gravelly loamy sand  
*BC - 14 to 24 inches:* very gravelly coarse sand  
*C - 24 to 65 inches:* extremely gravelly coarse sand

##### Properties and qualities

*Slope:* 8 to 15 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Excessively drained  
*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:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)  
*Available water storage in profile:* Very low (about 2.5 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4e  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

#### Minor Components

##### Adams

*Percent of map unit:* 10 percent

## Custom Soil Resource Report

*Landform:* Outwash terraces  
*Landform position (two-dimensional):* Backslope, summit  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

### **Sheepscot**

*Percent of map unit:* 3 percent  
*Landform:* Outwash terraces  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

### **Croghan**

*Percent of map unit:* 2 percent  
*Landform:* Outwash terraces  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

## **36B—Adams loamy sand, 3 to 8 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 2wqnc  
*Elevation:* 10 to 2,000 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 52 degrees F  
*Frost-free period:* 90 to 160 days  
*Farmland classification:* Farmland of local importance

### **Map Unit Composition**

*Adams and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Adams**

#### **Setting**

*Landform:* Outwash deltas  
*Landform position (two-dimensional):* Backslope, summit  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Convex  
*Parent material:* Sandy glaciofluvial deposits

## Custom Soil Resource Report

### Typical profile

*Ap - 0 to 7 inches:* loamy sand  
*Bs - 7 to 21 inches:* sand  
*BC - 21 to 27 inches:* sand  
*C - 27 to 65 inches:* sand

### Properties and qualities

*Slope:* 3 to 8 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Somewhat excessively drained  
*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:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water storage in profile:* Low (about 3.6 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3s  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

### Minor Components

#### Croghan

*Percent of map unit:* 5 percent  
*Landform:* Outwash deltas  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

#### Colton

*Percent of map unit:* 5 percent  
*Landform:* Outwash deltas  
*Landform position (two-dimensional):* Backslope, summit  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

#### Nicholville

*Percent of map unit:* 3 percent  
*Landform:* Outwash deltas  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

#### Sheepscot

*Percent of map unit:* 2 percent  
*Landform:* Outwash deltas  
*Landform position (two-dimensional):* Footslope

## Custom Soil Resource Report

*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

### 76C—Marlow fine sandy loam, 8 to 15 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2ty5h  
*Elevation:* 490 to 1,740 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 52 degrees F  
*Frost-free period:* 90 to 160 days  
*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Marlow and similar soils:* 84 percent  
*Minor components:* 16 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Marlow

##### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy lodgment till derived from granite and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from phyllite

##### Typical profile

*Ap - 0 to 4 inches:* fine sandy loam  
*E - 4 to 6 inches:* fine sandy loam  
*Bs1 - 6 to 10 inches:* fine sandy loam  
*Bs2 - 10 to 15 inches:* fine sandy loam  
*Bs3 - 15 to 20 inches:* fine sandy loam  
*BC - 20 to 24 inches:* fine sandy loam  
*Cd - 24 to 65 inches:* fine sandy loam

##### Properties and qualities

*Slope:* 8 to 15 percent  
*Depth to restrictive feature:* 20 to 40 inches to densic material  
*Natural drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.01 to 1.42 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None

## Custom Soil Resource Report

*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water storage in profile:* Low (about 3.6 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3e  
*Hydrologic Soil Group:* C  
*Hydric soil rating:* No

### Minor Components

#### Peru

*Percent of map unit:* 7 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Footslope, backslope  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interflue  
*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

#### Berkshire

*Percent of map unit:* 4 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interflue  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

#### Tunbridge

*Percent of map unit:* 3 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interflue  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

#### Pillsbury

*Percent of map unit:* 2 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interflue  
*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes



## 77C—Marlow fine sandy loam, 8 to 15 percent slopes, very stony

### Map Unit Setting

*National map unit symbol:* 2ty5p  
*Elevation:* 520 to 1,900 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 55 degrees F  
*Frost-free period:* 90 to 160 days  
*Farmland classification:* Farmland of local importance

### Map Unit Composition

*Marlow, very stony, and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Marlow, Very Stony

#### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy lodgment till derived from granite and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from phyllite

#### Typical profile

*O<sub>i</sub> - 0 to 2 inches:* slightly decomposed plant material  
*A - 2 to 5 inches:* fine sandy loam  
*E - 5 to 8 inches:* fine sandy loam  
*B<sub>s1</sub> - 8 to 15 inches:* fine sandy loam  
*B<sub>s2</sub> - 15 to 19 inches:* fine sandy loam  
*BC - 19 to 33 inches:* gravelly fine sandy loam  
*Cd - 33 to 65 inches:* fine sandy loam

#### Properties and qualities

*Slope:* 8 to 15 percent  
*Percent of area covered with surface fragments:* 1.1 percent  
*Depth to restrictive feature:* 20 to 41 inches to densic material  
*Natural drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (K<sub>sat</sub>):* Moderately low to moderately high (0.01 to 1.42 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water storage in profile:* Low (about 5.1 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* C  
*Hydric soil rating:* No

**Minor Components**

**Peru, very stony**

*Percent of map unit:* 6 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Footslope, backslope  
*Landform position (three-dimensional):* Mountainbase, mountainflank, interflue, side slope, nose slope  
*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

**Berkshire, very stony**

*Percent of map unit:* 4 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interflue  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

**Tunbridge, very stony**

*Percent of map unit:* 3 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interflue  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

**Pillsbury, very stony**

*Percent of map unit:* 2 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interflue  
*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

## 77D—Marlow fine sandy loam, 15 to 35 percent slopes, very stony

### Map Unit Setting

*National map unit symbol:* 2ty5s  
*Elevation:* 390 to 2,030 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 55 degrees F  
*Frost-free period:* 90 to 160 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Marlow, very stony, and similar soils:* 86 percent  
*Minor components:* 14 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Marlow, Very Stony

#### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Mountainflank, side slope, nose slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy lodgment till derived from granite and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from phyllite

#### Typical profile

*O<sub>i</sub> - 0 to 2 inches:* slightly decomposed plant material  
*A - 2 to 5 inches:* fine sandy loam  
*E - 5 to 8 inches:* fine sandy loam  
*B<sub>s1</sub> - 8 to 15 inches:* fine sandy loam  
*B<sub>s2</sub> - 15 to 19 inches:* fine sandy loam  
*BC - 19 to 33 inches:* gravelly fine sandy loam  
*Cd - 33 to 65 inches:* fine sandy loam

#### Properties and qualities

*Slope:* 15 to 35 percent  
*Percent of area covered with surface fragments:* 1.1 percent  
*Depth to restrictive feature:* 20 to 41 inches to densic material  
*Natural drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (K<sub>sat</sub>):* Moderately low to moderately high (0.01 to 1.42 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water storage in profile:* Low (about 5.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

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*Land capability classification (nonirrigated): 7s*  
*Hydrologic Soil Group: C*  
*Hydric soil rating: No*

### Minor Components

#### **Tunbridge, very stony**

*Percent of map unit: 5 percent*  
*Landform: Hills, mountains*  
*Landform position (two-dimensional): Backslope, summit, shoulder*  
*Landform position (three-dimensional): Mountainflank, side slope, nose slope*  
*Down-slope shape: Convex*  
*Across-slope shape: Convex*  
*Hydric soil rating: No*

#### **Peru, very stony**

*Percent of map unit: 4 percent*  
*Landform: Hills, mountains*  
*Landform position (two-dimensional): Footslope, backslope*  
*Landform position (three-dimensional): Mountainflank, side slope, nose slope*  
*Microfeatures of landform position: Open depressions, open depressions*  
*Down-slope shape: Concave*  
*Across-slope shape: Concave*  
*Hydric soil rating: No*

#### **Berkshire, very stony**

*Percent of map unit: 3 percent*  
*Landform: Hills, mountains*  
*Landform position (two-dimensional): Backslope, summit, shoulder*  
*Landform position (three-dimensional): Mountainflank, side slope, nose slope*  
*Down-slope shape: Convex*  
*Across-slope shape: Convex*  
*Hydric soil rating: No*

#### **Pillsbury, very stony**

*Percent of map unit: 2 percent*  
*Landform: Hills, mountains*  
*Landform position (two-dimensional): Footslope, toeslope*  
*Landform position (three-dimensional): Mountainflank, side slope, nose slope*  
*Microfeatures of landform position: Open depressions, open depressions*  
*Down-slope shape: Concave*  
*Across-slope shape: Concave*  
*Hydric soil rating: Yes*

## **143C—Monadnock fine sandy loam, 8 to 15 percent slopes, very stony**

### **Map Unit Setting**

*National map unit symbol: 2wlm7*  
*Elevation: 360 to 1,670 feet*  
*Mean annual precipitation: 31 to 95 inches*  
*Mean annual air temperature: 27 to 55 degrees F*

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*Frost-free period:* 90 to 150 days

*Farmland classification:* Farmland of local importance

### Map Unit Composition

*Monadnock, very stony, and similar soils:* 79 percent

*Minor components:* 21 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Monadnock, Very Stony

#### Setting

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, summit, shoulder

*Landform position (three-dimensional):* Mountainflank, mountainbase, side slope, nose slope, interfluvium

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist over sandy and gravelly supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

#### Typical profile

*Oe - 0 to 3 inches:* moderately decomposed plant material

*E - 3 to 8 inches:* fine sandy loam

*Bs1 - 8 to 10 inches:* fine sandy loam

*Bs2 - 10 to 12 inches:* fine sandy loam

*Bs3 - 12 to 22 inches:* gravelly fine sandy loam

*BC - 22 to 25 inches:* gravelly fine sandy loam

*2C1 - 25 to 45 inches:* gravelly loamy sand

*2C2 - 45 to 65 inches:* gravelly loamy sand

#### Properties and qualities

*Slope:* 8 to 15 percent

*Percent of area covered with surface fragments:* 1.1 percent

*Depth to restrictive feature:* 18 to 36 inches to strongly contrasting textural stratification

*Natural drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high (0.14 to 14.03 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water storage in profile:* Low (about 4.3 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6s

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

### Minor Components

#### Becket, very stony

*Percent of map unit:* 11 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, summit, shoulder

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*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

### **Skerry, very stony**

*Percent of map unit:* 5 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, footslope  
*Landform position (three-dimensional):* Mountainflank, mountainbase, interfluve, side slope, nose slope  
*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions  
*Down-slope shape:* Concave, convex  
*Across-slope shape:* Concave, linear  
*Hydric soil rating:* No

### **Tunbridge, very stony**

*Percent of map unit:* 4 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

### **Lyme, very stony**

*Percent of map unit:* 1 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Mountainflank, mountainbase, nose slope, interfluve, side slope  
*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

## **143D—Monadnock fine sandy loam, 15 to 35 percent slopes, very stony**

### **Map Unit Setting**

*National map unit symbol:* 2wlm9  
*Elevation:* 390 to 1,770 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 55 degrees F  
*Frost-free period:* 90 to 150 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Monadnock, very stony, and similar soils:* 80 percent

*Minor components:* 20 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Monadnock, Very Stony**

**Setting**

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, summit, shoulder

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist over sandy and gravelly supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

**Typical profile**

*Oe - 0 to 3 inches:* moderately decomposed plant material

*E - 3 to 8 inches:* fine sandy loam

*Bs1 - 8 to 10 inches:* fine sandy loam

*Bs2 - 10 to 12 inches:* fine sandy loam

*Bs3 - 12 to 22 inches:* gravelly fine sandy loam

*BC - 22 to 25 inches:* gravelly fine sandy loam

*2C1 - 25 to 45 inches:* gravelly loamy sand

*2C2 - 45 to 65 inches:* gravelly loamy sand

**Properties and qualities**

*Slope:* 15 to 35 percent

*Percent of area covered with surface fragments:* 1.1 percent

*Depth to restrictive feature:* 18 to 36 inches to strongly contrasting textural stratification

*Natural drainage class:* Well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high (0.14 to 14.03 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water storage in profile:* Low (about 4.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7s

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

**Minor Components**

**Berkshire, very stony**

*Percent of map unit:* 10 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, summit, shoulder

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

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*Hydric soil rating:* No

### **Tunbridge, very stony**

*Percent of map unit:* 5 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, summit, shoulder

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

### **Sunapee, very stony**

*Percent of map unit:* 3 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, footslope

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Microfeatures of landform position:* Open depressions, open depressions

*Down-slope shape:* Convex, concave

*Across-slope shape:* Convex, concave

*Hydric soil rating:* No

### **Cabot, very stony**

*Percent of map unit:* 2 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Toeslope, footslope

*Landform position (three-dimensional):* Mountainflank, side slope, nose slope

*Microfeatures of landform position:* Open depressions, open depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

## **145C—Monadnock fine sandy loam, 0 to 15 percent slopes, extremely bouldery**

### **Map Unit Setting**

*National map unit symbol:* 2wlmd

*Elevation:* 690 to 1,410 feet

*Mean annual precipitation:* 31 to 95 inches

*Mean annual air temperature:* 27 to 52 degrees F

*Frost-free period:* 90 to 150 days

*Farmland classification:* Not prime farmland

### **Map Unit Composition**

*Monadnock, extremely bouldery, and similar soils:* 79 percent

*Minor components:* 21 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Monadnock, Extremely Bouldery**

#### **Setting**

*Landform:* Hills, mountains



## Custom Soil Resource Report

*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainflank, mountainbase, side slope, nose slope, interfluve, base slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist over sandy and gravelly supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

### Typical profile

*Oe - 0 to 3 inches:* moderately decomposed plant material  
*E - 3 to 8 inches:* fine sandy loam  
*Bs1 - 8 to 10 inches:* fine sandy loam  
*Bs2 - 10 to 12 inches:* fine sandy loam  
*Bs3 - 12 to 22 inches:* gravelly fine sandy loam  
*BC - 22 to 25 inches:* gravelly fine sandy loam  
*2C1 - 25 to 45 inches:* gravelly loamy sand  
*2C2 - 45 to 65 inches:* gravelly loamy sand

### Properties and qualities

*Slope:* 0 to 15 percent  
*Percent of area covered with surface fragments:* 6.0 percent  
*Depth to restrictive feature:* 18 to 36 inches to strongly contrasting textural stratification  
*Natural drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high (0.14 to 14.03 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water storage in profile:* Low (about 4.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7s  
*Hydrologic Soil Group:* B  
*Hydric soil rating:* No

### Minor Components

#### **Becket, extremely bouldery**

*Percent of map unit:* 11 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainflank, mountainbase, side slope, nose slope, interfluve, base slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

#### **Skerry, extremely bouldery**

*Percent of map unit:* 5 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, footslope  
*Landform position (three-dimensional):* Mountainflank, mountainbase, interfluve, side slope, nose slope, base slope

## Custom Soil Resource Report

*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions  
*Down-slope shape:* Concave, convex  
*Across-slope shape:* Concave, linear  
*Hydric soil rating:* No

### **Tunbridge, extremely bouldery**

*Percent of map unit:* 4 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve, base slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

### **Lyme, extremely bouldery**

*Percent of map unit:* 1 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Mountainbase, mountainflank, nose slope, interfluve, side slope, base slope  
*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

## **160B—Tunbridge-Lyman-Monadnock complex, stony, 3 to 8 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 9chc  
*Elevation:* 10 to 2,500 feet  
*Mean annual precipitation:* 35 to 50 inches  
*Mean annual air temperature:* 37 to 46 degrees F  
*Frost-free period:* 60 to 160 days  
*Farmland classification:* Not prime farmland

### **Map Unit Composition**

*Tunbridge and similar soils:* 35 percent  
*Lyman and similar soils:* 30 percent  
*Monadnock and similar soils:* 25 percent  
*Minor components:* 10 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Tunbridge**

#### **Setting**

*Parent material:* Ablation till derived from granite and gneiss

## Custom Soil Resource Report

### Typical profile

*H1 - 0 to 4 inches:* fine sandy loam  
*H2 - 4 to 22 inches:* channery fine sandy loam  
*H3 - 22 to 30 inches:* channery fine sandy loam  
*H4 - 30 to 34 inches:* unweathered bedrock

### Properties and qualities

*Slope:* 3 to 8 percent  
*Percent of area covered with surface fragments:* 1.6 percent  
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock  
*Natural drainage class:* Well drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Low to high (0.01 to 6.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Low (about 4.5 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* B  
*Hydric soil rating:* No

## Description of Lyman

### Setting

*Parent material:* Ablation till derived from granite and gneiss and/or ablation till derived from mica schist

### Typical profile

*H1 - 0 to 4 inches:* sandy loam  
*H2 - 4 to 15 inches:* gravelly fine sandy loam  
*R - 15 to 19 inches:* unweathered bedrock

### Properties and qualities

*Slope:* 3 to 8 percent  
*Percent of area covered with surface fragments:* 1.6 percent  
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock  
*Natural 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 6.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Very low (about 2.7 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

## Description of Monadnock

### Setting

*Parent material:* Ablation till derived from granite and gneiss

### Typical profile

*H1 - 0 to 4 inches:* fine sandy loam

*H2 - 4 to 28 inches:* fine sandy loam

*H3 - 28 to 60 inches:* gravelly loamy sand

### Properties and qualities

*Slope:* 3 to 8 percent

*Percent of area covered with surface fragments:* 1.6 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Runoff class:* Medium

*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:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Low (about 5.6 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6s

*Hydrologic Soil Group:* B

*Hydric soil rating:* No

## Minor Components

### Not named wet

*Percent of map unit:* 3 percent

*Landform:* Depressions

*Hydric soil rating:* Yes

### Marlow

*Percent of map unit:* 3 percent

*Hydric soil rating:* No

### Rock outcrop

*Percent of map unit:* 2 percent

*Hydric soil rating:* No

### Not named

*Percent of map unit:* 2 percent

*Hydric soil rating:* No

## 161C—Lyman-Tunbridge-Rock outcrop complex, 3 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* 2trpt  
*Elevation:* 390 to 1,440 feet  
*Mean annual precipitation:* 36 to 71 inches  
*Mean annual air temperature:* 36 to 55 degrees F  
*Frost-free period:* 60 to 160 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Lyman, very stony, and similar soils:* 38 percent  
*Tunbridge, very stony, and similar soils:* 28 percent  
*Rock outcrop:* 18 percent  
*Minor components:* 16 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Lyman, Very Stony

#### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Shoulder, summit, backslope  
*Landform position (three-dimensional):* Mountaintop, mountainflank, mountainbase, crest, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

#### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*A - 1 to 3 inches:* loam  
*E - 3 to 5 inches:* fine sandy loam  
*Bhs - 5 to 7 inches:* loam  
*Bs1 - 7 to 11 inches:* loam  
*Bs2 - 11 to 18 inches:* channery loam  
*R - 18 to 28 inches:* bedrock

#### Properties and qualities

*Slope:* 3 to 15 percent  
*Percent of area covered with surface fragments:* 1.5 percent  
*Depth to restrictive feature:* 11 to 24 inches to lithic bedrock  
*Natural drainage class:* Somewhat excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)  
*Depth to water table:* More than 80 inches

## Custom Soil Resource Report

*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Low (about 3.4 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

### Description of Tunbridge, Very Stony

#### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Mountaintop, mountainflank, mountainbase, side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

#### Typical profile

*Oe - 0 to 3 inches:* moderately decomposed plant material  
*Oa - 3 to 5 inches:* highly decomposed plant material  
*E - 5 to 8 inches:* fine sandy loam  
*Bhs - 8 to 11 inches:* fine sandy loam  
*Bs - 11 to 26 inches:* fine sandy loam  
*BC - 26 to 28 inches:* fine sandy loam  
*R - 28 to 38 inches:* bedrock

#### Properties and qualities

*Slope:* 3 to 15 percent  
*Percent of area covered with surface fragments:* 1.5 percent  
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock  
*Natural drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Moderate (about 6.1 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* C  
*Hydric soil rating:* No

### Description of Rock Outcrop

#### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Mountaintop, mountainflank, mountainbase, crest, side slope

## Custom Soil Resource Report

*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Igneous and metamorphic rock

### Typical profile

*R - 0 to 10 inches:* bedrock

### Properties and qualities

*Slope:* 3 to 15 percent  
*Depth to restrictive feature:* 0 inches to lithic bedrock  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to very high  
(0.00 to 14.17 in/hr)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 8s  
*Hydric soil rating:* Unranked

## Minor Components

### Marlow, very stony

*Percent of map unit:* 5 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountaintop, mountainflank, mountainbase, side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

### Monadnock, very stony

*Percent of map unit:* 5 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountaintop, mountainflank, mountainbase, side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

### Brayton, very stony

*Percent of map unit:* 4 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountaintop, mountainflank, mountainbase, side slope, crest  
*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

### Abram, very stony

*Percent of map unit:* 2 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Shoulder, summit, backslope  
*Landform position (three-dimensional):* Mountainflank, mountaintop, mountainbase, side slope, crest

## Custom Soil Resource Report

*Microfeatures of landform position:* Rises, rises  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

### 161D—Lyman-Tunbridge-Rock outcrop complex, 15 to 35 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2trps  
*Elevation:* 490 to 2,130 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 55 degrees F  
*Frost-free period:* 60 to 160 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Lyman, very stony, and similar soils:* 39 percent  
*Tunbridge, very stony, and similar soils:* 31 percent  
*Rock outcrop:* 17 percent  
*Minor components:* 13 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Lyman, Very Stony

##### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Shoulder, summit, backslope  
*Landform position (three-dimensional):* Mountaintop, mountainflank, crest, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

##### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*A - 1 to 3 inches:* loam  
*E - 3 to 5 inches:* fine sandy loam  
*Bhs - 5 to 7 inches:* loam  
*Bs1 - 7 to 11 inches:* loam  
*Bs2 - 11 to 18 inches:* channery loam  
*R - 18 to 28 inches:* bedrock

##### Properties and qualities

*Slope:* 15 to 35 percent  
*Percent of area covered with surface fragments:* 1.5 percent  
*Depth to restrictive feature:* 11 to 24 inches to lithic bedrock



## Custom Soil Resource Report

*Natural drainage class:* Somewhat excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Low (about 3.4 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7s  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

### Description of Tunbridge, Very Stony

#### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountaintop, mountainflank, side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

#### Typical profile

*Oe - 0 to 3 inches:* moderately decomposed plant material  
*Oa - 3 to 5 inches:* highly decomposed plant material  
*E - 5 to 8 inches:* fine sandy loam  
*Bhs - 8 to 11 inches:* fine sandy loam  
*Bs - 11 to 26 inches:* fine sandy loam  
*BC - 26 to 28 inches:* fine sandy loam  
*R - 28 to 38 inches:* bedrock

#### Properties and qualities

*Slope:* 15 to 35 percent  
*Percent of area covered with surface fragments:* 1.5 percent  
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock  
*Natural drainage class:* Well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water storage in profile:* Moderate (about 6.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7s  
*Hydrologic Soil Group:* C  
*Hydric soil rating:* No

## Description of Rock Outcrop

### Setting

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Mountaintop, mountainflank, crest, side slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Igneous and metamorphic rock

### Typical profile

*R - 0 to 10 inches:* bedrock

### Properties and qualities

*Slope:* 15 to 35 percent

*Depth to restrictive feature:* 0 inches to lithic bedrock

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to very high (0.00 to 14.17 in/hr)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8s

*Hydric soil rating:* Unranked

## Minor Components

### Monadnock, very stony

*Percent of map unit:* 5 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Shoulder, backslope, summit

*Landform position (three-dimensional):* Mountaintop, mountainflank, side slope, crest

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

### Marlow, very stony

*Percent of map unit:* 4 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, summit, shoulder

*Landform position (three-dimensional):* Mountaintop, mountainflank, side slope, crest

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

### Cabot, very stony

*Percent of map unit:* 4 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Toeslope, footslope

*Landform position (three-dimensional):* Mountaintop, mountainflank, side slope, crest

*Microfeatures of landform position:* Open depressions, open depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

## 247B—Lyme fine sandy loam, 0 to 8 percent slopes, very stony

### Map Unit Setting

*National map unit symbol:* 2trsd  
*Elevation:* 360 to 1,940 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 52 degrees F  
*Frost-free period:* 90 to 140 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Lyme, very stony, and similar soils:* 80 percent  
*Minor components:* 20 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Lyme, Very Stony

#### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Mountainbase, interfluve, base slope  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Loamy supraglacial meltout till derived from phyllite and/or granite and gneiss and/or mica schist

#### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*A - 1 to 8 inches:* fine sandy loam  
*Bg1 - 8 to 13 inches:* cobbly sandy loam  
*Bg2 - 13 to 26 inches:* cobbly sandy loam  
*BC - 26 to 31 inches:* cobbly sandy loam  
*Cg - 31 to 42 inches:* gravelly sandy loam  
*C - 42 to 65 inches:* gravelly sandy loam

#### Properties and qualities

*Slope:* 0 to 8 percent  
*Percent of area covered with surface fragments:* 1.1 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Poorly drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high (0.14 to 14.03 in/hr)  
*Depth to water table:* About 0 to 18 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water storage in profile:* Moderate (about 8.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* B/D  
*Hydric soil rating:* Yes

**Minor Components**

**Pillsbury, very stony**

*Percent of map unit:* 10 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Toeslope, footslope  
*Landform position (three-dimensional):* Mountainbase, base slope, interfluvium  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

**Searsport, very stony**

*Percent of map unit:* 4 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Toeslope, footslope  
*Landform position (three-dimensional):* Mountainbase, base slope, interfluvium  
*Microfeatures of landform position:* Closed depressions, closed depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

**Sunapee, very stony**

*Percent of map unit:* 3 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, footslope  
*Landform position (three-dimensional):* Mountainbase, base slope, interfluvium  
*Microfeatures of landform position:* Rises, rises  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear, convex  
*Hydric soil rating:* No

**Naumburg, very stony**

*Percent of map unit:* 3 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Mountainbase, base slope, interfluvium  
*Microfeatures of landform position:* Rises, rises  
*Down-slope shape:* Linear, convex  
*Across-slope shape:* Concave, convex  
*Hydric soil rating:* No

## 295—Greenwood mucky peat

### Map Unit Setting

*National map unit symbol:* 9chw  
*Elevation:* 600 to 1,600 feet  
*Mean annual precipitation:* 28 to 32 inches  
*Mean annual air temperature:* 39 to 45 degrees F  
*Frost-free period:* 60 to 140 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Greenwood and similar soils:* 90 percent  
*Minor components:* 10 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Greenwood

#### Setting

*Landform:* Bogs  
*Parent material:* Herbaceous organic material and/or woody organic material

#### Typical profile

*O - 0 to 60 inches:* mucky peat

#### Properties and qualities

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural 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 to 12 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* Frequent  
*Available water storage in profile:* Very high (about 31.7 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  
*Hydric soil rating:* Yes

#### Borochemists

*Percent of map unit:* 5 percent

## Custom Soil Resource Report

*Landform:* Bogs  
*Hydric soil rating:* Yes

### **559C—Skerry fine sandy loam, 8 to 15 percent slopes, very stony**

#### **Map Unit Setting**

*National map unit symbol:* 2w9pd  
*Elevation:* 160 to 1,540 feet  
*Mean annual precipitation:* 31 to 65 inches  
*Mean annual air temperature:* 36 to 52 degrees F  
*Frost-free period:* 90 to 160 days  
*Farmland classification:* Not prime farmland

#### **Map Unit Composition**

*Skerry, very stony, and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### **Description of Skerry, Very Stony**

##### **Setting**

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, footslope  
*Landform position (three-dimensional):* Mountainflank, mountainbase, side slope, nose slope, interfluve  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear  
*Parent material:* Loamy lodgment till derived from granite and gneiss and/or schist over sandy lodgment till derived from granite and gneiss and/or schist

##### **Typical profile**

*Oa - 0 to 2 inches:* highly decomposed plant material  
*E - 2 to 4 inches:* fine sandy loam  
*Bhs - 4 to 6 inches:* fine sandy loam  
*Bs1 - 6 to 20 inches:* gravelly fine sandy loam  
*Bs2 - 20 to 25 inches:* gravelly fine sandy loam  
*Cd1 - 25 to 34 inches:* gravelly loamy sand  
*Cd2 - 34 to 65 inches:* gravelly loamy sand

##### **Properties and qualities**

*Slope:* 8 to 15 percent  
*Percent of area covered with surface fragments:* 1.1 percent  
*Depth to restrictive feature:* 21 to 43 inches to densic material  
*Natural drainage class:* Moderately well drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.01 to 1.42 in/hr)  
*Depth to water table:* About 19 to 34 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)

## Custom Soil Resource Report

*Available water storage in profile:* Low (about 4.2 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6s

*Hydrologic Soil Group:* C/D

*Hydric soil rating:* No

### **Minor Components**

#### **Becket, very stony**

*Percent of map unit:* 6 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve

*Microfeatures of landform position:* Rises, rises

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### **Colonel, very stony**

*Percent of map unit:* 3 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Footslope

*Landform position (three-dimensional):* Mountainbase, mountainflank, nose slope, side slope, interfluve

*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions

*Down-slope shape:* Linear, concave

*Across-slope shape:* Concave

*Hydric soil rating:* No

#### **Monadnock, very stony**

*Percent of map unit:* 3 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Mountainbase, mountainflank, side slope, nose slope, interfluve

*Microfeatures of landform position:* Rises, rises

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### **Pillsbury, very stony**

*Percent of map unit:* 3 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Toeslope, footslope

*Landform position (three-dimensional):* Mountainflank, mountainbase, side slope, nose slope, interfluve

*Microfeatures of landform position:* Open depressions, open depressions, closed depressions, closed depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

## 647B—Pillsbury fine sandy loam, 0 to 8 percent slopes, very stony

### Map Unit Setting

*National map unit symbol:* 2ty6x  
*Elevation:* 360 to 2,070 feet  
*Mean annual precipitation:* 31 to 95 inches  
*Mean annual air temperature:* 27 to 52 degrees F  
*Frost-free period:* 90 to 140 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Pillsbury, very stony, and similar soils:* 79 percent  
*Minor components:* 21 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Pillsbury, Very Stony

#### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Toeslope, footslope  
*Landform position (three-dimensional):* Mountainbase, base slope, interfluve  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Parent material:* Loamy lodgment till derived from gneiss and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from granite

#### Typical profile

*Oe - 0 to 1 inches:* mucky peat  
*A - 1 to 6 inches:* fine sandy loam  
*Bg1 - 6 to 13 inches:* cobbly fine sandy loam  
*Bg2 - 13 to 23 inches:* cobbly fine sandy loam  
*Cd - 23 to 65 inches:* cobbly fine sandy loam

#### Properties and qualities

*Slope:* 0 to 8 percent  
*Percent of area covered with surface fragments:* 1.1 percent  
*Depth to restrictive feature:* 21 to 43 inches to densic material  
*Natural drainage class:* Poorly drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.01 to 1.42 in/hr)  
*Depth to water table:* About 0 to 12 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Salinity, maximum in profile:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water storage in profile:* Low (about 3.3 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* D



## Custom Soil Resource Report

*Hydric soil rating:* Yes

### Minor Components

#### **Peru, very stony**

*Percent of map unit:* 9 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, footslope

*Landform position (three-dimensional):* Mountainbase, interfluve, base slope

*Microfeatures of landform position:* Rises, rises

*Down-slope shape:* Convex

*Across-slope shape:* Linear, convex

*Hydric soil rating:* No

#### **Peacham, very stony**

*Percent of map unit:* 5 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Toeslope, footslope

*Landform position (three-dimensional):* Mountainbase, base slope, interfluve

*Microfeatures of landform position:* Closed depressions, closed depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

#### **Wonsqueak**

*Percent of map unit:* 4 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Toeslope, footslope

*Landform position (three-dimensional):* Mountainbase, base slope, interfluve

*Microfeatures of landform position:* Closed depressions, closed depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

#### **Lyman, very stony**

*Percent of map unit:* 3 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, shoulder, summit

*Landform position (three-dimensional):* Mountainbase, interfluve, base slope

*Microfeatures of landform position:* Rises, rises

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

## W—Water

### Map Unit Composition

*Water (less than 40):* 100 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

# References

---

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- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2\\_053374](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374)
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

## Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2\\_054242](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242)

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053624](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624)

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## Appendix E – Photo Log

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 1: Looking southeasterly at proposed access in Keene.



Photograph No. 2: Looking at proposed access off Route 12 in Keene.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 3: Looking northerly at proposed replacement L163 Structure 212 and proposed access in Keene.



Photograph No. 4: Looking at proposed access between Structure 211 and 212.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 5: Looking at proposed access between Structure 208 and 209.



Photograph No. 6: Looking at proposed access and proposed structure replacement structure 208.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 7: Looking at proposed access to Structure 175.



Photograph No. 8: Looking at proposed access between Structure 174 and 175.



**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 9: Looking at proposed access and work pad at Structure 174.



Photograph No. 10: Looking at proposed work pad at Structure 173.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 11: Looking at proposed access between Structure 171 and 172.



Photograph No. 12: Looking at proposed access between Structure 171 and 172.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 13: Looking at proposed access between Structure 172 and 173.



Photograph No. 14: Looking at proposed access between Structure 170 and 171.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 15: Looking at proposed work pad at Structure 170.



Photograph No. 16: Looking at proposed access between Structure 169 and 170.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 17: Looking at proposed access between Structure 169 and 170.



Photograph No. 18: Looking at proposed work pad at Structure 169.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 19: Looking at proposed access between Structure 168 and 169.



Photograph No. 20: Looking at proposed access toward Structure 188 off Old Gilsum Road.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 21: Looking at proposed access and work pad at Structure 188.



Photograph No. 22: Looking at proposed access between Structure 187 and 188.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 23: Looking at proposed access and work pad at Structure 187.



Photograph No. 24: Looking at proposed work pad at Structure 185.

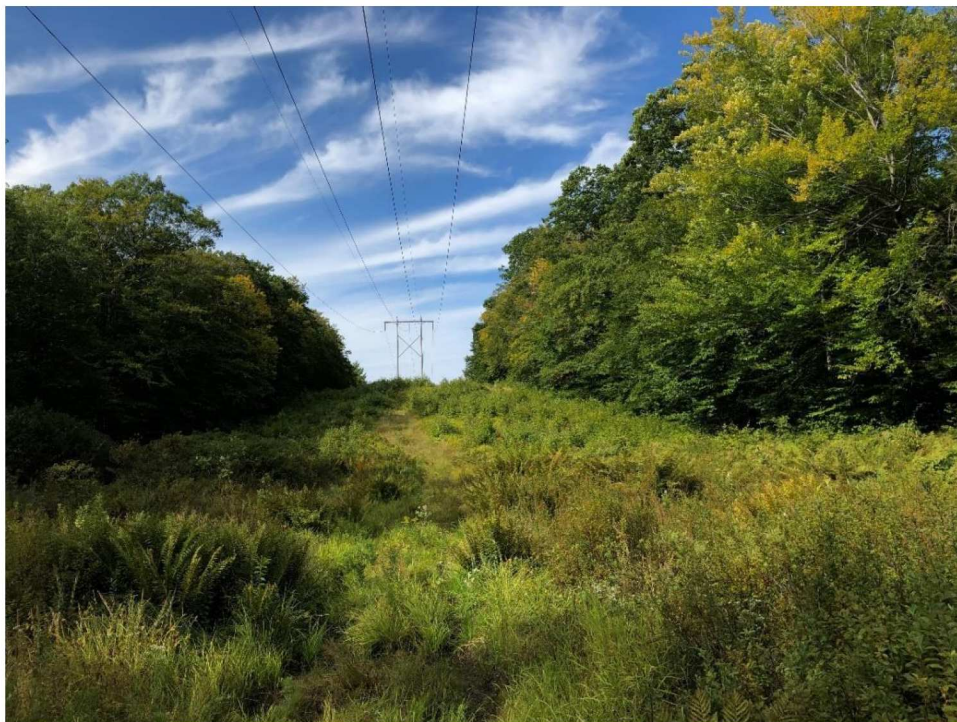


**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 25: Looking at proposed access between Structure 182 and 183.



Photograph No. 26: Looking at proposed access between 183 and 184.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 27: Looking at proposed access between Structure 184 and 185.



Photograph No. 28: Looking at proposed work pad and access at Structure 180.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 29: Looking at proposed work pad at Structure 30.



Photograph No. 30: Looking at proposed access adjacent to Structure 24.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 31: Looking at proposed access between Structure 22 and 23.



Photograph No. 32: Looking at proposed access between Structure 17 and 18.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 33: Looking at proposed access between Structure 16 and 17.



Photograph No. 34: Looking at proposed access adjacent to Structure 15.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 35: Looking at proposed access between Structure 12 and 13.



Photograph No. 36: Looking at proposed access between Structure 11 and 12.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 37: Looking at proposed access between Structure 9 and 10.



Photograph No. 38: Looking at proposed work pad and access at Structure 9.

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 39: Looking at proposed access adjacent to Structure 7.



Photograph No. 40: Looking at proposed access and work pad between Structure 3 and 4.



**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 41: Looking for proposed access and work pad at Structure 3.



Photograph No. 42: Looking at proposed work pad at Structure 44 (X104 Line).

**PHOTO LOG**  
**L163 Transmission Line Structure Replacement Project**  
**Keene, New Hampshire**

**Photos Taken: September 5, 6 & 9, December 13, 2019**



Photograph No. 43: Looking at proposed work pad and access to Structure 44 (X104 Line).



## **Appendix F – 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		
L163 Transmission Line Structure Replacement Project <b>Project Name</b>		
Existing L163 Right-of-Way <b>Street Address</b>		
Keene, Stoddard, and Antrim <b>City/Town</b>	Multiple <b>Zip Code</b>	
Multiple – see attached <b>Tax Map/Lot Number</b>		
B. APPLICANT/OWNER INFORMATION		
Jeremy <b>First Name</b>	Fennell <b>Last Name</b>	
Eversource Energy <b>Organization</b>		
13 Legends Drive <b>Street Address</b>		
Hooksett <b>City/Town</b>	New Hampshire <b>State</b>	03106 <b>Zip Code</b>
Jeremy.fennell@eversource.com <b>Email</b>	603-634-3396 <b>Telephone Number</b>	
C. APPLICANT/OWNER AGENT INFORMATION		
Anthony <b>First Name</b>	Damiano <b>Last Name</b>	
GZA GeoEnvironmental, Inc. <b>Organization</b>		
5 Commerce Park North, Suite 201 <b>Street Address</b>		
Bedford <b>City/Town</b>	New Hampshire <b>State</b>	03110 <b>Zip Code</b>
Anthony.damiano@gza.com <b>Email</b>	603-232-8796 <b>Telephone Number</b>	

<b>D. WAIVER REQUESTS</b>	
Env-Wq 1504.09 <b>Rule Section Waiver Request</b>	Stormwater Drainage Report; Drainage Area Plans; Hydrologic Soil Group Plans <b>Name of Rule</b>
<p><b>Reason for Waiver Request</b></p> <p>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 maintenance of the existing L163 Transmission Line structures. The proposed access -and work pad improvements for continued transmission line maintenance work will not result in new impervious surfaces. As a result, stormwater treatment practices are not proposed.</p>	
<p><b>Waiver Timeline</b></p> <p>Permanent</p>	
<p><b>Proposed Alternative</b></p> <p>The proposed access and work pad improvements will not result in new impervious surface. Therefore, there is no proposed alternative to substitute the requirements of Env-Wq 1504.09.</p>	
<p><b>Compliance with Env- WQ 1509.04</b></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 in order to maintain the safety and reliability of the electrical infrastructure. Access and work pad improvements will be completed using stone and gravel, and 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.</p> <p>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 that a Stormwater Drainage Report, Drainage Area Plans, and Hydrologic Soil Group Plans be waived for the purposes of the proposed utility line maintenance project.</p>	
Env-Wq 1503.09 <b>Rule Section Waiver Request</b>	Information Required for Projects Within the 100-year Floodplain <b>Name of Rule</b>
<p><b>Reason for Waiver Request</b></p> <p>Eversource is requesting a waiver for preparing a supplementary report for proposed work within the 100-year floodplain for proposed access improvements and work pad grading associated with maintenance of the existing L163 Transmission Line structures. The proposed access and work pad improvements for continued transmission line maintenance work will not result in new impervious</p>	

surfaces and is not anticipated to change existing grading by more than 2 feet. As a result, existing drainage and grading will not be significantly impacted within the existing 100-year floodplain.

**Waiver Timeline**

Permanent

**Proposed Alternative**

The proposed access and work pad improvements will not result in new impervious surface. Therefore, there is no proposed alternative to substitute the requirements of Env-Wq 1503.09.

**Compliance with Env- WQ 1509.04**

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 in order to maintain the safety and reliability of the electrical infrastructure. Access and work pad improvements will be completed using stone and gravel, and therefore no new impervious surface is proposed as part of this project. In addition, grading changes are not anticipated to exceed 2-feet. Therefore, it is not anticipated that the 100-year floodplain will be significantly impacted by the proposed 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 that a supplementary report for proposed work within the 100-year floodplain be waived for the purposes of the proposed utility line maintenance project.

**E. SIGNATURES**



Applicant/Owner, **Jeremy Fennell, Eversource Energy**

01/30/2020

Date



Applicant/Owner Agent, **Anthony Damiano, GZA**

01/30/2020

Date



**Appendix G – Certified Mail Receipts**  
**[Reserved for DES certified mailing receipts]**



GZA GeoEnvironmental, Inc.



## **Correspondence**

## Anthony Damiano

---

**From:** Mauck, Ridgely <Addison.Mauck@des.nh.gov>  
**Sent:** Friday, April 10, 2020 5:06 AM  
**To:** Anthony Damiano  
**Cc:** Fennell, Jeremy D (jeremy.fennell@eversource.com)  
**Subject:** RE: Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

Anthony,

This email will serve as issuance of a waiver of Env-Wq 1503.21(a) for the subject project, waiving the requirement to provide at least one week of notification prior to the start of construction.

Regards,

-Ridge

---

**From:** Anthony Damiano <Anthony.Damiano@gza.com>  
**Sent:** Thursday, April 9, 2020 5:35 PM  
**To:** Mauck, Ridgely <Addison.Mauck@des.nh.gov>  
**Subject:** RE: Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

**EXTERNAL: Do not open attachments or click on links unless you recognize and trust the sender.**

---

Thanks Ridge, we appreciate your help finalizing the permit.

We understand the timeline for issuing this permit has been affected by COVID-19 and thus permitting schedules have been affected as a result. We would like to submit the pre-construction notice as soon as possible but despite other delays, our construction schedule has been upheld. Due to constraints of Eversource outages, we will need to commence construction prior to the ten day notice.

Please let us know if you have any questions.

Jeremy Fennell will fill out the online Start of Construction Form online and submit shortly.

Anthony

**Anthony Damiano**  
**Assistant Project Manager**  
GZA | 249 Vanderbilt Avenue | Norwood, MA 02062  
o: 603.232.8796 | c: 603.213.2682 | [anthony.damiano@gza.com](mailto:anthony.damiano@gza.com) | [www.gza.com](http://www.gza.com) | [LinkedIn](#)

*\* Please note: Our office is currently working remotely. I can be reached at 603.213.2682*

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---

**From:** Mauck, Ridgely <Addison.Mauck@des.nh.gov>  
**Sent:** Thursday, April 9, 2020 11:40 AM

**To:** Anthony Damiano <[Anthony.Damiano@gza.com](mailto:Anthony.Damiano@gza.com)>

**Subject:** RE: Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

Was developing the permit document and off of email when your correspondence arrived. You should have the permit now.

Regards,

-Ridge

---

**From:** Anthony Damiano <[Anthony.Damiano@gza.com](mailto:Anthony.Damiano@gza.com)>

**Sent:** Thursday, April 9, 2020 10:58 AM

**To:** Mauck, Ridgely <[Addison.Mauck@des.nh.gov](mailto:Addison.Mauck@des.nh.gov)>

**Subject:** RE: Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

**EXTERNAL: Do not open attachments or click on links unless you recognize and trust the sender.**

---

Hi Ridge,

Any word from NHFG regarding their delay? Was it either Melissa or Kim you have been working with? We would be happy to follow up with them if you think that might be helpful.

I am told we are getting very close to our required construction start date.

Thanks!

Anthony

**Anthony Damiano**

**Assistant Project Manager**

GZA | 249 Vanderbilt Avenue | Norwood, MA 02062

o: 603.232.8796 | c: 603.213.2682 | [anthony.damiano@gza.com](mailto:anthony.damiano@gza.com) | [www.gza.com](http://www.gza.com) | [LinkedIn](#)

*\* Please note: Our office is currently working remotely. I can be reached at 603.213.2682*

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---

**From:** Mauck, Ridgely <[Addison.Mauck@des.nh.gov](mailto:Addison.Mauck@des.nh.gov)>

**Sent:** Friday, April 3, 2020 5:32 AM

**To:** Anthony Damiano <[Anthony.Damiano@gza.com](mailto:Anthony.Damiano@gza.com)>

**Subject:** RE: Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

Thanks Anthony. I will forward the plans to NHFG. Once issued, you will be emailed a copy of the permit.

Regards,

-Ridge

---

**From:** Anthony Damiano <[Anthony.Damiano@gza.com](mailto:Anthony.Damiano@gza.com)>  
**Sent:** Thursday, April 2, 2020 4:02 PM  
**To:** Mauck, Ridgely <[Addison.Mauck@des.nh.gov](mailto:Addison.Mauck@des.nh.gov)>  
**Subject:** RE: Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

**EXTERNAL: Do not open attachments or click on links unless you recognize and trust the sender.**

---

I'm using Mimecast to share large files with you. Please see the attached instructions.

---

Hi Ridge,

Please find the attached AOT plans updated to reflect the comments from NHFG.

Do you typically email/mail a copy of the issued permit? And could I be emailed a copy?

Thanks!

Anthony

**Anthony Damiano**  
**Assistant Project Manager**  
GZA | 249 Vanderbilt Avenue | Norwood, MA 02062  
o: 603.232.8796 | c: 603.213.2682 | [anthony.damiano@gza.com](mailto:anthony.damiano@gza.com) | [www.gza.com](http://www.gza.com) | [LinkedIn](#)

*\* Please note: Our office is currently working remotely. I can be reached at 603.213.2682*

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---

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---

**From:** Mauck, Ridgely <[Addison.Mauck@des.nh.gov](mailto:Addison.Mauck@des.nh.gov)>  
**Sent:** Thursday, April 2, 2020 11:40 AM  
**To:** Anthony Damiano <[Anthony.Damiano@gza.com](mailto:Anthony.Damiano@gza.com)>  
**Subject:** RE: Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

Great. Then I can email to NHFG and request their sign-off. This may add another day to issuance of the permit but it should be forthcoming in the very near future

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**Sent:** Thursday, April 2, 2020 11:37 AM  
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**Subject:** RE: Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

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Thanks Ridge,

That is a fairly easy fix. I will have those updated plans for you this afternoon.

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**Anthony Damiano**

**Assistant Project Manager**

GZA | 249 Vanderbilt Avenue | Norwood, MA 02062

o: 603.232.8796 | c: 603.213.2682 | [anthony.damiano@gza.com](mailto:anthony.damiano@gza.com) | [www.gza.com](http://www.gza.com) | [LinkedIn](#)

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Anthony,

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**Sent:** Wednesday, April 1, 2020 1:53 PM

**To:** Mauck, Ridgely <[Addison.Mauck@des.nh.gov](mailto:Addison.Mauck@des.nh.gov)>

**Subject:** RE: Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

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**From:** Anthony Damiano

**Sent:** Friday, March 27, 2020 8:10 AM

**To:** Mauck, Ridge <[Ridgely.Mauck@des.nh.gov](mailto:Ridgely.Mauck@des.nh.gov)>

**Subject:** Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

Hi Ridge,

I am following up my phone call and voicemail that I left yesterday, realizing that you may be working remotely, as most of us are at this point.

I understand you have been finalizing a few applications for us on behalf of Lindsey White and I was wondering if you could provide an update on the L163 application status which was submitted January 30, 2020.

Feel free to call my cell if that is easier,

Thanks!

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**Assistant Project Manager**

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---



## Anthony Damiano

---

**From:** Mauck, Ridgely <Addison.Mauck@des.nh.gov>  
**Sent:** Thursday, April 9, 2020 11:34 AM  
**To:** Anthony Damiano  
**Cc:** Fennell, Jeremy D (jeremy.fennell@eversource.com); Doperalski, Melissa; Sales, Tracie; 'Barbara Skuly'; 'mlundsted@ceiengineers.com'  
**Subject:** Eversource L163/X104 Transmission Line Structure Replacement Project  
**Attachments:** aot1785\_rm.pdf

Anthony,

Permit attached. Now that the permit has been issued, in accordance with Env-Wq 1503.20 (e), **within 7 days** of the issuance of this permit please submit the requisite CD containing copies of all approved project documents. Please review the guidance below relative to submittal of the CD. Thanks.

-Ridge

*Before you send your CD check to make sure that: 1) it is not corrupt, 2) the CD contains the report and plans that were approved, not ones from an earlier submittal; and 3) it contains all the approved documents (we sometimes receive CDs without plans).*

*PREFERABLY..... the CD contains only 3 PDFs.*

*AoT-xxxx Plans.pdf*

*AoT-xxxx Drainage Report.pdf*

*AoT-xxxx Miscellaneous.pdf*

*Some engineers save each plan sheet as an individual PDF and/or each storm event as an individual PDF. This makes it time consuming to verify that the PDFs are what we permitted. PLEASE save the full plan set as one PDF and the drainage report as one PDF.*

Ridgely Mauck, P.E.

Alteration of Terrain Bureau, Land Resources Management

Water Division, NH Dept. of Environmental Services

PO Box 95, 29 Hazen Drive

Concord, NH 03302

(603)271-2303

Email: Ridgely.Mauck@des.nh.gov



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## Anthony Damiano

---

**From:** Mauck, Ridgely <Addison.Mauck@des.nh.gov>  
**Sent:** Friday, April 3, 2020 1:29 PM  
**To:** Anthony Damiano  
**Subject:** RE: Eversource Energy L163 Transmission Line Project

Thanks Anthony.

-Ridge

---

**From:** Anthony Damiano <Anthony.Damiano@gza.com>  
**Sent:** Friday, April 3, 2020 1:19 PM  
**To:** Mauck, Ridgely <Addison.Mauck@des.nh.gov>  
**Subject:** RE: Eversource Energy L163 Transmission Line Project

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---

I'm using Mimecast to share large files with you. Please see the attached instructions.

---

Hi Ridge,

Attached are the updated plans,

Thanks,

**Anthony Damiano**

**Assistant Project Manager**

GZA | 249 Vanderbilt Avenue | Norwood, MA 02062

o: 603.232.8796 | c: 603.213.2682 | [anthony.damiano@gza.com](mailto:anthony.damiano@gza.com) | [www.gza.com](http://www.gza.com) | [LinkedIn](#)

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**From:** Mauck, Ridgely <[Addison.Mauck@des.nh.gov](mailto:Addison.Mauck@des.nh.gov)>  
**Sent:** Friday, April 3, 2020 7:06 AM  
**To:** Anthony Damiano <[Anthony.Damiano@gza.com](mailto:Anthony.Damiano@gza.com)>  
**Subject:** Eversource Energy L163 Transmission Line Project

Anthony,

I've reviewed the amended plans submitted yesterday and have one additional request. The note placed on the plans "IF SPOTTED, WOOD OR BLANDING'S TURTLES ARE FOUND LAYING EGGS IN THE WORK AREA, PLEASE CONTACT MELISSA DOPERLSKI AT 271-1738 or JOSH MEGYESY AT 978-578-0802 FOR FURTHER INSTRUCTIONS." needs to be modified to state "...in the work area, personnel shall immediately contact...". Notes such as these need to be stated as requirements rather than requests. We've had recent Water Council rulings in permit appeals that have addressed this specific issue.

Thanks,

-Ridge

Ridgely Mauck, P.E.  
Alteration of Terrain Bureau, Land Resources Management  
Water Division, NH Dept. of Environmental Services  
PO Box 95, 29 Hazen Drive  
Concord, NH 03302  
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## Anthony Damiano

---

**From:** Mauck, Ridgely <Addison.Mauck@des.nh.gov>  
**Sent:** Friday, April 3, 2020 5:32 AM  
**To:** Anthony Damiano  
**Subject:** RE: Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

Thanks Anthony. I will forward the plans to NHFG. Once issued, you will be emailed a copy of the permit.

Regards,

-Ridge

---

**From:** Anthony Damiano <Anthony.Damiano@gza.com>  
**Sent:** Thursday, April 2, 2020 4:02 PM  
**To:** Mauck, Ridgely <Addison.Mauck@des.nh.gov>  
**Subject:** RE: Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

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Hi Ridge,

Please find the attached AOT plans updated to reflect the comments from NHFG.

Do you typically email/mail a copy of the issued permit? And could I be emailed a copy?

Thanks!

Anthony

**Anthony Damiano**  
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**From:** Mauck, Ridgely <[Addison.Mauck@des.nh.gov](mailto:Addison.Mauck@des.nh.gov)>  
**Sent:** Thursday, April 2, 2020 11:40 AM  
**To:** Anthony Damiano <[Anthony.Damiano@gza.com](mailto:Anthony.Damiano@gza.com)>  
**Subject:** RE: Eversource Energy L163 Transmission Line Project - Alteration of Terrain Permit

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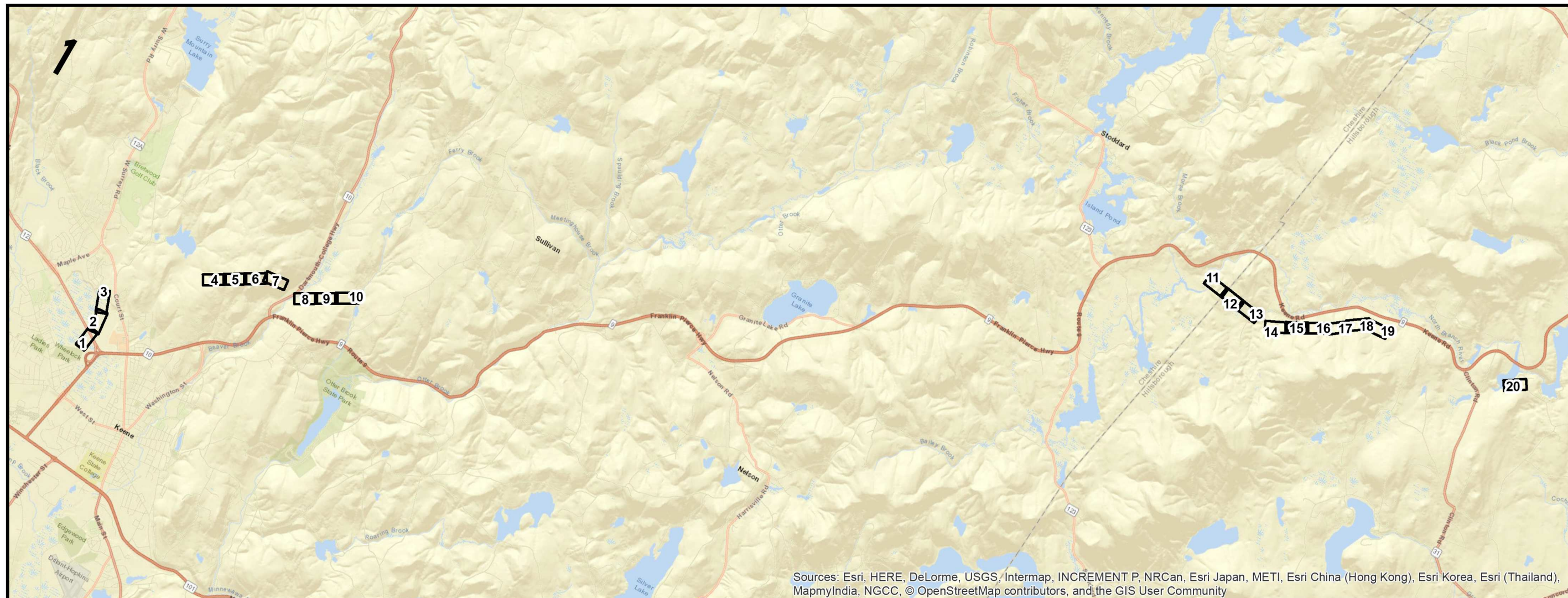
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## Revisions

**L163 TRANSMISSION LINE**  
**2020 STRUCTURE REPLACEMENT PROJECT**  
**KEENE, STODDARD, AND ANTRIM**  
**NEW HAMPSHIRE**  
**4/3/2020**



Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

PREPARED FOR



**INDEX OF FIGURES**

1 inch = 7,500 feet

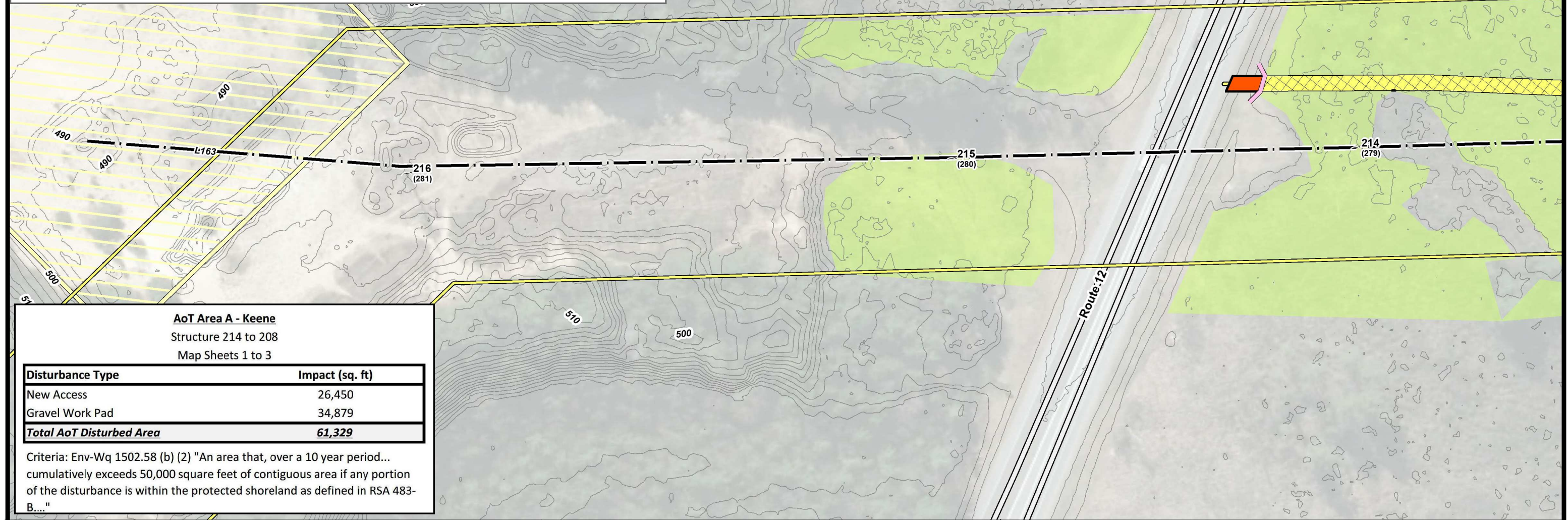
- T1: TITLE SHEET
- 1-20: MAP SHEETS
- S1: NOTES
- S2: DETAILS
- S3: DETAILS (CONT.)

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1. Prior to daily construction activities, timber matting will be reviewed for snakes and turtles. GZA will provide an environmental addendum to the contractors' daily tailboards which shall include guidance for identification of wood turtle.
2. Observed snakes and turtles will be moved off of construction access roads to limit and prevent mortality to turtles during construction.
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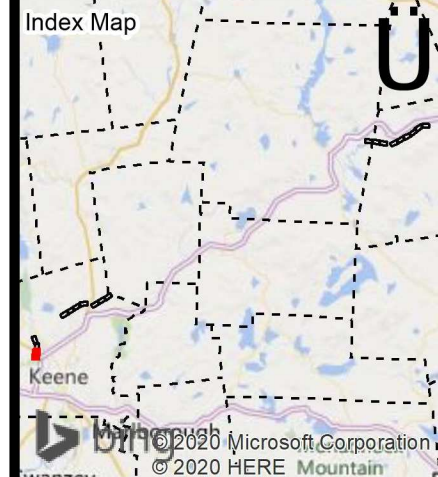
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**AoT Area A - Keene**  
Structure 214 to 208  
Map Sheets 1 to 3

Disturbance Type	Impact (sq. ft)
New Access	26,450
Gravel Work Pad	34,879
<b>Total AoT Disturbed Area</b>	<b>61,329</b>

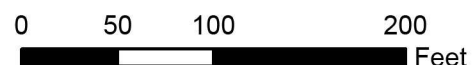
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**Keene**      **Current Town: Keene**      **Hillsborough**

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**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

ALTERATION OF TERRAIN  
PERMITTING PLANS  
APRIL 03, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 1 OF 20

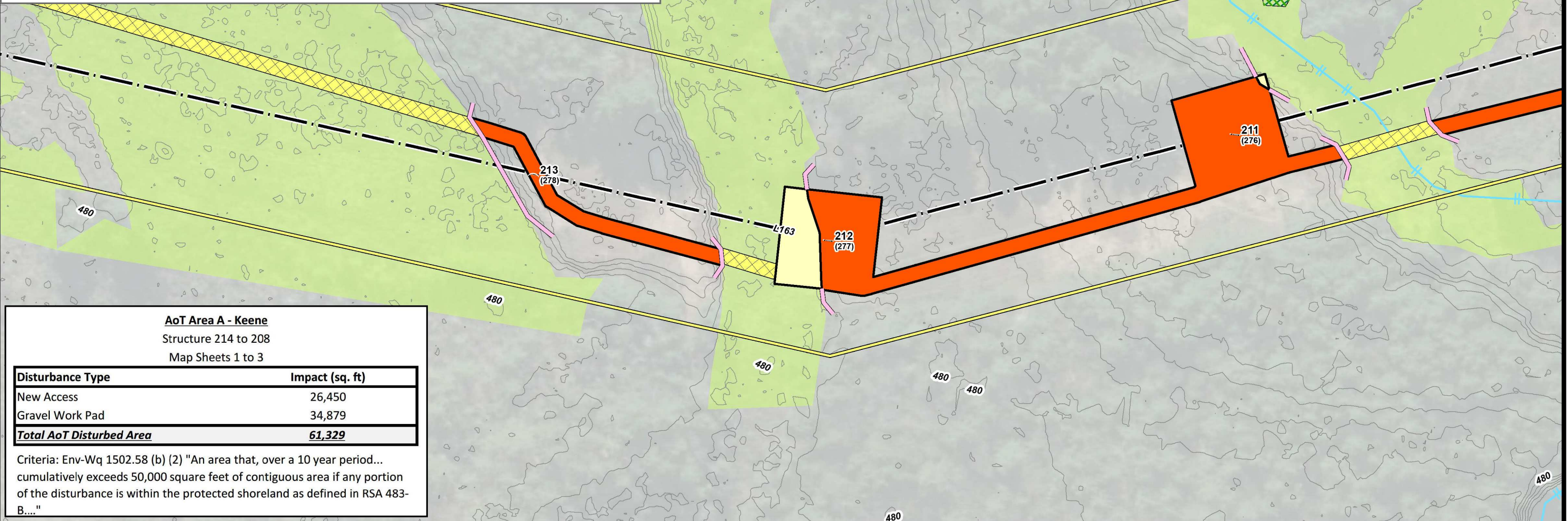
Project No.: 04.0190923.05

1 inch = 100 Feet



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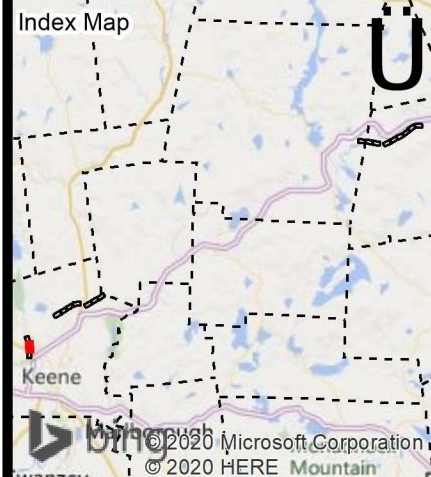
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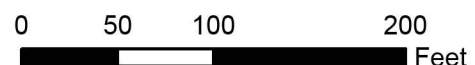
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KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 2 OF 20

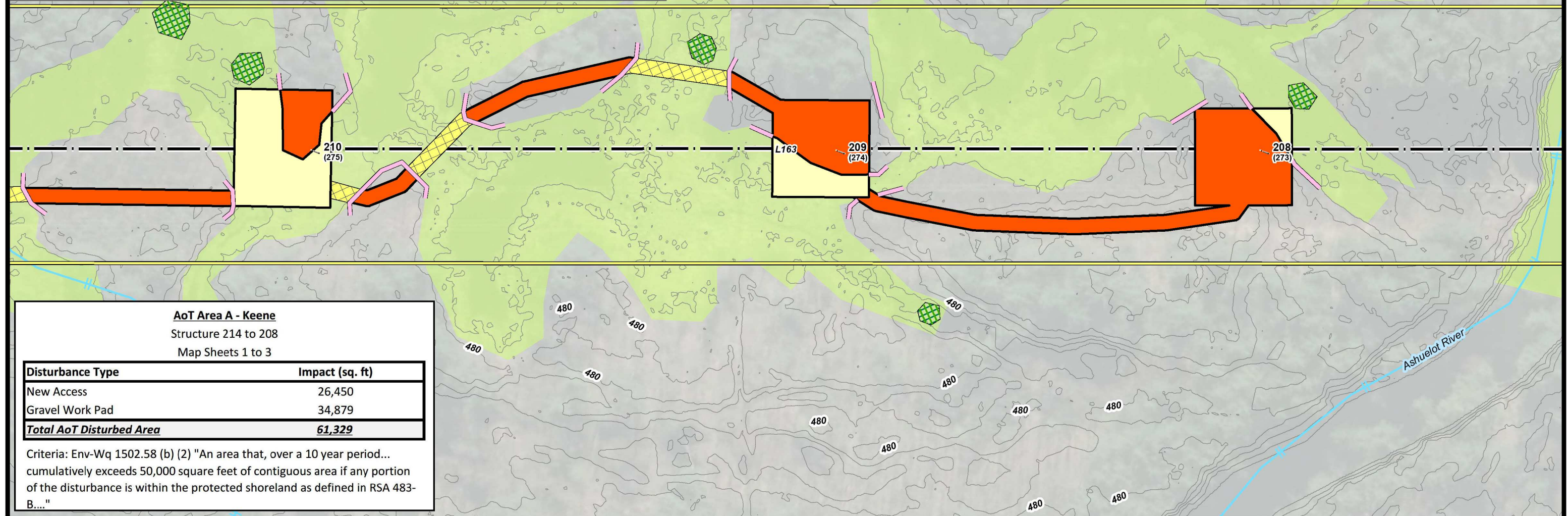
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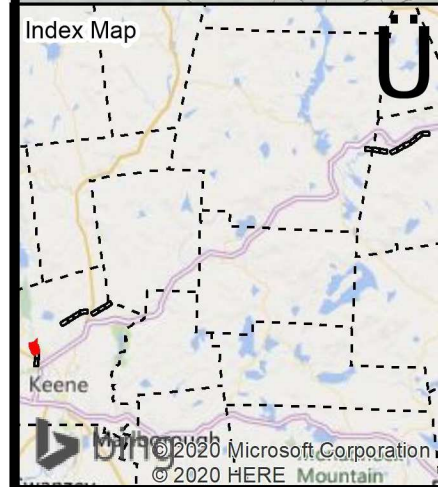
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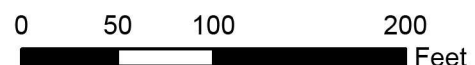
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KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 3 OF 20



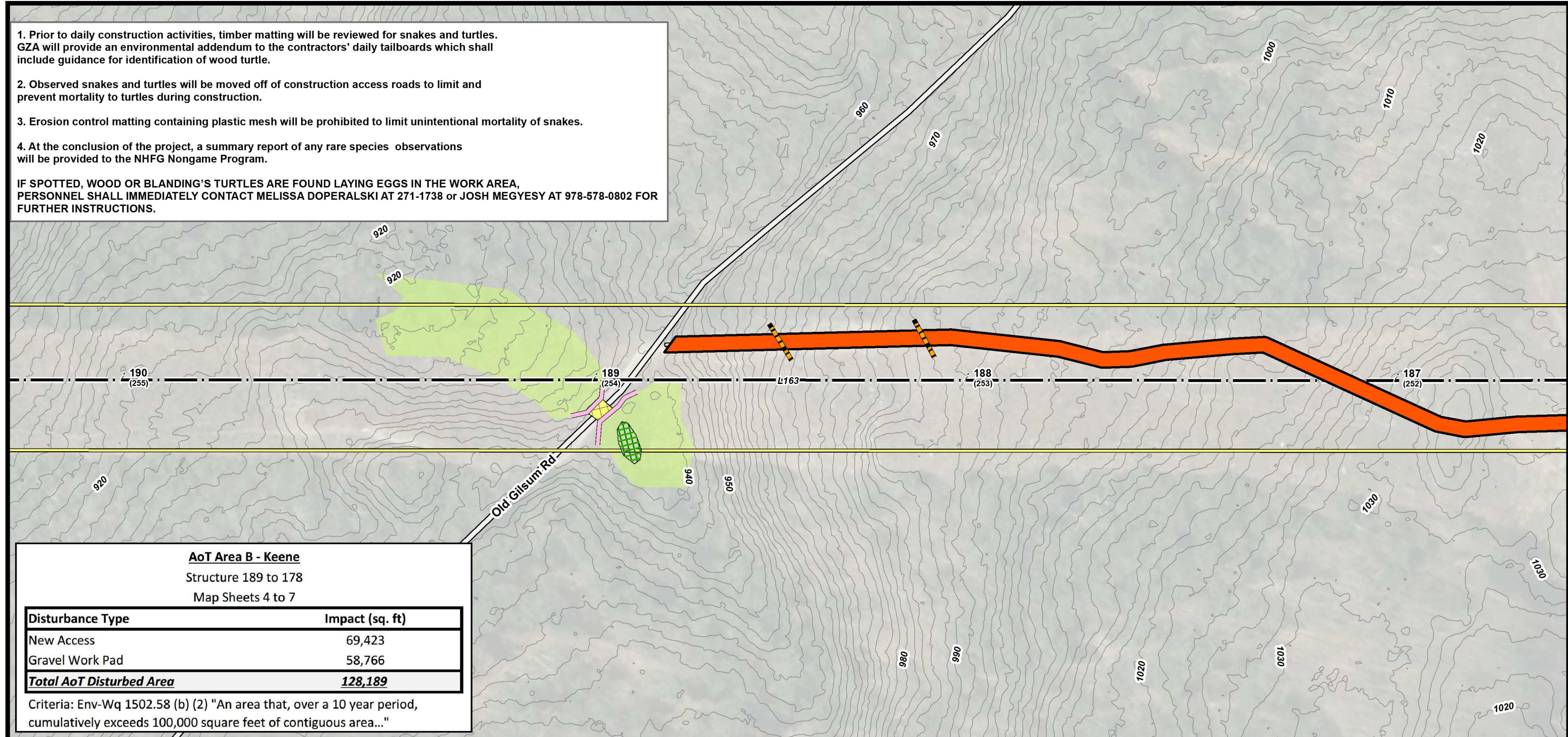
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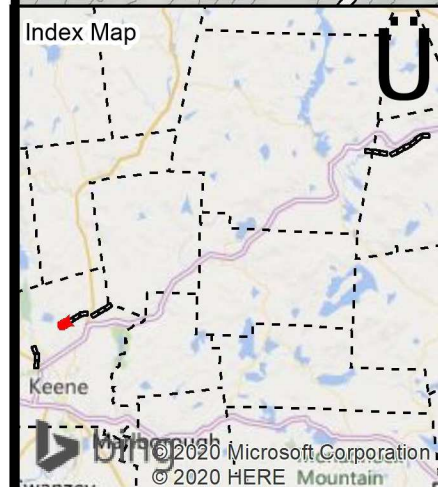
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**AoT Area B - Keene**  
Structure 189 to 178  
Map Sheets 4 to 7

Disturbance Type	Impact (sq. ft)
New Access	69,423
Gravel Work Pad	58,766
<b>Total AoT Disturbed Area</b>	<b>128,189</b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period, cumulatively exceeds 100,000 square feet of contiguous area..."

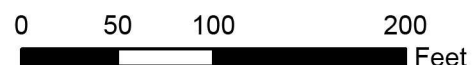


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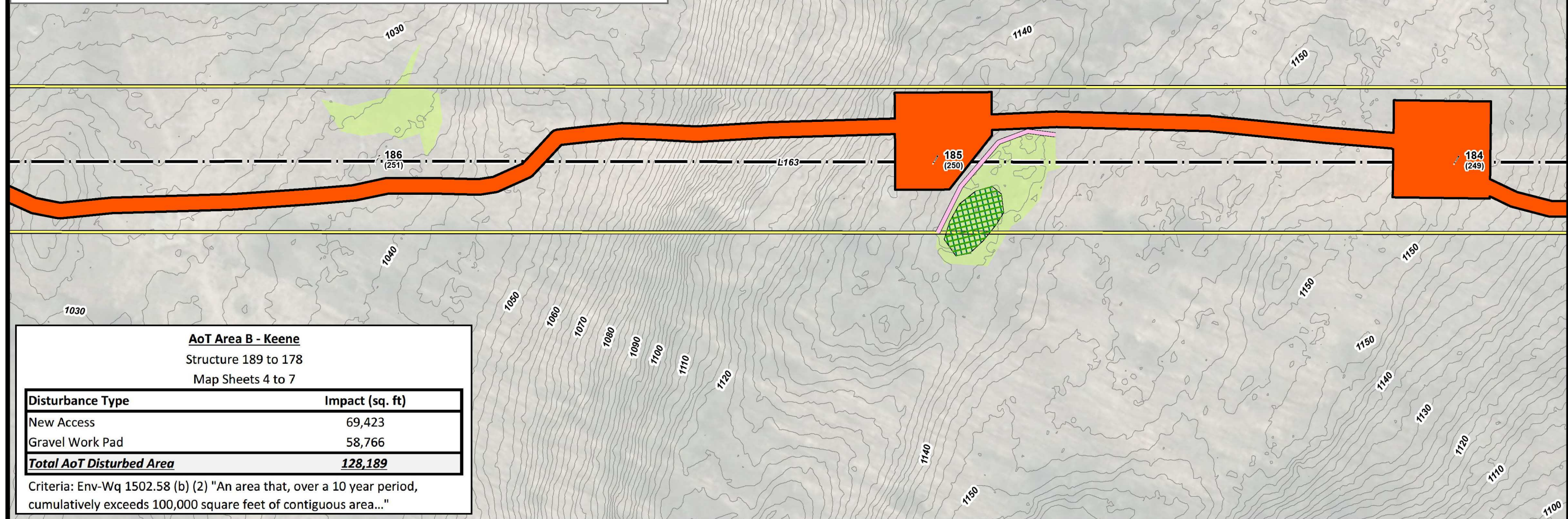
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KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 4 OF 20



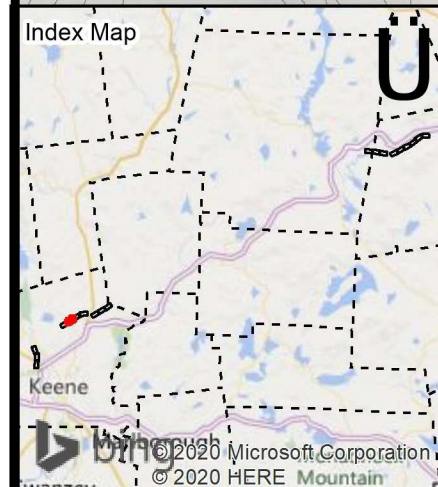
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**AoT Area B - Keene**  
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0 50 100 200 Feet

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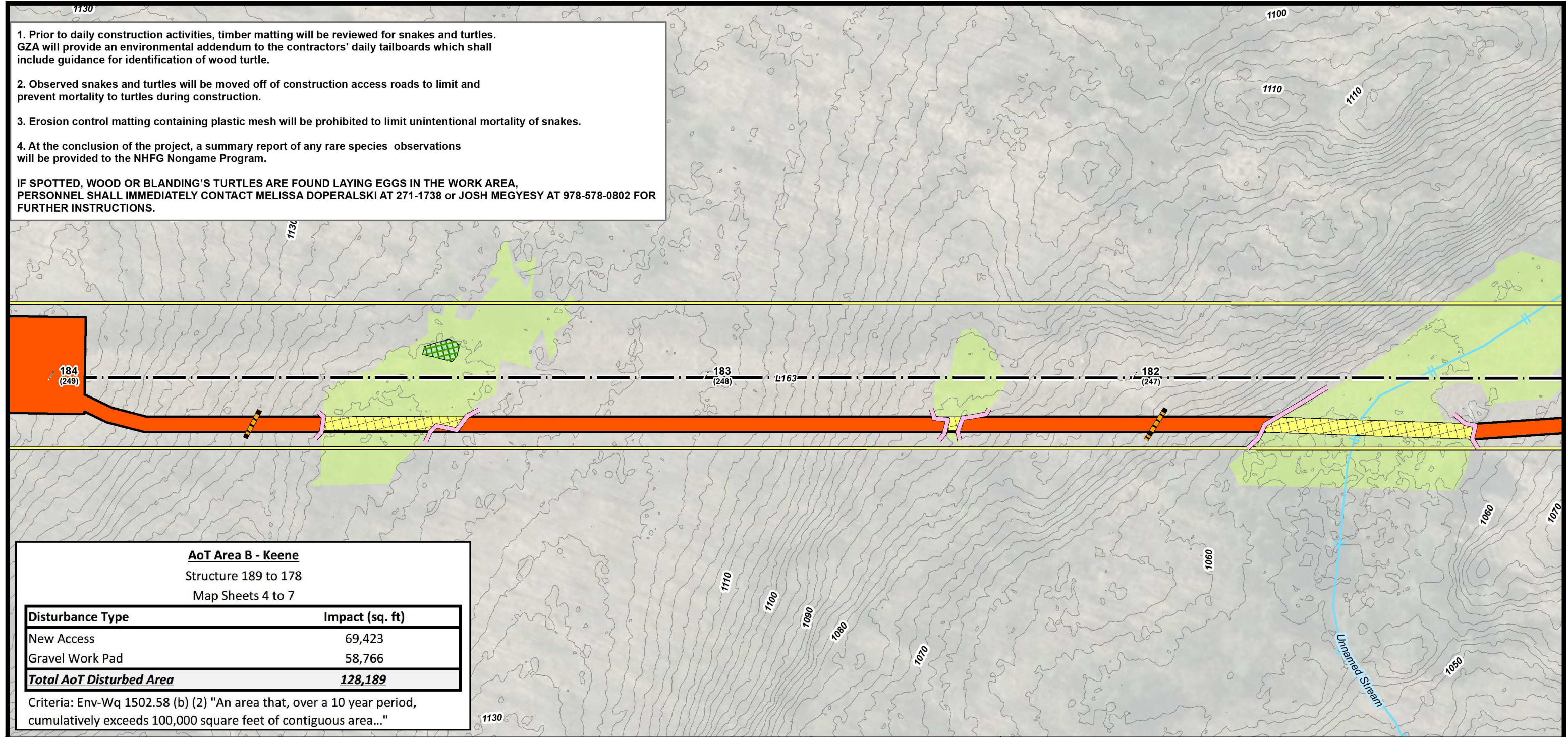
KEENE, STODDARD & ANTRIM,  
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PAGE 5 OF 20

Project No.: 04.0190923.05      1 inch = 100 Feet

**EVSOURCE ENERGY**

**GZA GeoEnvironmental, Inc.**  
Engineers and Scientists  
www.gza.com

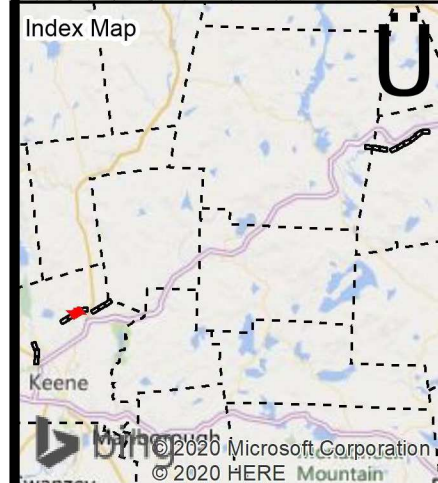
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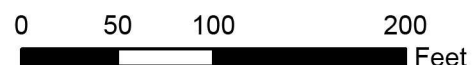
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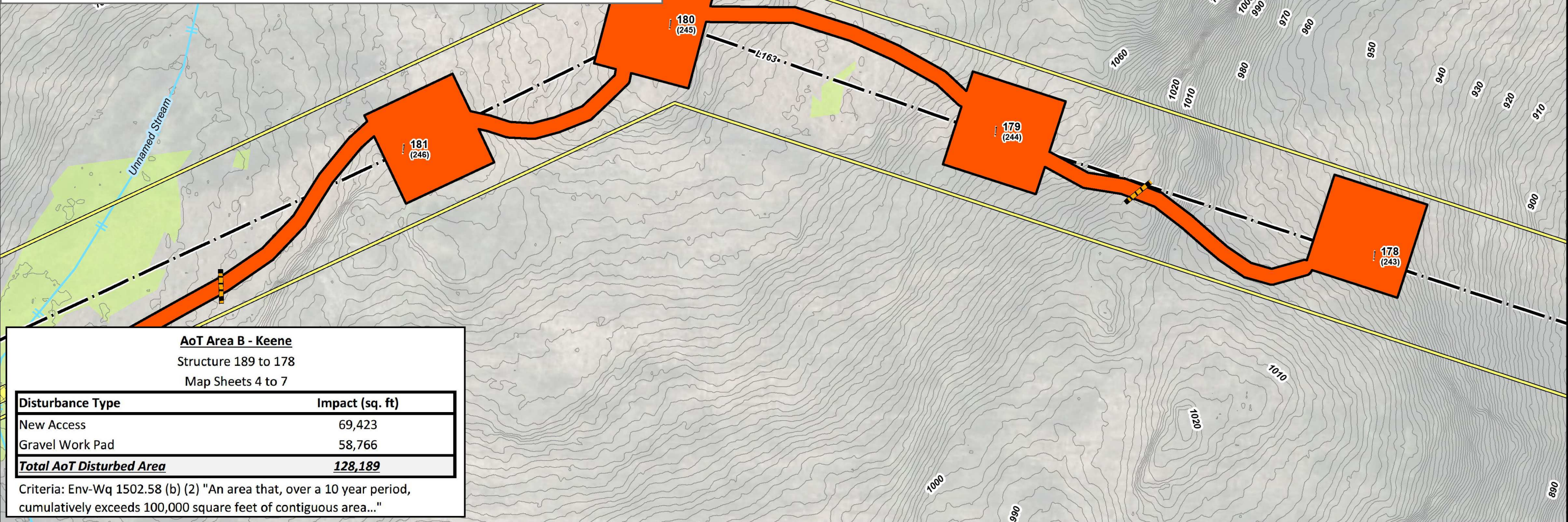
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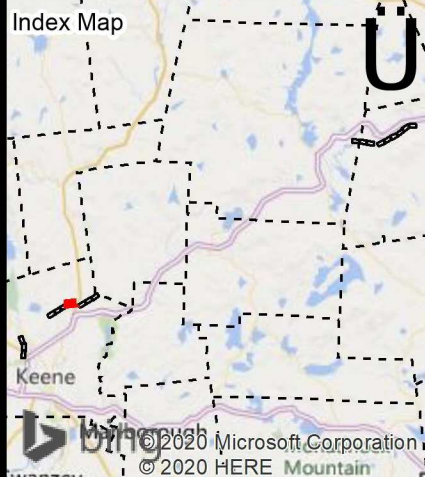
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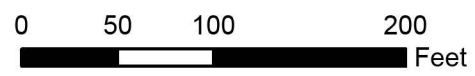
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  4. L163 STRUCTURE DATA WAS PROVIDED BY EVERSOURCE ENERGY.
  5. PROPOSED ACCESS ROUTES AND WORK PAD LOCATIONS HAVE NOT BEEN FIELD VERIFIED.
  6. 2 FOOT GROUND SURFACE ELEVATION CONTOURS WERE OBTAINED FROM UNH GRANIT.



**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

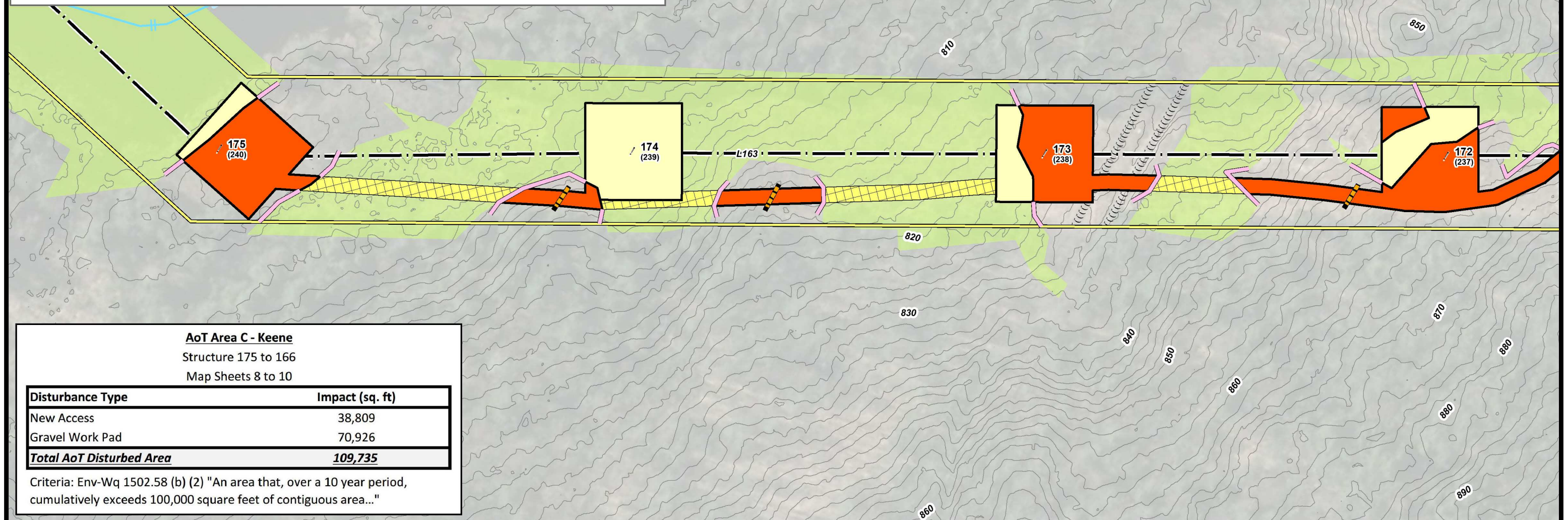
ALTERATION OF TERRAIN  
PERMITTING PLANS  
APRIL 03, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 7 OF 20



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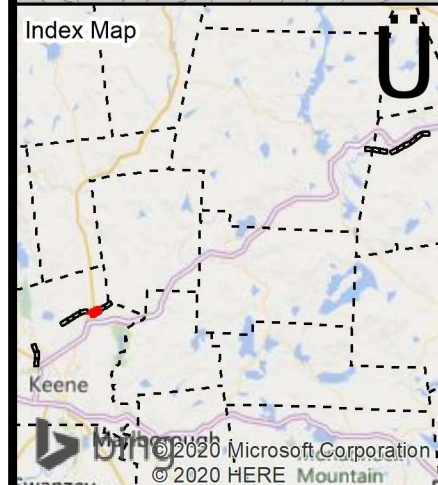


**AoT Area C - Keene**

Structure 175 to 166  
Map Sheets 8 to 10

Disturbance Type	Impact (sq. ft)
New Access	38,809
Gravel Work Pad	70,926
<b>Total AoT Disturbed Area</b>	<b>109,735</b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period, cumulatively exceeds 100,000 square feet of contiguous area..."



**Keene**

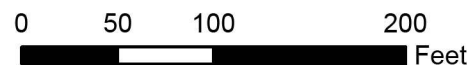
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- WORK PAD
- AOT DISTURBANCE AREA
- TEMPORARY WETLAND IMPACT
- GATE
- POTENTIAL VERNAL POOL
- EVERSOURCE TRANSMISSION LINE
- APPROXIMATE ROW
- FENCE

**Current Town: Keene**

- STONE WALL
- WETLAND
- SUBSTATION
- DOT ROADS
- NHD FLOWLINE
- PRIMARY ACCESS
- SECONDARY ACCESS
- 2 FT CONTOURS
- STRAW WATTLE
- WATER BAR
- TOWN BOUNDARY

**Hillsborough**

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2020 STRUCTURE  
REPLACEMENT PROJECT**

ALTERATION OF TERRAIN  
PERMITTING PLANS  
APRIL 03, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 8 OF 20

Project No.: 04.0190923.05

1 inch = 100 Feet



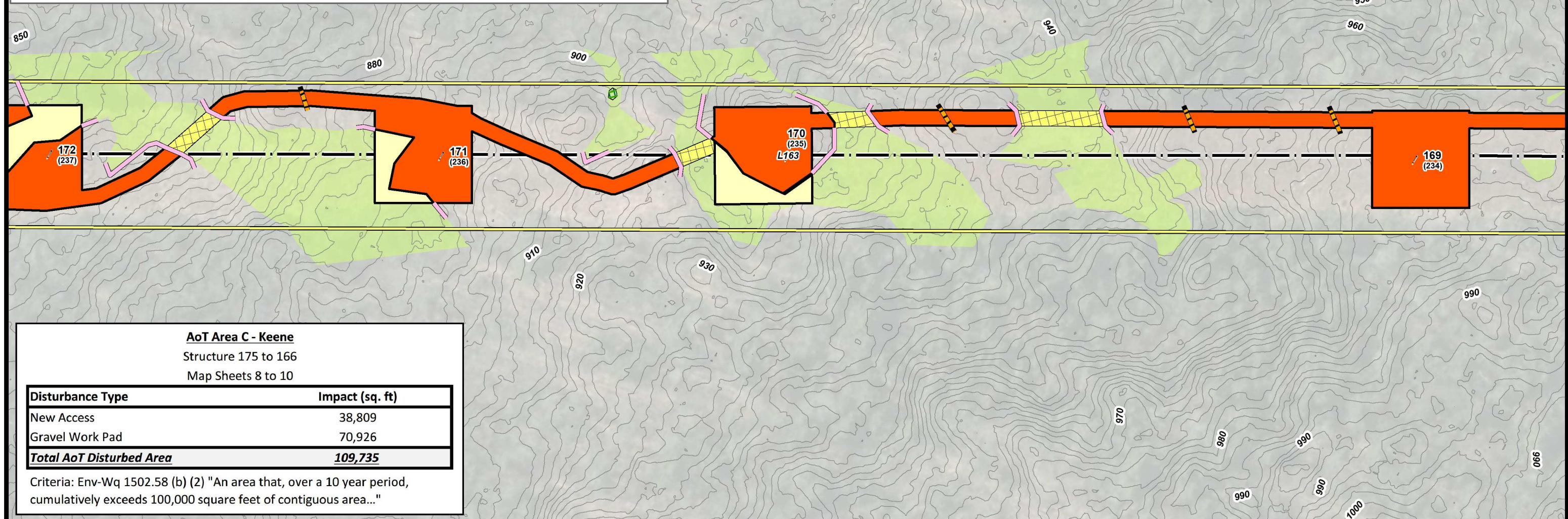
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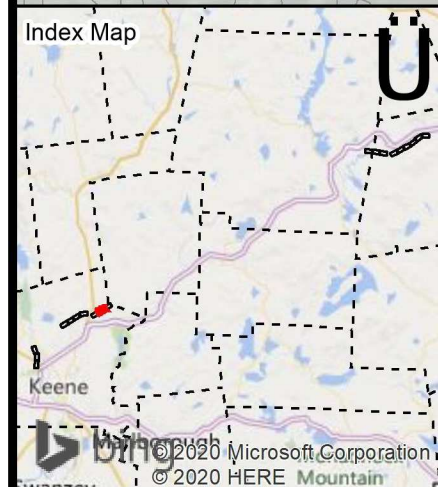
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**AoT Area C - Keene**  
Structure 175 to 166  
Map Sheets 8 to 10

Disturbance Type	Impact (sq. ft)
New Access	38,809
Gravel Work Pad	70,926
<b>Total AoT Disturbed Area</b>	<b>109,735</b>

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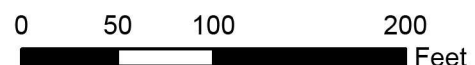


**Keene**      **Current Town: Keene**      **Hillsborough**

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- EXISTING STRUCTURE TO BE REPLACED
- EXISTING STRUCTURE TO BE WRECKED OUT
- WORK PAD
- AOT DISTURBANCE AREA
- TEMPORARY WETLAND IMPACT
- GATE
- POTENTIAL VERNAL POOL
- EVERSOURCE TRANSMISSION LINE
- APPROXIMATE ROW
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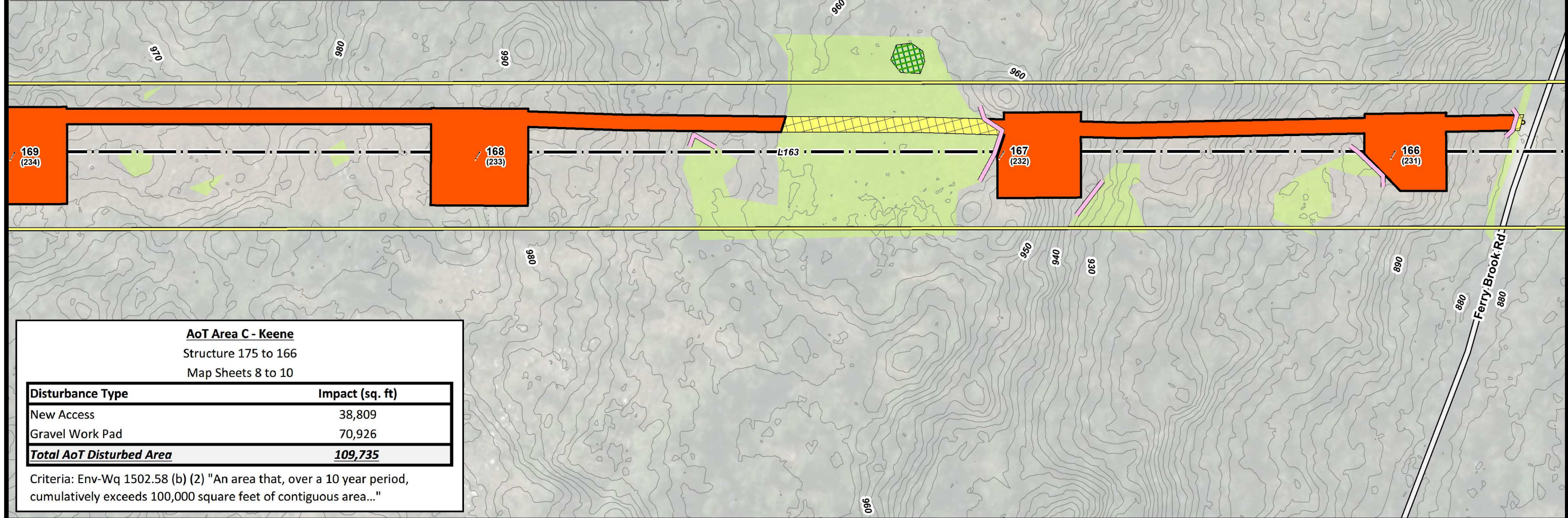
**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

ALTERATION OF TERRAIN  
PERMITTING PLANS  
APRIL 03, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 9 OF 20



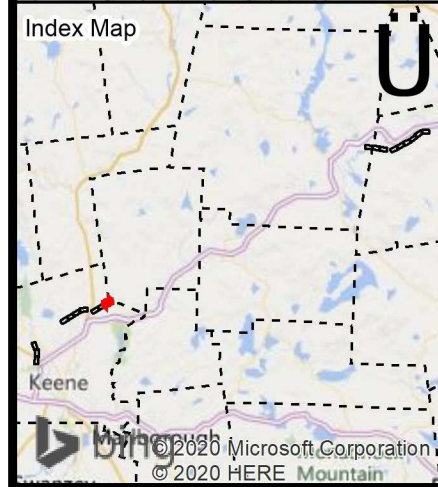
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**AoT Area C - Keene**  
Structure 175 to 166  
Map Sheets 8 to 10

Disturbance Type	Impact (sq. ft)
New Access	38,809
Gravel Work Pad	70,926
<b>Total AoT Disturbed Area</b>	<b>109,735</b>

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**Keene**      **Current Town: Keene**      **Hillsborough**

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0 50 100 200 Feet

**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

ALTERATION OF TERRAIN  
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APRIL 03, 2020

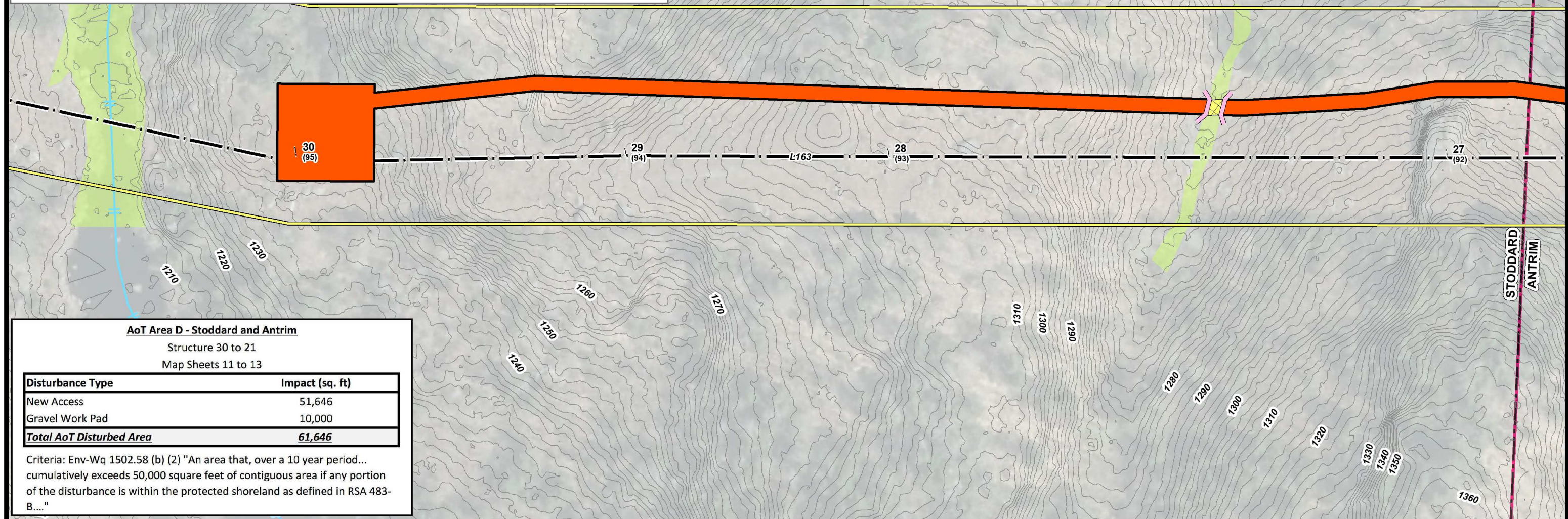
KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 10 OF 20

Project No.: 04.0190923.05      1 inch = 100 Feet

**EVERSOURCE ENERGY**

**GZA GeoEnvironmental, Inc.**  
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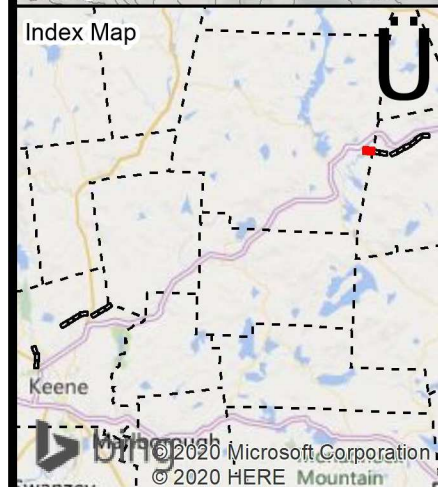
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**AoT Area D - Stoddard and Antrim**  
Structure 30 to 21  
Map Sheets 11 to 13

Disturbance Type	Impact (sq. ft)
New Access	51,646
Gravel Work Pad	10,000
<b>Total AoT Disturbed Area</b>	<b>61,646</b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period... cumulatively exceeds 50,000 square feet of contiguous area if any portion of the disturbance is within the protected shoreland as defined in RSA 483-B...."



Keene Current Town: Stoddard Hillsborough

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0 50 100 200 Feet

**L163 TRANSMISSION LINE  
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ALTERATION OF TERRAIN  
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KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 11 OF 20

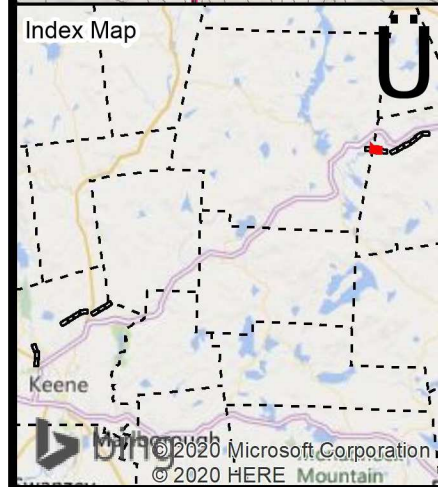
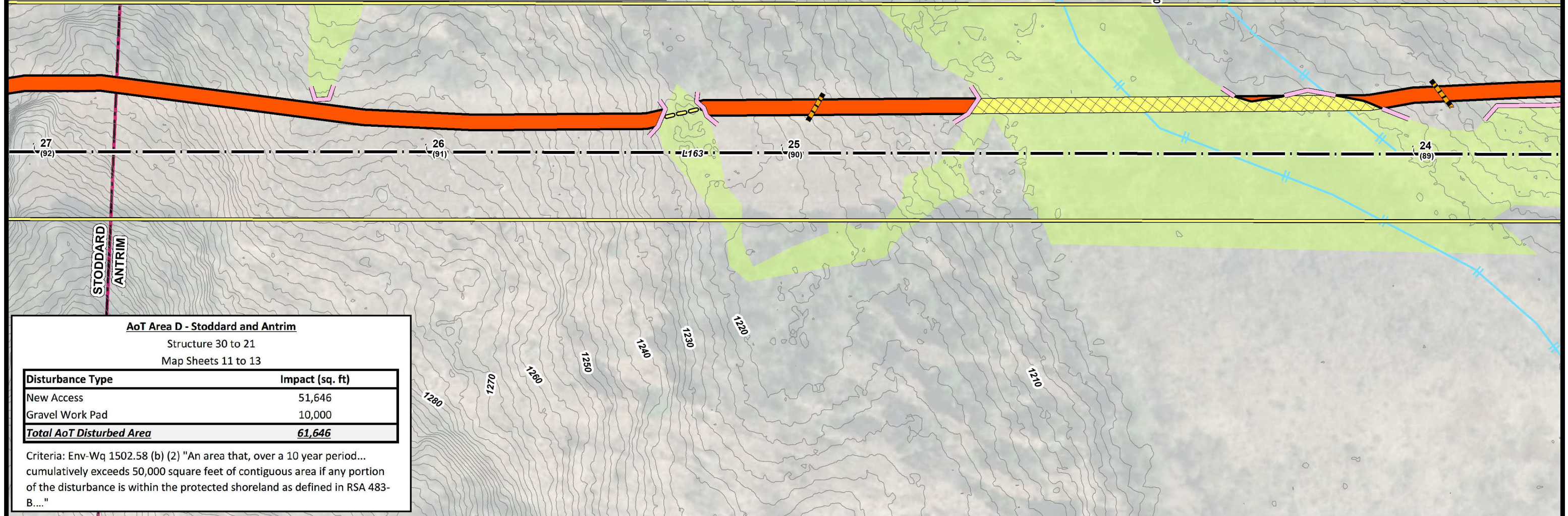
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**Keene**      **Current Town: Antrim**      **Hillsborough**

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0 50 100 200 Feet

**L163 TRANSMISSION LINE  
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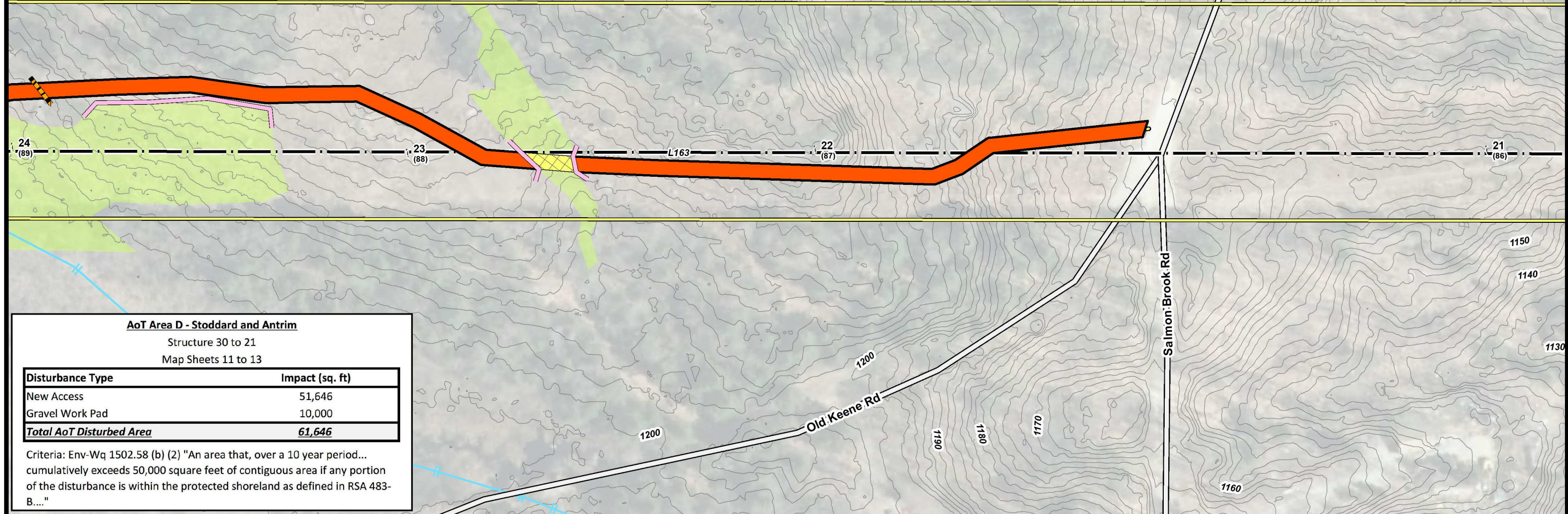
KEENE, STODDARD & ANTRIM,  
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PAGE 12 OF 20

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**AoT Area D - Stoddard and Antrim**  
Structure 30 to 21  
Map Sheets 11 to 13

Disturbance Type	Impact (sq. ft)
New Access	51,646
Gravel Work Pad	10,000
<b>Total AoT Disturbed Area</b>	<b>61,646</b>

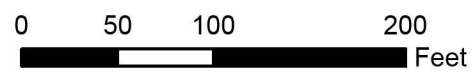
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ALTERATION OF TERRAIN  
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APRIL 03, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 13 OF 20

Project No.: 04.0190923.05

1 inch = 100 Feet



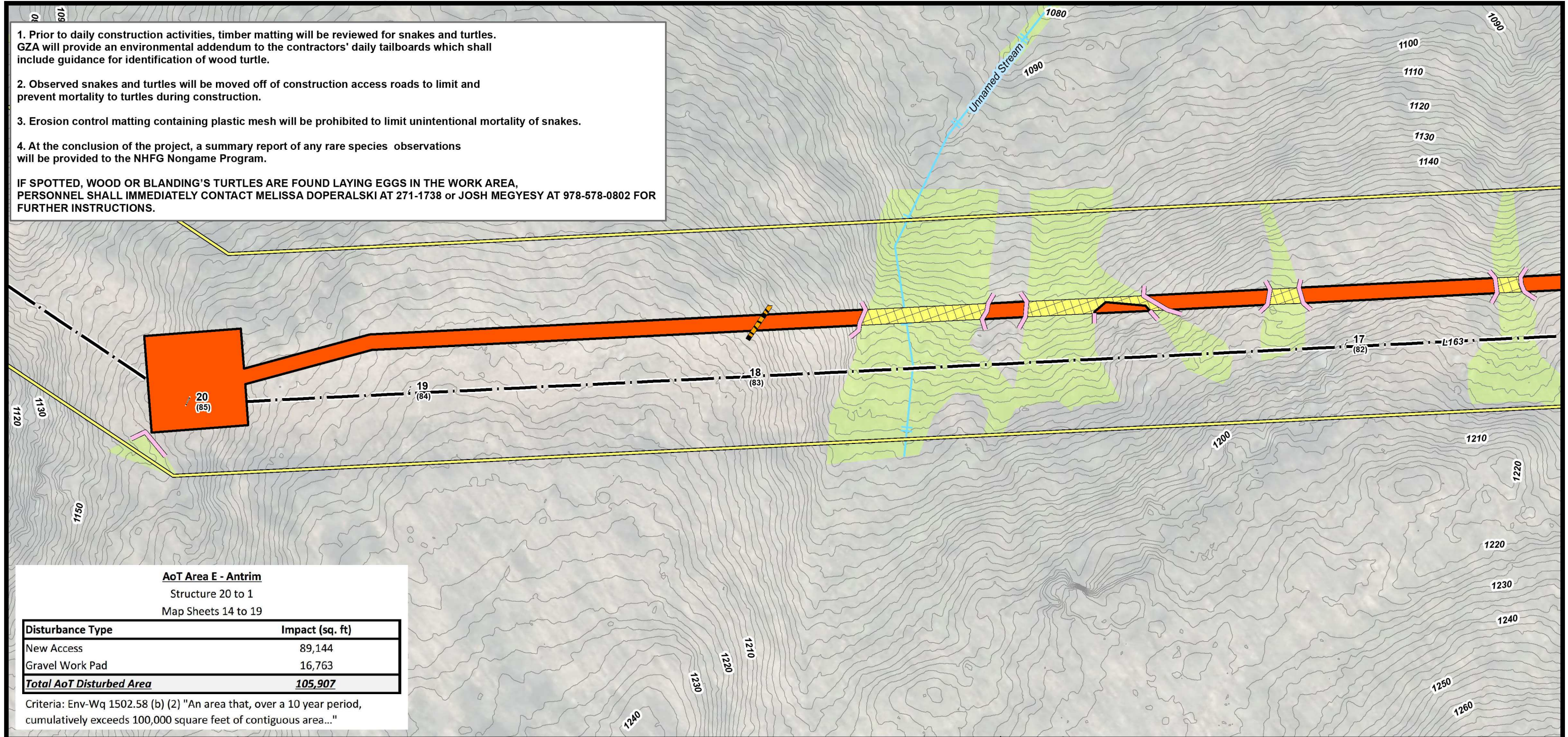
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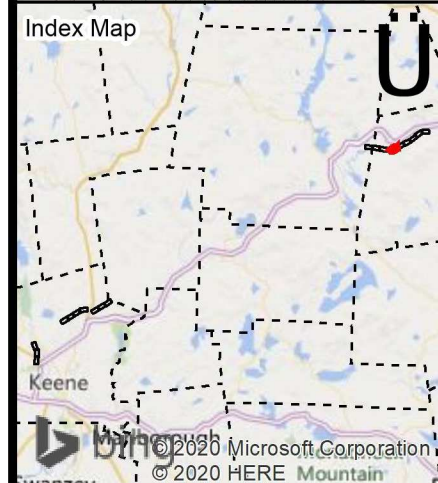
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**AoT Area E - Antrim**  
Structure 20 to 1  
Map Sheets 14 to 19

Disturbance Type	Impact (sq. ft)
New Access	89,144
Gravel Work Pad	16,763
<b>Total AoT Disturbed Area</b>	<b>105,907</b>

Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period, cumulatively exceeds 100,000 square feet of contiguous area..."



**Keene**

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- WORK PAD
- AOT DISTURBANCE AREA
- TEMPORARY WETLAND IMPACT
- GATE
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- FENCE

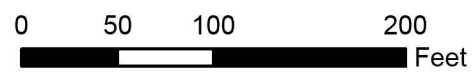
**Current Town: Antrim**

- STONE WALL
- WETLAND
- SUBSTATION
- DOT ROADS
- NHD FLOWLINE
- PRIMARY ACCESS
- SECONDARY ACCESS
- 2 FT CONTOURS
- STRAW WATTLE
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**Hillsborough**

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KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 14 OF 20

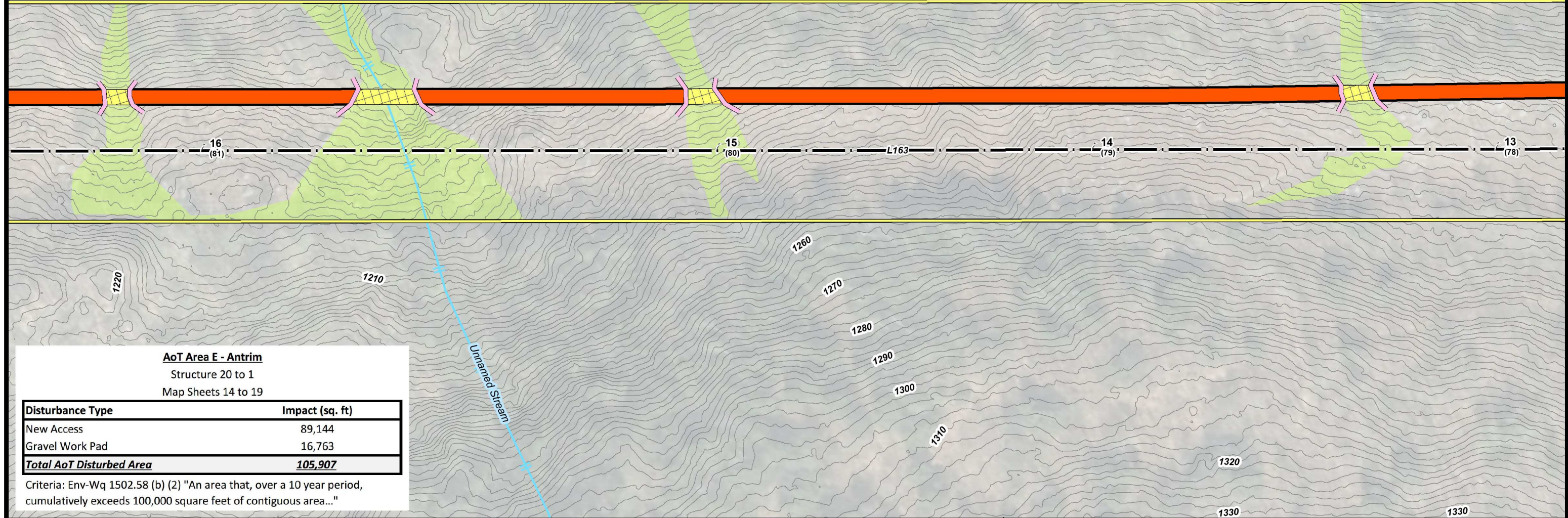
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**Keene**      **Current Town: Antrim**      **Hillsborough**

- EXISTING STRUCTURE - NO WORK PROPOSED
- EXISTING STRUCTURE TO BE REPLACED
- EXISTING STRUCTURE TO BE WRECKED OUT
- WORK PAD
- AOT DISTURBANCE AREA
- TEMPORARY WETLAND IMPACT
- GATE
- POTENTIAL VERNAL POOL
- EVERSOURCE TRANSMISSION LINE
- APPROXIMATE ROW
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- 2 FT CONTOURS
- STRAW WATTLE
- WATER BAR
- TOWN BOUNDARY

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0 50 100 200 Feet

**L163 TRANSMISSION LINE  
2020 STRUCTURE  
REPLACEMENT PROJECT**

ALTERATION OF TERRAIN  
PERMITTING PLANS  
APRIL 03, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 15 OF 20

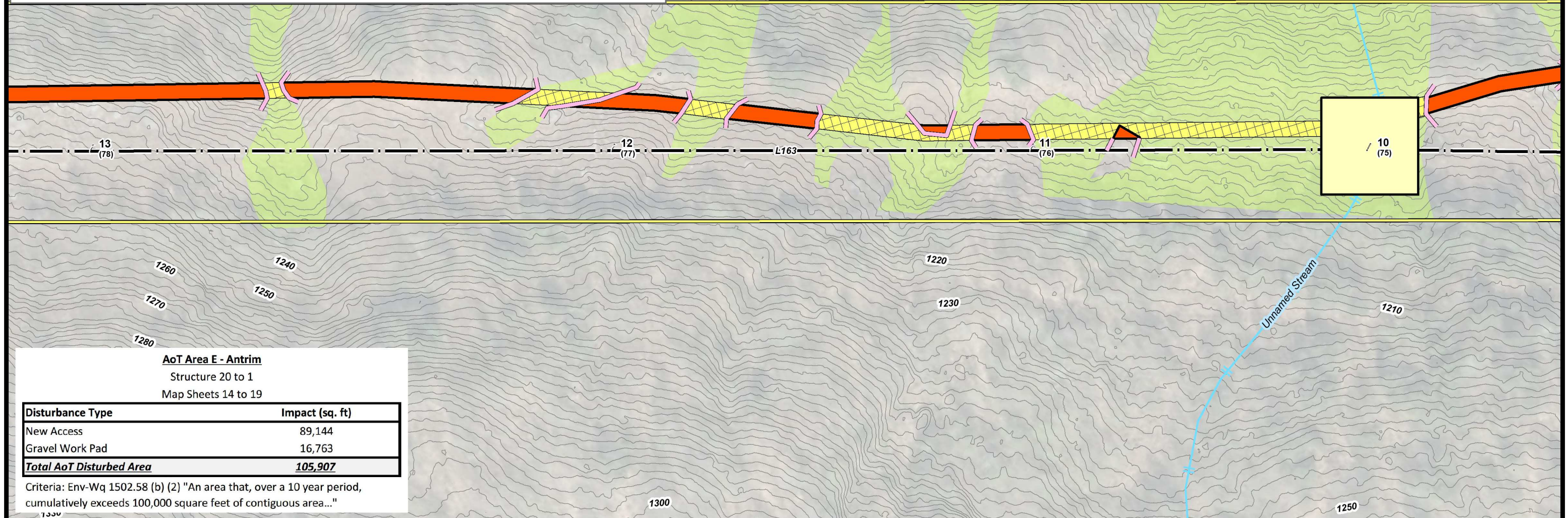
Project No.: 04.0190923.05      1 inch = 100 Feet

**EVERSOURCE ENERGY**

**GZA GeoEnvironmental, Inc.**  
Engineers and Scientists  
www.gza.com

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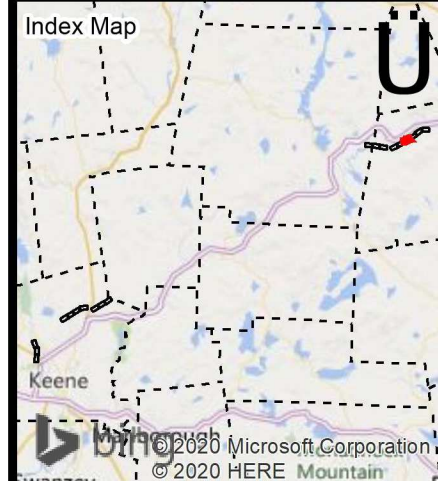
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**AoT Area E - Antrim**  
Structure 20 to 1  
Map Sheets 14 to 19

Disturbance Type	Impact (sq. ft)
New Access	89,144
Gravel Work Pad	16,763
<b>Total AoT Disturbed Area</b>	<b>105,907</b>

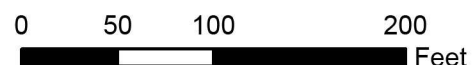
Criteria: Env-Wq 1502.58 (b) (2) "An area that, over a 10 year period, cumulatively exceeds 100,000 square feet of contiguous area..."



Keene Current Town: Antrim Hillsborough

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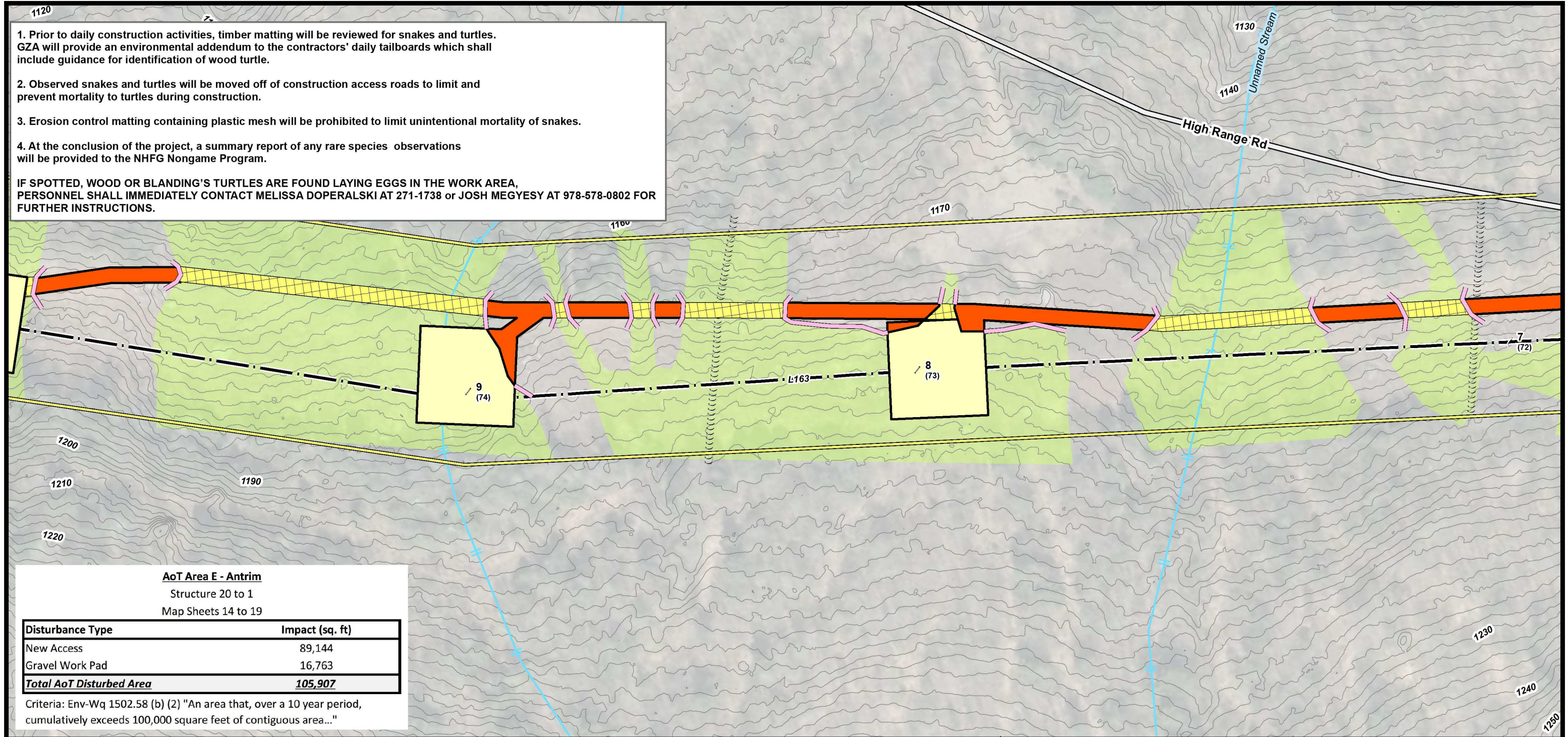
**L163 TRANSMISSION LINE  
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APRIL 03, 2020

KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 16 OF 20



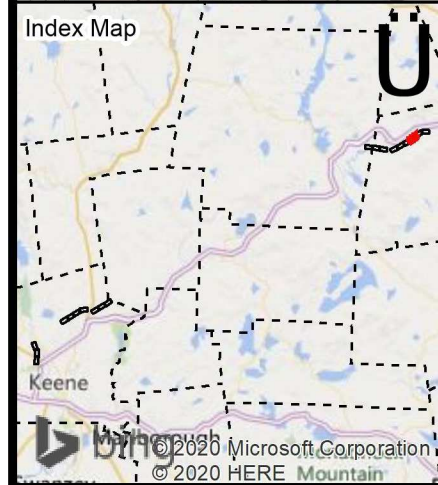
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**AoT Area E - Antrim**  
Structure 20 to 1  
Map Sheets 14 to 19

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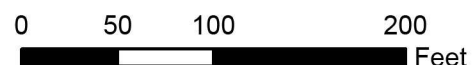
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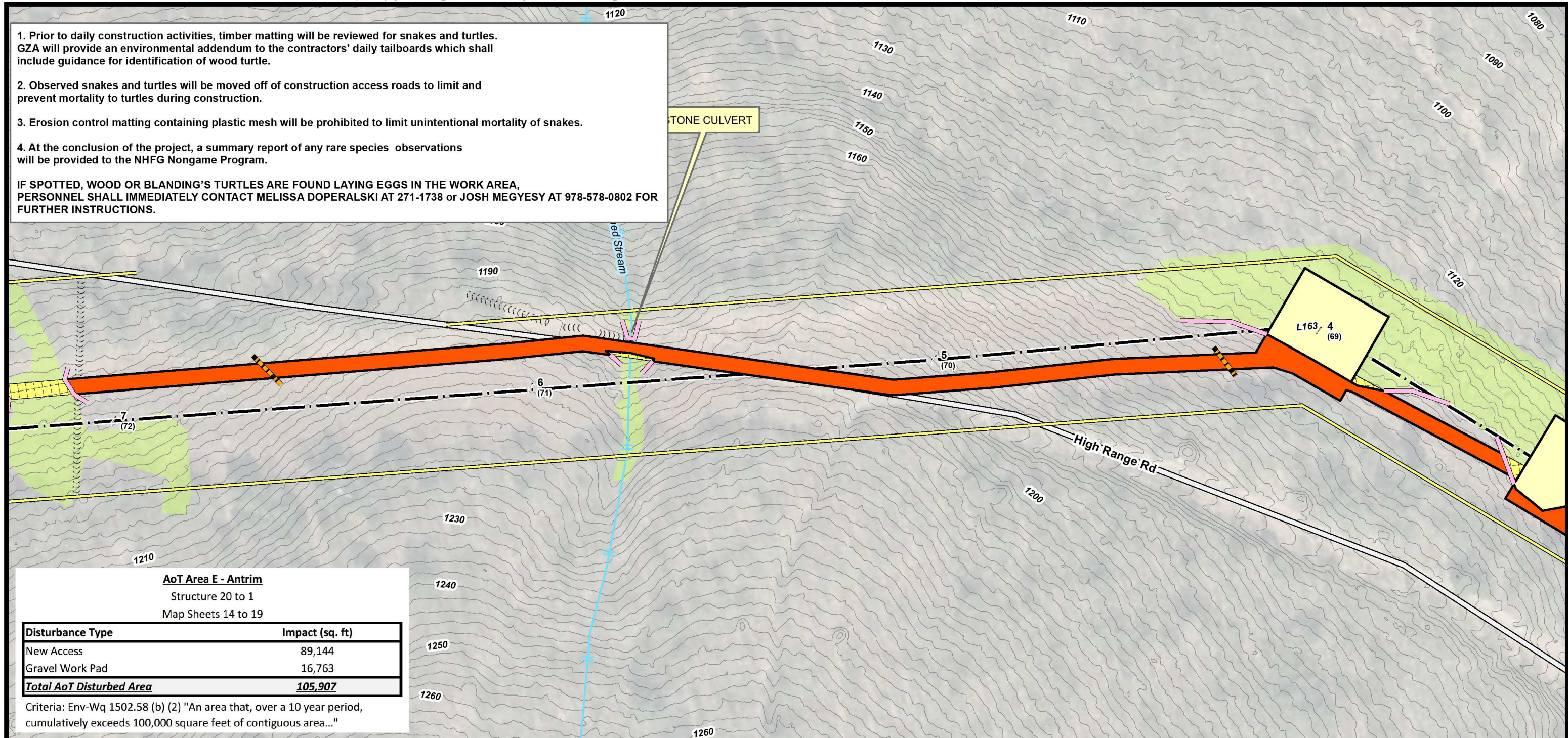
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KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 17 OF 20



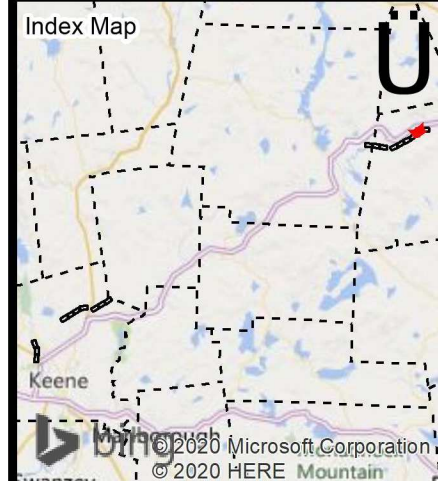
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**AoT Area E - Antrim**  
 Structure 20 to 1  
 Map Sheets 14 to 19

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Gravel Work Pad	16,763
<b>Total AoT Disturbed Area</b>	<b>105,907</b>

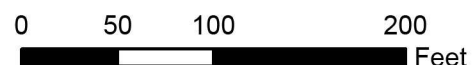
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Keene Current Town: Antrim Hillsborough

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 APRIL 03, 2020

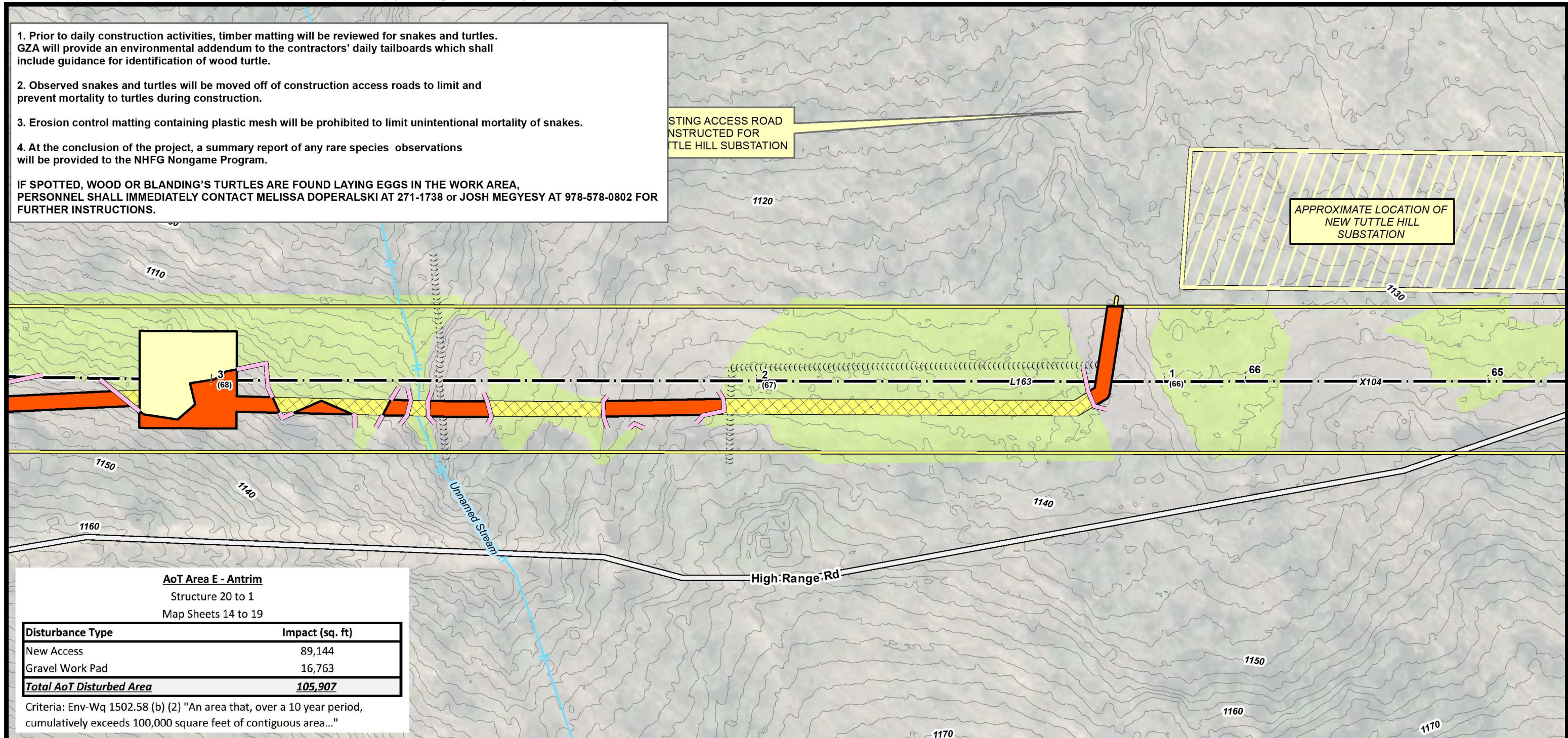
KEENE, STODDARD & ANTRIM,  
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STING ACCESS ROAD  
NSTRUCTURED FOR  
TTLE HILL SUBSTATION

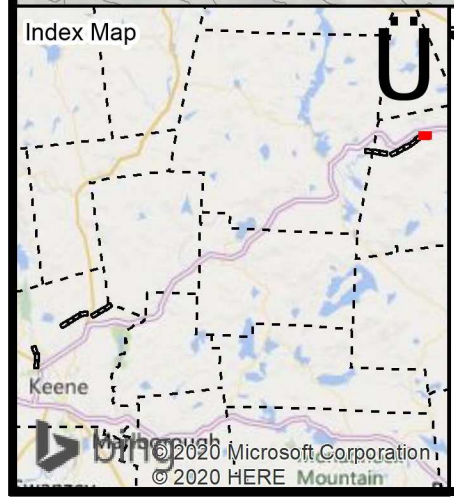
APPROXIMATE LOCATION OF  
NEW TUTTLE HILL  
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**AoT Area E - Antrim**  
Structure 20 to 1  
Map Sheets 14 to 19

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Gravel Work Pad	16,763
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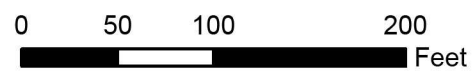
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KEENE, STODDARD & ANTRIM,  
NEW HAMPSHIRE  
PAGE 19 OF 20

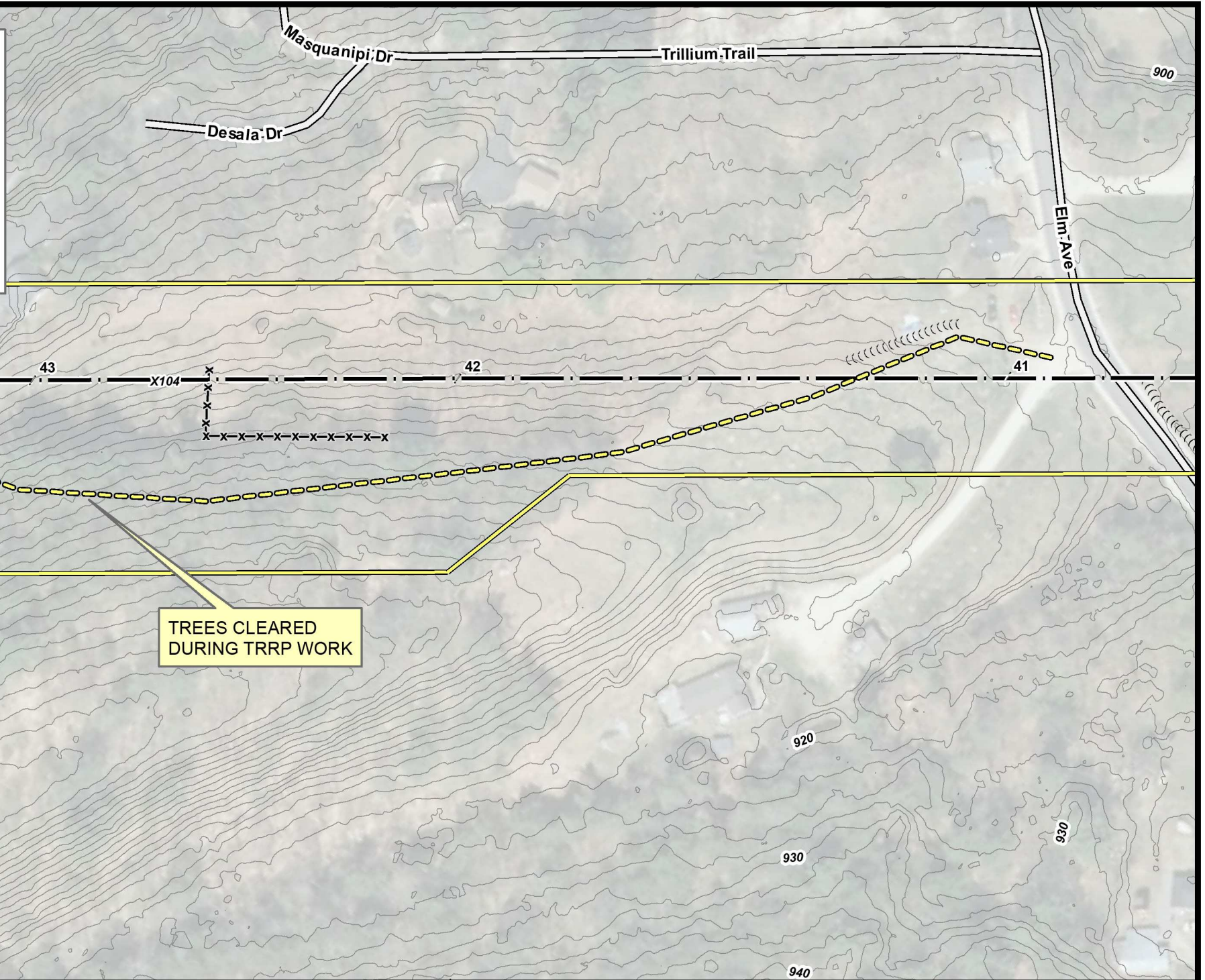
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**AoT Area F- Antrim**  
Structure 44  
Map Sheet 20

Disturbance Type	Impact (sq. ft)
New Access	0
Gravel Work Pad	7,858
<b>Total AoT Disturbed Area</b>	<b>7,858</b>

Criteria: Env-Wq 1502.58 (b) (1) "An area that: Is more than 2,500 square feet in size; Is within 50 feet of any surface water; Is sloped such that runoff is in the direction of the surface water; and Is subject to runoff over 50 feet or more of land having a grade of 25% or greater when measured at 2-foot intervals..."



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0 50 100 200 Feet

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PAGE 20 OF 20

Project No.: 04.0190923.05

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1 inch = 100 Feet

© 2020 - GZA GeoEnvironmental, Inc. P:\04 Jobs\0190923\04\_0190923\00 - Eversource MSA\04\_0190923\05 - L163 Transmission Line - Structure Reprint Proj\Figures\GIS 2019\_2020\MXD\L163 AOT NOTESHEET 1.mxd, 1/16/2020, 10:55:52 AM, matthew.deane

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 WITHIN THE RIGHT OF WAY. CONSTRUCTION ACTIVITIES SHALL OCCUR DURING PERIODS OF LOW FLOW.
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. ALL OPERATIONS SHALL BE CONFINED TO THE SPECIFIED ACCESS ROUTES WITHIN THE PROPOSED WETLAND IMPACT AREA. ALL ACCESS ROUTES SHALL NOT EXCEED A 16 FOOT-WIDTH.
7. IMPACT TO VEGETATION WITHIN WETLANDS WILL BE LIMITED TO THE EXTENT NECESSARY TO PLACE THE SWAMP MATS WHERE REQUIRED.
8. ALL 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 EXCAVATIONS IS NEEDED FOR ACCESS.
9. SWAMP MATS WILL BE USED ALONG ALL 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 SWAMP MAT BMP IS NOT SUFFICIENT DUE TO HIGH WATER, ADDITIONAL BMP'S MAY INCLUDE THE PLACEMENT OF GEOTEXTILE FABRIC, 3"-4" STONE, AND GRAVEL TO PROVIDE A SUITABLE ROAD BED. A TEMPORARY CULVERT MAY BE REQUIRED IN AREAS OF HIGH FLOW 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 OR FOUNDATION PLACEMENT OR STABILIZATION. ALL EXCESS MATERIAL TAKEN FROM THE WETLAND WILL BE REMOVED FROM THE SITE.
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.
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. REMOVAL OF THE OLD POLE WILL OCCUR ONCE THE CABLE HAS BEEN INSTALLED ON THE NEW STRUCTURE. THE OLD STRUCTURES WILL BE REMOVED FROM THE SITE. POLES WILL BE CUT AT THE GROUND SURFACE. FOOTINGS WILL BE ABANDONED IN PLACE TO MINIMIZE IMPACTS.
17. ALL SWAMP MATS, MATERIAL, AND DEBRIS WILL BE REMOVED FROM THE WORK AREA UPON THE COMPLETION OF CONSTRUCTION.
18. 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.
19. ALL TEMPORARY WETLAND IMPACTS WILL BE RE-GRADED TO ORIGINAL CONTOURS FOLLOWING CONSTRUCTION. NEW ENGLAND EROSION CONTROL/RESTORATION MIX, AVAILABLE THROUGH NEW ENGLAND WETLAND PLANTS, INC., 820 WEST STREET, AMHERST, MA 01002, 413-548-8000, OR EQUIVALENT SEED MIX SHALL BE APPLIED IN WETLAND AREAS THAT ARE NOT INUNDATED, AS NECESSARY.
20. SEDIMENT AND EROSION CONTROL MEASURES WILL BE EVALUATED AND REMOVED IF NECESSARY UPON THE COMPLETION OF CONSTRUCTION.

WINTER CONSTRUCTION NOTES

1. ALL 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. ALL 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: EVERSOURCE ENERGY  
13 LEGENDS DRIVE  
HOOKSETT, NH 03106

1. BASE PLAN PROVIDED BY EVERSOURCE ENERGY. EVERSOURCE ENERGY PROVIDED THE WETLAND DATA. EVERSOURCE ENERGY PROVIDED THE UTILITY DESIGN.
2. JURISDICTIONAL WETLANDS WERE DELINEATED BY TIGHE AND BOND IN 2018, 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. WETLANDS WERE REVIEWED BY GZA GEOENVIRONMENTAL, INC. IN JANUARY AND FEBRUARY 2019.
3. GZA EVALUATED WETLANDS AS POTENTIAL VERNAL POOLS ON FEBRUARY 6, 12, AND 15, 2019 IN ACCORDANCE WITH "IDENTIFICATION AND DOCUMENTATION OF VERNAL POOLS IN NEW HAMPSHIRE," 1997, NEW HAMPSHIRE FISH AND GAME DEPARTMENT, NONGAME AND ANDANGERED WILDLIFE PROGRAM.
4. GZA PERFORMED A WETLANDS FUNCTION AND VALUES ASSESSMENT IN ACCORDANCE WITH THE ACOE'S "HIGHWAY METHODOLOGY WORKBOOK SUPPLEMENT," SEPTEMBER 1999, IN THE TOWN OF STRAFFORD.
5. SITE PLAN IS FOR PERMITTING PURPOSES ONLY AND DOES NOT REPRESENT A PROPERTY BOUNDARY SURVEY.
6. 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.
7. 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.
8. ALL AREAS SHALL BE STABILIZED WITH 45 DAYS OF INITIAL DISTURBANCE.

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 AGAINST EROSION, AS NECESSARY.
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.

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L163 TRANSMISSION LINE STRUCTURE REPLACEMENT PROJECT

KEENE, STODDARD, AND ANTRIM  
NEW HAMPSHIRE

NOTES

PREPARED BY:  <b>GZA</b> GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR:  <b>EVSOURCE</b> ENERGY	
PROJ MGR: AJD	REVIEWED BY: LEW	CHECKED BY: DMZ	SHEET <b>1</b> 1 OF 3
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE:	
DATE: 01/16/2020	PROJECT NO: 04.0190923.05	REVISION NO:	

© 2020 - GZA GeoEnvironmental, Inc. P:\04\jobs\01909023\04\_0190923\_00 - Eversource MSA\04\_0190923\_05 - L163 Transmission Line - Structure Reprint Proj\Figures\GIS\2019\_2020\MXD\L163 AOT NOTESHEET 2 - BMPs.mxd, 1/16/2020, 10:58:12 AM, matthew.deane

### Best Management Practices (BMP's) for Straw wattles

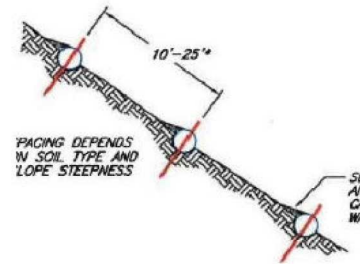
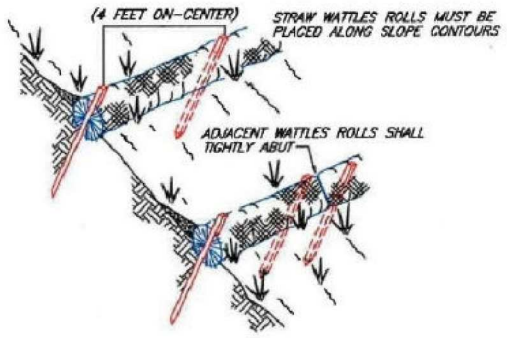
**Definition and purpose:**  
Straw wattles are burlap rolls filled with straw that trap sediment and interrupt water flow by reducing slope lengths.

- Applications:**
- \* Along erodible or unstabilized slopes
  - \* Spread overland waterflow
  - \* Trap sediment
  - \* Around storm drain inlets to slow water and settle out sediment
  - \* Overlap ends approximately 6 inches

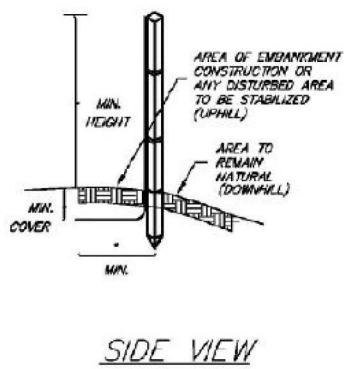
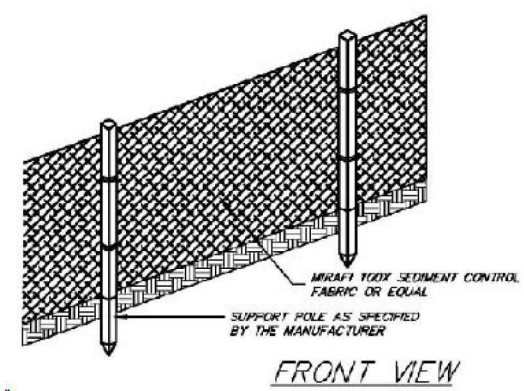
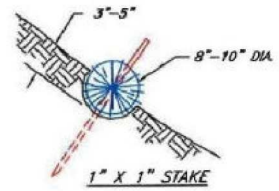
**Installation:**  
Straw wattles are installed parallel to slope contours and perpendicular to sheet flow.

**Spacing\*** - Dependent on slope length, soil steepness and soil type (general range 10 - 25').

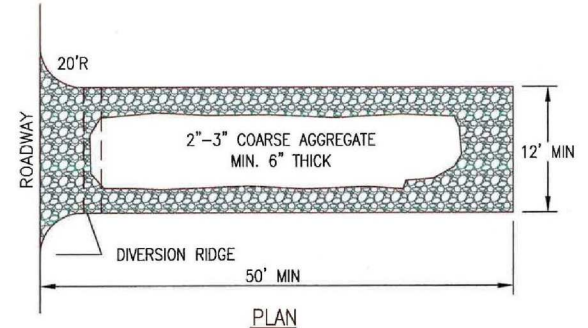
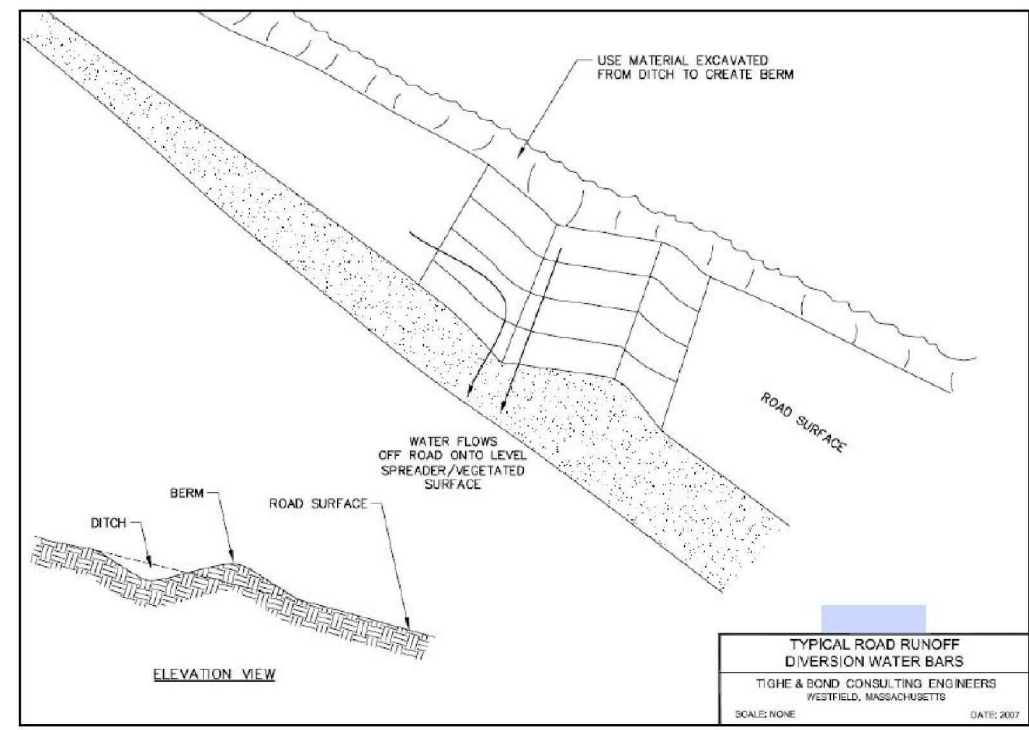
**Trenching** - 2"-5" inch trench  
**Stacking** - at each end and four foot on center (i.e. 25 foot wattle uses 6 stacks)



SEDIMENT, ORGANIC MATTER, AND NATIVE SEEDS ARE CAPTURED BEHIND THE WATTLE ROWS.



- NOTES (SILT FENCE)**
1. THE HEIGHT OF THE BARRIER SHALL NOT EXCEED 36 INCHES.
  2. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6-INCH OVERLAP, AND SECURELY SEALED. SEE MANUFACTURER'S RECOMMENDATIONS.
  3. POSTS SHALL BE PLACED AT A MAXIMUM OF 10 FEET APART AT THE BARRIER LOCATION AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 12 INCHES). WHEN EXTRA STRENGTH FABRIC IS USED WITHOUT THE WIRE SUPPORT FENCE, POST SPACING SHALL BE AS MANUFACTURER RECOMMENDS.
  4. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 6 INCHES WIDE AND 6 INCHES DEEP ALONG THE LINE OF POSTS AND UPSLOPE OF THE BARRIER IN ACCORDANCE WITH RECOMMENDATIONS
  5. THE FABRIC SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE, AND WILL EXTEND A MINIMUM OF 8 INCHES INTO THE TRENCH. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
  6. THE TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE FILTER FABRIC.
  7. FABRIC BARRIERS SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.
  8. FILTER BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST ONCE DAILY DURING PROLONGED RAINFALL AND ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
  9. SHOULD THE FABRIC DECOMPOSE OR BECOME INEFFECTIVE PRIOR TO THE END OF THE EXPECTED USABLE LIFE AND THE BARRIER STILL BE NECESSARY, THE FABRIC SHALL BE REPLACED PROMPTLY.
  10. SEDIMENT DEPOSITS SHOULD BE REMOVED WHEN THEY REACH APPROXIMATELY ONE-HALF THE HEIGHT OF THE BARRIER.
  11. ANY SEDIMENT DEPOSITS REMAINING IN PLACE AFTER THE SILT FENCE OR FILTER BARRIER IS NO LONGER REQUIRED SHALL BE DRESSED TO CONFORM TO THE EXISTING GRADE, PREPARED AND SEEDED.



- NOTES:**
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
  2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.

### CONSTRUCTION ENTRANCE

NOT TO SCALE

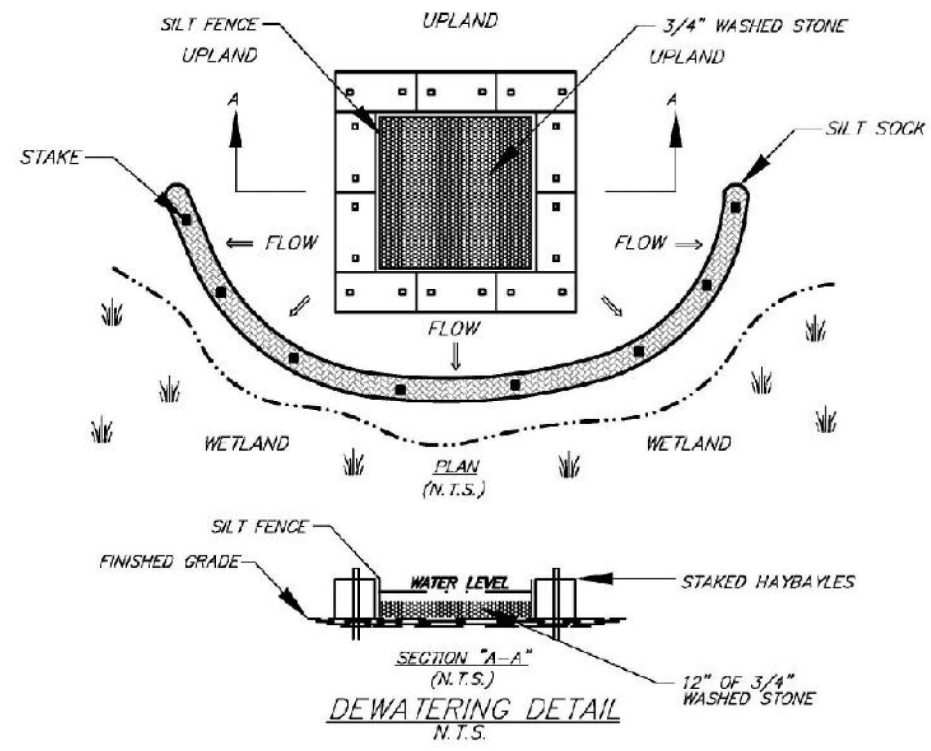
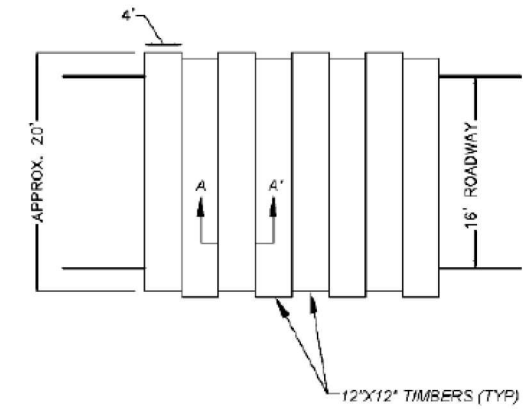
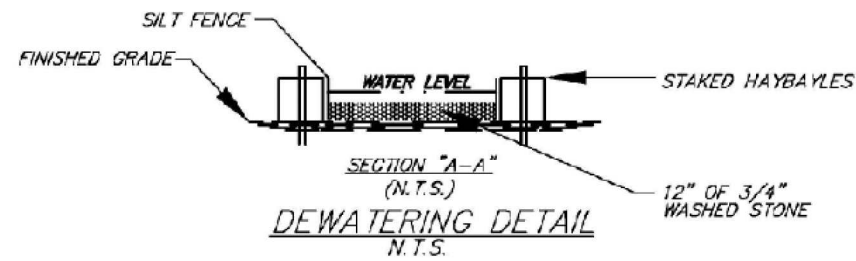
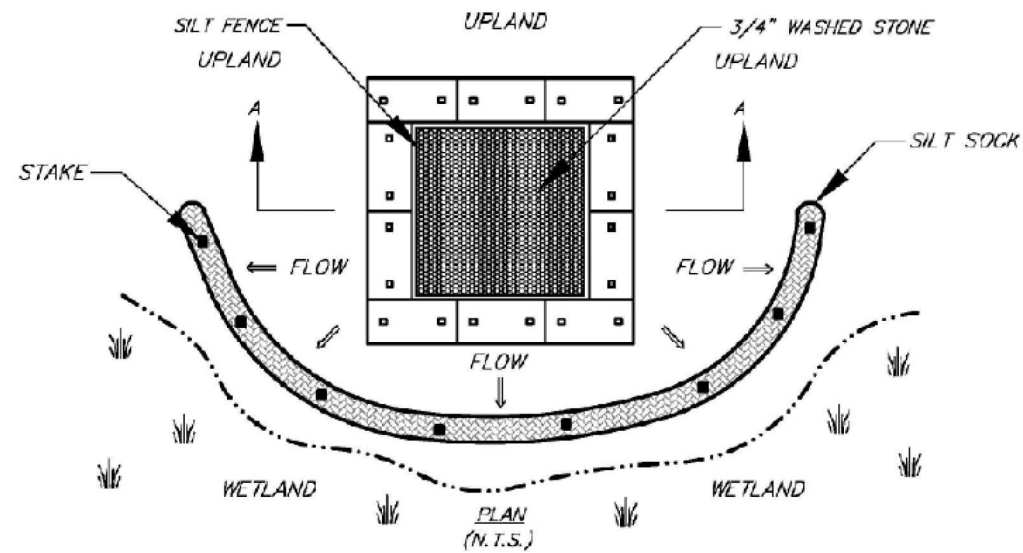


Figure 5

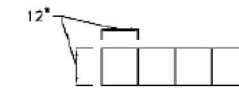
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<b>L163 TRANSMISSION LINE STRUCTURE REPLACEMENT PROJECT</b>			
KEENE, STODDARD, AND ANTRIM NEW HAMPSHIRE			
<b>BMP DETAILS</b>			
PREPARED BY: <b>GZA</b> GeoEnvironmental, Inc. Engineers and Scientists www.gza.com	PREPARED FOR: <b>EVERSOURCE</b> ENERGY		
PROJ MGR: AJD	REVIEWED BY: LEW	CHECKED BY: DMZ	<b>SHEET</b>  <b>2</b>
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE:	
DATE: 01/16/2020	PROJECT NO: 04.0190923.05	REVISION NO:	



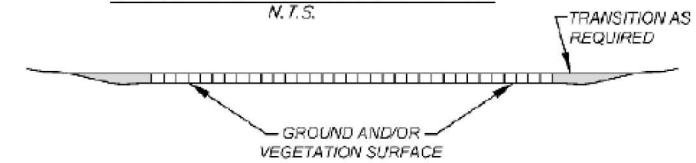
© 2020 - GZA GeoEnvironmental, Inc. P:\04\jobs\0190923\04\_0190923\_00 - E:\source\MSA\04\_0190923\_05 - L163 Transmission Line - Structure Replmt Proj\Figures\GIS\2019\_2020\MXD\L163 AOT NOTESHEET 3- BMPs 2.mxd, 1/16/2020, 10:57:09 AM, matthew.deane



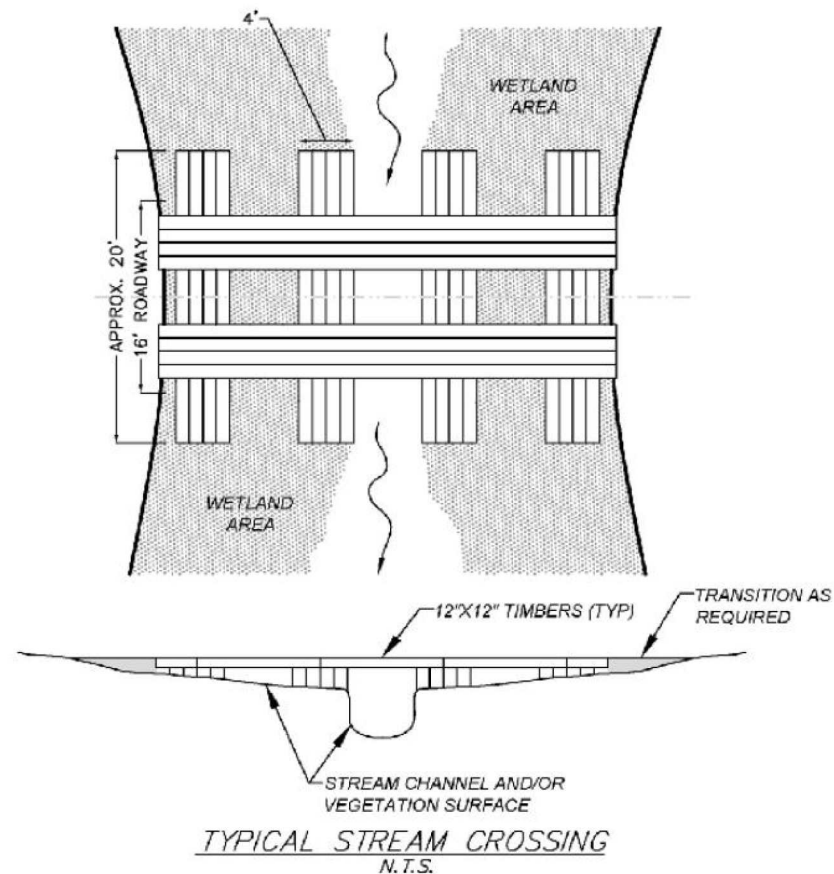
TYPICAL SWAMP MAT PLAN VIEW  
N.T.S.



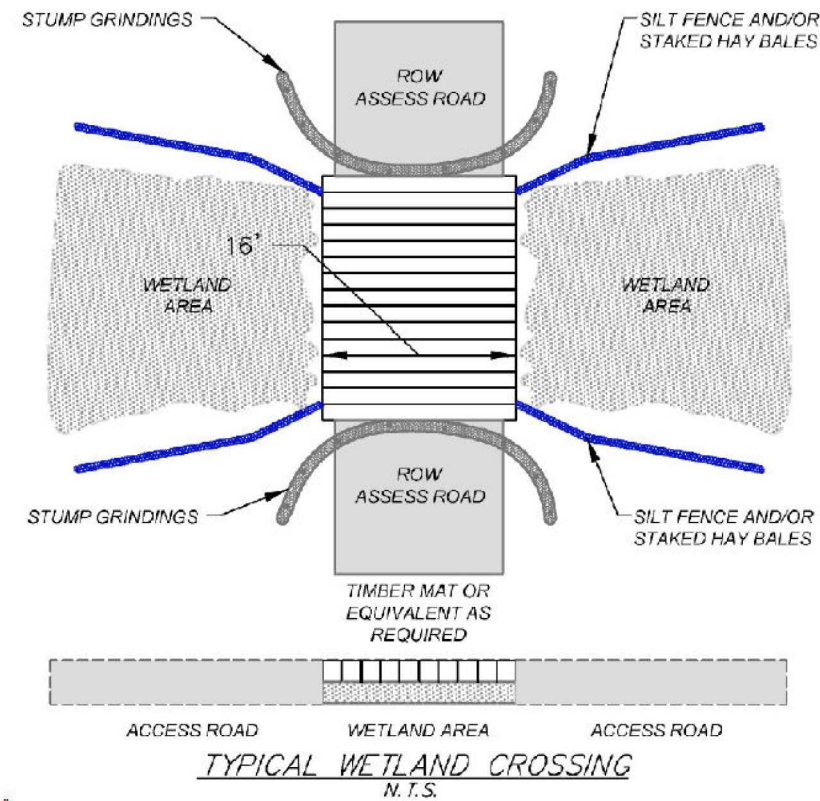
TYPICAL MAT SECTION A-A  
N.T.S.



TYPICAL SWAMP MAT SECTION DETAIL  
N.T.S.



TYPICAL STREAM CROSSING  
N.T.S.



TYPICAL WETLAND CROSSING  
N.T.S.

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L163 TRANSMISSION LINE STRUCTURE REPLACEMENT PROJECT

KEENE, STODDARD, AND ANTRIM  
NEW HAMPSHIRE

BMP DETAILS

PREPARED BY:  
**GZA** GeoEnvironmental, Inc.  
Engineers and Scientists  
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PREPARED FOR:  
**EVERSOURCE**  
ENERGY

PROJ MGR: AJD	REVIEWED BY: LEW	CHECKED BY: DMZ	SHEET <b>3</b>
DESIGNED BY: MJD	DRAWN BY: MJD	SCALE:	
DATE: 01/16/2020	PROJECT NO. 04.0190923.05	REVISION NO.	

# Redaction Log

Total Number of Redactions in Document: 5

## Redaction Reasons by Page

Page	Reason	Description	Occurrences
82	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
83	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
84	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
85	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
86	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

# Redaction Log

## Redaction Reasons by Exemption

Reason	Description	Pages (Count)
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.	82(1) 83(1) 84(1) 85(1) 86(1)